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TAJUK PROJEK :

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Dynamic Scheduling in a Multi-Product Manufacturing System

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#### (Keywords: dynamic scheduling, job shop, ANN model, simulation scheduling)

To remain competitive in global marketplace, manufacturing companies need to improve their operational practices. One of the methods to increase competitiveness in manufacturing is by implementing proper scheduling system. This is important to enable job orders to be completed on time, minimize waiting time and maximize utilization of equipment and machineries. The dynamics of real manufacturing system are very complex in nature. Schedules developed based on deterministic algorithms are unable to effectively deal with uncertainties in demand and capacity. Significant differences can be found between planned schedules and actual schedule implementation. This study attempted to develop a scheduling system that is able to react quickly and reliably for accommodating changes in product demand and manufacturing capacity. A case study, 6 by 6 job shop scheduling problem was adapted with uncertainty elements added to the data sets. A simulation model was designed and implemented using ARENA simulation package to generate various job shop scheduling scenarios. Their performances were evaluated using scheduling rules, namely, first-in-first-out (FIFO), earliest due date (EDD), and shortest processing time (SPT). An artificial neural network (ANN) model was developed and trained using various scheduling scenarios generated by ARENA simulation. The experimental results suggest that the ANN scheduling model can provided moderately reliable prediction results for limited scenarios when predicting the number completed jobs, maximum flowtime, average machine utilization, and average length of queue. This study has provided better understanding on the effects of changes in demand and capacity on the job shop schedules. Areas for further study includes: (i) Fine tune the proposed ANN scheduling model (ii) Consider more variety of job shop environment (iii) Incorporate an expert system for interpretation of results. The theoretical framework proposed in this study can be used as a basis for further investigation.

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## **CHAPTER 1**

## **INTRODUCTION**

## **1.1** Background of the problem

The effect of globalization in every sector of the country, such as economic, information technology, communication, transportation, etc. has directly heightened customer expectation. Today's customers expect to be delighted with customized quality, lower price, time delivery, and service satisfaction. These situations have forced manufacturers to adapt changes in technology, among others, automated, flexibility and integrated system, rapid and short run manufacturing have been improved to respond customer expectation (Hassan, 2002). Figure 1.1 summarizes the background of the problems. Frequent changes due to the above mentioned factors have meant frequent rescheduling of production operation. Flexibility in reacting to changes in production scheduling has become an important attribute of modern manufacturing system.

One method of increasing the productivity of a manufacturing is by proper production scheduling of the jobs on the available machines/resources so that a high percentage of orders can be completed on time, average waiting time of orders minimized and utilization of the equipment maximized. The production schedulers (people who make scheduling) have to make a production schedule to meet shorten production lead time, to reduce work-in-process (WIP) inventory and to improve machine utilization. Even if he/she has special knowledge and experience for shop floor control, the scheduling job is much too complicated and time-consuming. To solve these problems, schedulers have to use more effective and interactive production schedules.



Figure 1.1: Background of the problems.

There is always some degree of uncertainty present in the real manufacturing environment that can affect the reliability of any production schedule. When these dynamic events occur, the current schedule that uses some static assumption will no longer be considered optimal. Therefore, robust scheduling systems are desirable to be used in the manufacturing process.

The dynamics of real manufacturing system are very complex in nature. Schedule based on deterministic algorithms fail to deal with any disturbances, such uncertainties as changes in demand and capacity. Significant differences can be found between planned schedules and actual process in progress. Based on this background, this study attempted to develop a production scheduling system that is able to react quickly, reliably, and can accommodate changes in demand and capacity.

#### **1.2** Statement of the problem

Although most manufacturing scheduling problems are dynamic and stochastic in nature, the majority of available scheduling techniques are based on static and deterministic conditions. This is partly due to the difficulty in formulating and solving dynamic problems analytically. As a consequence, the solutions obtained from the traditional scheduling technique fail wherever changes occur to the system (Vieira, 2000).

Changes in manufacturing system can be defined as deviations which occur during production that cause such systems to behave differently from what is expected (Pendharkar, 1999). Changes can cause the scheduling system to perform its function either incorrectly or inefficiently. As a result, the changes can eventually prevent the system from accomplishing its objective or delivering products to customer on time. Changes in manufacturing can be classified into two broad categories (Vieira, 2000); (i) changes in demand, such as rush job, job cancellation by customer and changes in master production schedule, (ii) changes in capacity, such as unplanned machine breakdowns, illness of manpower and maintenance. Managing such changes is becoming critical in the era of time-based competition. For example, if a schedule is generated without considering possible orders in the future, new orders of significant urgency may interrupt those already scheduled, causing serious violation of their promised delivery dates. When this dynamic event occurs, the current schedule that uses some static assumption is no longer optimal.

## **1.3** Objectives of the Study

The research objectives are listed as below:

- To compare effectiveness of various scheduling rules in dynamic job shop scheduling.
- (ii) To develop a decision support model for enabling analysis of dynamic scheduling of job shops under conditions of changing demand and/or capacity.

#### **1.4** Scope of the study

The scope of research is limited to job shops, when jobs arrive in the shop in a dynamic and random manner to the scheduler.

- The study is limited to discrete products.
- Focusing on small and medium industries (SMI).
- The performance measures are limited to three: (i) minimization of the makespan, (ii) minimization of average tardiness and (iii) minimization of percentage number of tardy jobs

## **1.5** Importance of the study

The study is important and significant both from the theoretical and practical view point. The rationale and motivation for this study are:

- (i). Traditionally, majority of current scheduling research assume static and deterministic condition, whereas, real manufacturing system are dynamic and stochastic in nature.
- (ii). This study addresses small and medium sized industries, and aimed at non-specialist scheduler. Such people normally built a schedule from scratch to address a particular job, and then it is often discarded/

forgotten. This approach is very expensive, time consuming, and wasteful. There is a need for a schedule system that retains and builds on existing knowledge and be used as a predictive tool when unforeseen and dynamic changes occur to the manufacturing system

#### **1.6** Organization of the Report

This report is organized into 6 chapters. Chapter 1 serve as an essential introduction to the research. Chapter 1 provides background information and a review of related literature that leads to the formulation of this report. Chapter 1 describes the research methodology and its rationale. Chapter 4 describes models development. Chapter 5 presents the data result and discussion. Chapter 5 provides an overall conclusion and suggestions for future research.

#### **CHAPTER 2**

## LITERATURE REVIEW

### 2.1 Scheduling

#### 2.1.1. Introduction

Scheduling deals with the allocation of scarce resources to task over time. It is a decision-making process with the goal of optimizing one or more objectives (Pinedo, 2002). Scheduling is important issue in management of organizations because it determines the cost and services reputation of the company with respect to the competition. The need to respond to market demand quickly and run plants efficiently raises complex scheduling problems in almost all but the simplest production environments.

The theory of scheduling has received significant attention since its beginning in the early 1950. A representative, although not complete, list of the most important survey on the field are: (Graves, 1981), ( Sen and Gupta, 1984) (Ramashes, 1990), (Sevastjanov, 1994), (Nagar, 1995), (Blazewick *et al.*, 1996) (Hall, 1996), (Drexl, 1997), (Mokotoff, 2001) and (Raheja and Subramaniam, 2002), (Lee *et. al*, 1997). Table 2.1 provides a brief summary of the topics covered by each article, while Table 2.2 classifies the articles by topics.

In additional, (Conway, *et al.*, 1967), (Baker, 1974) ), (Rinooy Kan, 1979), (Gupta, 1981), (French, 1982), (Blazewicz, *et al*, 1993), (Brucker, 1995), (Jordan, 1996), (Kimms, 1997), (Pinedo, 2002), and (Cottet, 2002) are book containing most of the basic theoretical knowledge accumulated to date. Partly under the influence of

Conway *et al.*, (1967), the activities to be scheduled are represented by job and the resources by machine. Thus, the scheduling problem can be verbally formulated as the determination of the optimal order of operations and jobs on each machine center based on overall criterion of measurement. This ordering of jobs and operations is called a schedule and assign jobs and operation to machine center.

Article	Scheduling Topics Covered
Graves, 1981	Classification of scheduling in problem classes and review of theoretical developments used to solve them. Discussion on the discrepancy between theory and practice and suggestion of six areas worth of further research.
Sen and Gupta, 1984	Discussion of scheduling techniques with performance measures related to due dates. A Classification based on scheduling objectives and a review of theoretical development and computational experiences is presented.
Ramashes, 1990	Provides a state-of-the-art survey of simulation-based research on dynamic job shop scheduling with a distinct emphasis on two important aspect, i.e. first, scheduling approaches taken on job shop simulation modeling and experimental, second focus on research finding on the job shop performance criteria of interest.
Sevastjanov, 1994	Survey on geometric method used in scheduling theory as approximation algorithm.
Nagar, 1995	Provides a detailed literature survey of multiple and bicriteria problems in scheduling. A broad classification scheme for scheduling problems is also provided.
Blazewick <i>et</i> <i>al.</i> , 1996	Provide conventional and new solution techniques for a job shop scheduling problem.

**Table 2.1**Description of Topics Covered by Reviews Articles in Scheduling.

Table 2.1Continued.

Article	Scheduling Topics Covered
Hall, 1996	Review the computational complexity of a wide variety of no-
	problems which remain open as to complexity.
Drexl, 1997	Summarizes recent work in the field of lot sizing and scheduling to explain differences o formal models and to provide some first readings recommendations. This paper also propose two research direction i.e. continuous tie models and multi-level lot sizing and scheduling.
Mokotoff, 2001	Presented an overview of the research devoted to the parallel machine with emphasis on the case of the optimal makespan on identical parallel machine.
Raheja and	Provides a comprehensive review of literature on the reactive
Subramaniam, 2002	recovery of job shop schedules. This paper also proposes further research work in job shop scheduling area.
Lee, et al., 1997	Review some of the recent developments in the theory, the heuristic search methods, and the practice of deterministic scheduling. This paper also describes problem classification, complexity and analytical approaches of deterministic scheduling.

Table 2.2	Classification	the Articles	by To	pics.
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Торіс	Related articles
Comprehensive and Historical Surveys	(Blazewick <i>et al.</i> , 1996), (Nagar 1995), (Drexl, 1997), (Raheja and Subramaniam, 2002)
Heuristic and Approximation algorithms	(Sevastjanov, 1994)

**Table 2.2**Continued.

Торіс	Related articles
Complexity Theory and Combinatorial Optimization	(Hall, 1996), (Lee, et al., 1997)
Analysis and Discussion of Performance Measures	(Sen and Gupta, 1984), (Ramashes, 1990), (Mokotoff, 2001)
Relation between Scheduling Practice and Scheduling	(Graves, 1981)

## 2.1.2. Notation for Scheduling

Using the classification scheme developed by Conway, *et al.*, (1967) and the refinements introduced by McCharty and Liu, (1993) it is possible to denote a scheduling problem using four field notation A/B/C/D where,

A- integer representing the number of jobs, N;

B- integer that represent the number of machine center, M;

C- flow pattern and technological constraint. Values of C are;

J,  $b_m \leq b^*$  job shop with  $b_m$  machines per machine center m bounded by an integer  $b^*$ ;

G: General job shop;

b-parallel: shop with b machines in parallel;

F: flow shop;

F-perm: permutation flow shop;

O: open shop;

||: single machine shop.

In some case, the above symbols might be accompanied by the expression  $n_i \le n^*$  denoting that the number of operations per job is bounded by an integer  $n^*$ .

D- criteria to be optimized. E.g., C<sub>max</sub>.

While this four field notation is suitable for basic problems, when non-basic problems (involving pre-emption, dependent jobs, etc.) require classification the three field notation ( $\alpha \mid \beta \mid \gamma$ ) of Graham *et al.* (1979) is more appropriate (Pinedo, 2002):

 $\alpha$  - machine environment (contain a single entry). The possible values for machine environments specified in the  $\alpha$  field are:

(1)	: Single machine
(Pm)	: Identical machine in parallel
(Qm)	: Machine in parallel with different speed
(Rm)	: Unrelated machines in parallel
(Fm)	: Flow Shop
(FFc)	: Flexible flow shop
(Jm)	: Job shop
(FJc)	: Flexible job shop
(Om)	: Open shop

 $\beta$  - processing characteristic and constraint (may contain no entry at all or multiple entries). The possible entries in the  $\beta$  field are :

(r <sub>j</sub> )	: Release date
(s <sub>jk</sub> )	: Sequences dependent setup times
(prmp)	: Preemption
(prec)	: Precedence constraint
(brkdwn)	: Breakdown
$(M_j)$	: Machine eligibility restriction
(prmu)	: Permutation
(block)	: Blocking
(nwy)	: No-wait
(recrc)	: Recirculation

 $\gamma$  - objectives to be minimized (usually contains a single entry). Examples of possible objective function (in the  $\gamma$  field) to be minimized are:

- Makespan (C<sub>max</sub>)
- Maximum Lateness (L<sub>max</sub>)
- Total weighted completion time  $(\sum w_j(C_j))$
- Discounted total weighted completion times  $(\sum w_j (1 e^{-rCj}))$
- Total weighted tardiness  $(\sum w_j T_j)$
- Weighted number of tardy jobs  $(\sum w_j U_j)$

MacCarthy and Liu (1993) indicate that the four field technique has been widely used and is familiar to most schedule researches. Consequently they propose a combination of the two methods where the C field is modified to take into account non-basic models.

#### 2.1.3. Scheduling Classification

Scheduling problems can be classified in many ways, such as base on job arrival, information flow to the scheduler, production stages, resources configuration and flexibility of resources (Bongaerts, 1998, French, 1982).

#### a. Based on Job Arrival

According to availability of jobs prior to the creation of the schedule, scheduling system can be classified as static and dynamic. In static scheduling all jobs are identified when creating the scheduling, and once the production sequences are defined, they are assumed not to be changes during processing. In dynamic scheduling, jobs arrive dynamically over time and are scheduled after arrival.

#### b. Based on Information to the Scheduler

Base on information to the scheduler, scheduling system can be classified as Deterministic or stochastic. When processing times and all other parameter are known and fixed, we call our problems deterministic. Problems, which the processing times, etc. is uncertain, are called stochastic.

## c. Processing Complexity

Processing complexity refers to the number of processing steps and workstation associated with the production process. This dimension can be decomposed further as follows:

- 1. One stage, one machine,
- 2. One stages, multiple machine,
- 3. Multistage, flow shop,
- 4. Multistage, job shop.

## d. Based on Resources Configuration

Base on models of Machine arrangement, the following scheduling problems can be defined (Blazewick *et al.*, 1994) as shown as Figure 2.1. Base on layout/configuration of the machines (Figure 2.1), the following scheduling problems can be defined:

Single machine model (French, 1982) has the simplest layout. It consists of a single machine that performs all operations. For models of machine in scheduling, the single machine model represents the simplest case. In a single machine problem,

one machine (acting independently) is considered to be the only limited resources. It is assumed that a single machine has a fixed capacity which allows one task to be processed at any instant (i.e., <u>a batch processor is not termed a single machine</u>)



Figure 2-1: Models of Machine Configuration

Other simplifying assumption are typically made in a single-machine problem, the most common being that the single machine processes at a constant rate and is available and fully functional at all times. This last assumption is not peculiar to single machine problems – it is an assumption made in the vast majority of scheduling problems.

The single machine is a *one-machine one-resource problem*, this being a special case of one-machine problems (Dunstall, 2001). One machine problems are those that deal with any production facility consisting of one processor acting independently and having a one-operation-at-a-time processing capacity.

A parallel machine problem is a special case of a multi-machine problem. A group of machines are commonly described as parallel machines if they serve a single input queue of waiting jobs (Figure 2.2). Typically, a parallel machine problem involves machine that individually are single machines.

There are three basic types of parallel machines modeled in scheduling problems: identical parallel machines, uniform or proportional parallel machines, and unrelated parallel machines. In a problem with identical parallel machines, all machine operate at the same speed (processing rate) and have the same processing capabilities. Uniform machines have the same processing capabilities but each has a different processing rate. $\rho_m$  ( $\rho_m > 0$ ,  $1 \le m \le M$ ), with the processing time of job j on machine m given by processing rate  $P_{mj} = P_j/\rho_m$  for a given processing requirement for  $P_j$  job  $a_j$ .



Figure 2.2: A Representation of Parallel Machine and a Single Input Queue.

Unrelated parallel machine represent the most complex of the three standards parallel machine type; such machine do not necessarily have identical processing capabilities, and the processing time of each job on machine *m* need not be related to either the processing times of other jobs on the same machine or to the processing time required on other machines. For each job j and machine m, a "job-dependent speed"  $P_{mj}$  is specified and used to provide processing time  $P_{mj} = P_j/\rho_{mj}$ . If a job cannot be processed on a certain machine, the use of value of  $\rho_{mj}$  "near to zero" can prohibit the job from being scheduled on that machine, due to the extraordinarily large processing time assigned to it.

An interesting extension to the "standard" parallel machine model is the parallel *multi-purpose machine models*. Each job or operation of a job can be processed on a particular subset of the parallel machines, and the parallel machines are otherwise either *identical* or *uniform*. Only a small amount of scheduling research has been directed toward multi-purpose machine models, although interested readers are referred to (Brucker, 1995), for example.

Single and parallel machines can be seen as representing individual processing units, or workcenters, in a plant. Where the execution of entire workorders (i.e., all operation of a job) can be carried out on one workcenter, these machine models can incorporate almost all of the relevant machine characteristics.

The applicability of single or parallel machine models is limited. Other multimachine, multi operation models are required to appropriately model many facilities. There are three classical multi-machine models in addition to the parallel machine model that regularly appear in the scheduling literature, these being (Figure 2.3):



Figure 2.3: Flow Shops, Open Shops, and Job Shops.

• Flow shop, where all work flows from one machine (workcenter) to the next; that is job share a common operation (processing) order and hence a common routing through the shop. A flow shop model implies that chain precedence holds between the operations of each job. In simple word, flow shop is a model, where every job visits several machines, but all job have same sequence

• Job shop, where operations of a job must be carried out in prespecified order (chain precedence) and on a prespecified machine (or parallel machines), so that individual job routings are fixed, but can vary between jobs. In simple word job shop is a model, where every job visits several machines, but with dependent sequence and routing specified;

• Open Shops, Where restrictions are not placed on the operation order (no precedence). Job routings are part of the decision process, but operation-machine assignments are predetermined. In simple word, open shop is a model, where every job visits several machines, but with dependent sequence and routing not specified;

Some multi-machine environments will be inadequately represented within the classification scheme of flow shop, open shops, and job shops. For the purpose of this chapter, however, there is no need to extend the classification.

#### 2.1.4. Scheduling Complexity

The theory of computational complexity can be traced back to the works of and (Karp, 1972) who first studied the relation between the classes P and NP of language recognition problems solvable by deterministic and non deterministic Turing machine respectively. This language recognition problem can be solved in a number of steps bounded by a polynomial function in the length of the input. With respect to combinatorial optimization, where deterministic scheduling problems belong, a rigorous mathematical definition of concepts is not needed (Lenstra, *et. al.* 1977), and it is sufficient to identify with P the class problems for which a polynomial-bounded, good or efficient algorithm exist (Edmon, 1965). On the other hand, all problems in NP can be solved by polynomial-depth backtrack search.

In the original context of complexity theory, all problems are stated in term of recognition problems which require a yes/no answer. To deal with the complexity of a combinatorial minimization problem, a transformation into the problem of determining the existence of a solution with value at most equal to z, for some threshold value z, is needed.

Problems in *NP* are not all equal in term of computational difficulty. It is clear that  $P \subset NP$ , but the proper inclusion is not yet known to be true or false. In fact one of the most intriguing open question is whether or not P=NP.

There are some problems of the *NP* class, however, that are considering the most difficult ones.

This is the *NP*-complete class. To clearly define this class, one must first define a problem *P*' as being reducible to a problem *P*. denoted  $P' \propto P$ , if for any instance of *P*' an instance of *P* can be constructed in polynomial-bounded time such that solving the instance of *P* will solve the instance of *P*' instance. *P* is called *NP*-hard if  $P' \propto P \forall P' \propto NP$ , and *P* is *NP*-complete if *P* is *NP*-hard and  $P \notin NP$  (Lenstra and Rinnooy Kan 1979). The theory of *NP*-completeness provides many straightforward techniques for proving that a given problem is "just as hard" as a large number of other "very difficult" problems. Thus, the theory of *NP*-completeness assists designers of algorithms in directing their problem solving efforts toward those approaches that have the greatest likelihood of leading to useful algorithms (Garey and Johnson, 1979).

Establishing *NP*-completeness for a scheduling problem is a strong justification for the use of enumerative methods, since no better optimal algorithm is likely to exist. (Graham, *et. al.*, 1979) have catalogued approximately 9.000 scheduling problems according to their computational complexity. Roughly 9% of these are *P*, 77% are *NP*-hard, and the remaining 14% are open. (Legeweg, *et. al.*, 1981) describe a computer program that maintains a record of the known complexity results for a structured class of combinatorial problems. Given listing of well-solved and *NP*-hard problems, the program employs a reducibility relation defined on the class to classify each problems s easy, hard or open and to open one, the hardest open ones and the easiest hard ones. The program was applied to class of 4536 machine

problems. The result indicates that 416 (9%) are *P*, 3730 (82%) are *NP*-hard, and the remaining 390 (8%) are still open (Lenstra and Rinnoy Kan 1984, 1985).

From a practical point of view, in order to solve *NP*-hard and *NP*-complete problems there is a need to:

(1) relax some of the constraints;

(2) use approximation algorithms and/or heuristics, and;

(3) use exact exponential algorithms.

Relaxation for scheduling problems is concerned with task preemptions, unit processing times, weaker precedence constraints, etc. The use of approximation algorithm requires an analysis of the quality of the solutions, where the distance to the optimum may be evaluated either in the worst case or on the average (Feisher, 1980). In the case of heuristic, a benchmark of problems might be used to suggest performance on practice with respect to parameters describing specific instances of the heuristic. Exact exponential algorithm are used mainly for small instances of the problem or for solving problems of special structure (blazewicz, *et. al.*, 1988).

To further limit the complexity of the problem, the following assumptions are made for the models development below:

- 1. Each job, denoted by a work order, is an entity;
- 2. No pre-emption;
- 3. Each job has m distinct operations, one on each machine;
- 4. No cancellation;
- 5. The processing times are independent of the schedule;
- 6. In-process inventory is allowed;
- 7. There is only one of each type of machine;
- 8. Machine may be idle;
- 9. No machine may process more than one operation at time;
- 10. Machines never break down, and are available throughout the scheduling period;
- 11. The technological constraint are known in advance and are immutable;
- 12. There is no randomness, in particular:
  - The number of jobs is known and fixed,

- The number of machines is known and fixed,
- The processing times are known and fixed,
- The ready times are known and fixed,
- All other quantities needed to define a particular problem are known and fixed.

There are standard assumption in job shop research ((Baker, 1974), (Conway, *et. al.*, 1967), (Blazewicz, *et. al.* 1993)), and obey to historical reasons based on the need for simple models that can capture the essence of a scheduling problems very difficult to solve if all possible variables that influence it are considered ((Sisson, 1959), (Mellor, 1966), and (Gere 1966)). Even though these assumption have been challenged on the basis of generalization an lack of applicability to real scheduling problems, it is also true that for most practical problems it is sufficient to get good suboptimal solution and, therefore, theoretical work and development of heuristic on simple models is still needed (Kan, 1979)

## 2.1.5 Scheduling Rules

A scheduling rule is used to select a job to be processed from a set of jobs waiting for services (these rules can also be used to introduce workpieces into the system, to route the parts in the system and also to assign parts to facilities). Scheduling rules may be static or dynamic. Because of the large number of scheduling rules, it is not obvious which scheduling rule to select in a given environment. However, have shown that the selection of the scheduling rules can have a significant impact on system performance. Hence, in recent years, substantial research and study has been carried out in analyzing these scheduling rules (Table 3).

#### 2.1.6 Performance Measures

A variety of performance measures guide rescheduling. These measures can be separated into three groups (Jain and Elmaraghy, 1997; Shafaei, and Brunn, 1999; Wu, Storer, and Chang, 1993): measures of schedule efficiency, measures of schedule stability, and cost.

Measures of schedule efficiency are often used when generating a production schedule. They are generally time-based measures (Shafaei and Brunn, 1999): makespan (Yamamoto, and Nof, 1985; Sabuncuoglu, and Karabuk, 1999; Fang, and Xi, 1997; Wu, Storer, and Chang, 1993), mean tardiness (Jain and Elmaraghy, 1997 Sabuncuoglu and Karabuk, 1999), mean flow-time (Jain and Elmaraghy, 1997), average resource utilization (Jain and Elmaraghy, 1997), and maximum lateness (Church and Uzsoy, 1992).

Schedule stability is not an issue in static, deterministic rescheduling environments since the schedule does not need updating. However, in other rescheduling environments, stability, nervousness, and robustness are important measures. Wu, Storer and Chang (1993), for instance, have said that the impact of schedule change is a non-regular performance measure defined in two ways: (1) the starting time deviations between the new schedule and the original schedule, and (2) a measure of the sequence difference between the two schedules. Abumaizar and Svestka (1997) proposed similar ideas saying that measures of stability deal with deviation from the initial schedule. Watatani and Fujii (1992) and Dhingra, Musser and Blankenship (1992) also considered the deviation between the revised and initial schedules as performance measures, even though they did not call it schedule stability.

The impact of machine failure seems to be the major concern when searching for more stable (less nervous) and robust schedules. Shafaei and Brunn (1999) have addressed the robustness of scheduling rules in a dynamic and stochastic environment. They concluded that as the level of uncertainty increases, frequent rescheduling becomes more effective in improving the robustness of the schedules. Wu, Storer, and Chang (1993) have studied rescheduling heuristics using schedule efficiency (makespan) and schedule stability as performance measure criteria. For the single-machine system they have considered, the heuristic used generated stable schedules while retaining near-optimal makespans.

Time-based performance measures (measures to reach schedule efficiency) do not completely reflect the economic performance of the manufacturing system. So, due to the lack of an overall, efficient, time-based performance measure, researchers have recognized that the scheduling decisions should also be evaluated by using an economic performance measure. The objective then is to minimize the cost of starting jobs too early, work-in-process inventory, and tardiness. Issues such as job profitability, total cost minimization, reduction in WIP, and the cost of missed due dates are more important for managers than the time-based measures mentioned above (Shafaei and Brunn, 1999). Shafaei and Brunn (1999) have proposed the use of a total cost function in terms of job due date, completion time, number of jobs, number of operations, operation processing time, job raw material cost, processing cost of operations, job revenue, processing start times, job release time, job tardiness, holding cost rate, and tardiness cost rate.

In general, rescheduling costs occur in three categories: computational costs, setup costs, and transportation costs. Computational costs include the computational burden on the computer running the scheduling system (Sabuncuoglu and Karabuk, 1999; Church, and Uzsoy, 1992), the non-recurring costs of investments in the necessary information systems (sensors, displays, communication networks, hardware, and software), and the recurring costs of administration, maintenance, and upgrades. If rescheduling is done manually, then the computational cost includes the time that the planners, managers, and supervisors spend generating and updating schedules. Setup costs occur when tooling and fixtures are created or allocated in advance according to the schedule. Thus a change in the schedule will incur costs to reallocate pallets and replan the tools (Olumolade, and Norrie, 1996). Transportation costs (also called material handling costs) are related to delivering materials earlier than required or additional material handling work to transport jobs from one scheduled machine to other points in the shop (Olumolade and Norrie, 1996). For instance, Bean et al. (Bean et. al., (1991)) use the number of jobs reassigned as a measure of solution cost that must be balanced against tardiness costs and

computational effort. In dynamic rescheduling environments, the relative values of the rescheduling period and the mean total processing time requirements of a job will affect the performance measures used in predictive-reactive rescheduling. When the rescheduling period is relatively large, jobs can be started and completed between rescheduling events. Scheduling objectives will typically focus on completing the available jobs within that time period. When the rescheduling period is relatively small, the system will have, at each rescheduling point, some jobs that are available and waiting to start and many others that started during a previous period but still require more processing. In a job shop environment, scheduling objectives are much more complex, since there is a need to balance available capacity among jobs at different stages in their processing. This is especially true in shops with re-entrant flow, like those found in semiconductor wafer fabrication plants (Kumar, 1994; Kempf, 1994).

## 2.2. Job Shop Scheduling

A job shop is a process-based manufacturing system in which jobs for different orders follow different routing or sequences through processes and machine (Black, 1983). The major characteristic of this system are flexibility, variety, highly skilled workers, much direct labor and great deal of manual material handling.

A schedule for job shop is an allocation of one or more time interval on one or more machine to each job. Job shop is one of the scheduling problems that have been study extensively because of its similarities to real production system. In a job shop, a job may require several different operations performed by different machines, and it may have to wait in several different queues. If jobs arrive at the shop randomly over time, the job shop is called a dynamic job shop (Jackson, 1963).

The objective of job shop scheduling problem usually is to find a processing order or a scheduling rule on each machine for which a chosen measure of performance is optimized. Job shop scheduling problems are very difficult to solve. The analytical approach has been proved to be extremely difficult to solve, even with several limiting assumption (Jackson, 1963)

Therefore, research on scheduling a job shop has focused primarily on identifying dispatching rules that perform well under a variety of shop condition or a variety of shop criteria (Philipoom, 1990). In job shop scheduling, a dispatching rules is a priority assignment algorithm that is used to assign priority to the jobs in queue and then decide which task from a set awaiting processing is to be perform next (Fry et al., 1988).

The great variation of dispatching rules reflects the amount of work in this area. In 1977, Panwalker and Iskander published a paper that categorized and listed 113 scheduling dispatching rules. In 1984, Sen and Gupta reviewed the static scheduling problem whose performance measures are related in some ways to job due dates. In 1990, Ramashes published survey paper on simulation-based research of job shop scheduling.

However, although a large number of dispatching rules have been studied, none of the claim to be the one that can operates effectively in all shop condition. In 1976, Weeks and Fryer found that the performance of some dispatching rules was influenced by the due date assignment method. In 1983, Elvers and Taube investigated the performance of five scheduling rules at six different shop-utilization levels and concluded that the relative performance of the rules was dependent on the shop-load level. In 1984, Baker verified the existence of crossover points, with some rules performing better for thigh due dates and other for loose ones. Also, in 1984. Kiran and Smith concluded that SPT is likely to perform better than slack per operation (S/OPN) in a shop that has high utilization and tight processing time independent due dates. There is no dispatching rule that has been shown to consistently produce better result than all other rules under a variety of shopconfiguration and operating condition.

#### 2.3. Dynamic Scheduling

Scheduling algorithm themselves can be characterized as being either static or dynamic (Cheng et al., 1988). A static approach determines schedules of process in advance; it requires prior knowledge of a process's characteristics but requires little runtime overhead since a completed schedule is known before the operation is started. By comparison, a dynamic method determines schedules at runtime, thereby furnishing a more flexible system that can react to changes in activities beyond those that were anticipated.

In a manufacturing environment, change is an inevitable element of daily life; hence, frequent scheduling changes are necessary (Hoitomt and Luh, 1993). An important factor that affects the scheduling of jobs is the dynamic variation of factory status (Sarin and salgame, 1990), (Buxey, 1989) suggest a list of factors that usually occur in the production and may influence the value of any production schedule. These factors are:

- a. An unpredictable level of absenteeism.
- b. Equipment under breakdown/repair.
- c. The volume of information to be handled allows requirements to be calculated at an aggregate level only.
- d. Time spent queuing at process stages, and for transport between them, is highly variable.
- e. Operation times used for planning purpose are rough estimates.
- f. Customer (or the marketing department) may cancel orders on short notice or alter design specification, order quantity, delivery date, etc., even after work has commenced.
- g. Following quality inspection, items may be scrapped, downgraded, or scheduled for reworking.

Thus far, it can see there is always some degree of uncertainty present in the factory environment that can destroy the credibility of any production schedule that is over-ambitious in its specification. When these dynamic events, the current schedule that uses some static assumption is no longer optimal (Yamamoto and Nof,

1985). Therefore, the desire for a flexible, integrative, and robust schedule system to be used in the manufacturing process is understandable.

#### 2.3.1. The Dynamic Job Shop Scheduling Characteristics

The static job shop scheduling problem can be described as follows (Kuroda and Wang, 1996): Given M machines and J jobs, the J jobs are to be processed on the M machines. Each job consists of P operations processed on the M machines. A schedule is feasible if each job can only be processed on one machine and each machine can only process one job at a time. Some jobs have prescribed routing through the m machines, but the routing for each of these jobs may be different. The objective function is generally to minimize the maximum completion time (makespan), which is equivalent to minimizing cycle time.

Based on the definition of the Static Job Shop Scheduling problem, the dynamic job shop scheduling problem may be characterized as follows: in a manufacturing system which comprises M machines (*work stations*) the jobs arrive continuously in time. Each job consists of a specified set of operations, which have to be performed in a specified sequence (routing) on the machines. Schedules for processing the jobs on each of the M machines have to be found which are best solutions with respect to given objective(s) function or performance measure(s). Because of the constrained information horizon (the arrival times, routings and processing times of the jobs arriving in future are not known in advance) only for those jobs currently in the shop processing sequences on the various machines can be determined. The decision as to which job is to be loaded on a machine, when the machine becomes free, is normally made with the help of a dispatching (scheduling) rule.
#### 2.3.2 Previous Research on Dynamic Scheduling

Dynamic scheduling is closely related to real-time control, since decisions are made based on the current state of the manufacturing system. Dynamic scheduling does not create production schedules. Instead, decentralized production control methods dispatch jobs when necessary and use information available at the moment of dispatching. Such schemes use dispatching rules or other heuristics to prioritize jobs waiting for processing at a resource. Some authors refer to dynamic scheduling schemes as on-line scheduling or reactive scheduling. In the following, the author reviews some research works that are related to dynamic scheduling.

The first study in this area was initialized in 1974 by Holloway and Nelson who implemented a multi-pass procedure in a job-shop by generating schedules periodically. They concluded that a periodic policy (scheduling/rescheduling periodically) is effective in dynamic job-shop environments. In 1982, Muhleman *et al*, analyzed the periodic scheduling policy in a dynamic and stochastic job-shop system. Their experiments indicate that more frequent revision is needed to obtain better scheduling performance. Yamamoto and Nof (1985) used a regeneration method in developing their scheduling systems in a job shop situation. The method rescheduling the entire set of operation (or jobs) including those unaffected by the change in condition, demand and/or constraints. They compared three scheduling procedures to deal with machine breakdowns. However, they did not address the problems of another uncertainties such as rush order, increased priority and order cancellation.

In 1992, Church and Uzsoy considered periodic and event-driven rescheduling approaches in a single machine production system with dynamic job arrivals. Their results indicate that the performance of periodic scheduling deteriorates as the length of rescheduling period increases and event-driven methods achieve a reasonably good performance.

Li *et al.* (1993) considered the problem of dynamic scheduling in response to changes that take place on a factory shop-floor. They proposed a heuristic rescheduling algorithm that revises schedules by rescheduling only those operations

that need to be revised. One limitation of the algorithm is that it can only deal with rescheduling when there is no change in existing operation sequence for each machine. They did not consider the alternate operation sequence for rescheduling. They stated that typical event to trigger the rescheduling include machine breakdown, job arrival or cancellation, job priority (or due date) changes, quality problems, over- or underestimate of processing times, shortage material, and being behind or beyond the schedule of transportation, tools or personnel delays. A rescheduling system creates a new schedule by altering the schedule being used and adapting it to the new shop status and production requirements.

In 1999, Sabuncuoglu and Karabuk proposed several reactive scheduling policies to cope with machine breakdowns and processing time variations. Their results indicate that it is not always beneficial to reschedule the operations in response to every unexpected event and the periodic response with an appropriate length can be quite effective in dealing with the interruptions. In 2000, Subramaniam *et. al.* demonstrated that significant improvements to the performance of dispatching in a dynamic job-shop could be achieved easily through the use of simple machine selection rules. In addition, the reactive scheduling problems have also been studied by implementing knowledge-based methodology, finite state machine, and other artificial intelligence

Vieira, *et. al.* (2000) described analytical model that predict the performance (such as average flow time and machine utilization) of a single machine system under periodic and event-driven rescheduling strategies in an environment where different job types arrive dynamically and set-ups incurred when production changes from one production to another. A first-in-first-out rule based algorithm was used to reschedule the new jobs up to the rescheduling moment, along with those jobs from the last schedule that did not begin processing.

Sun and Xue, 2001, develop a reactive scheduling method to minimize the scheduling changes for improving the efficiency of reactive scheduling, while maintaining the quality of the overall scheduling. Their main objective of their study is to integrate production scheduling with product design, when design parameter are changed, the manufacturing requirement are then update automatically, when these

manufacturing requirement cannot be satisfied by the current created schedule, change of the production schedule can be conducted simply by canceling the original order and inserting the modified order. They called a match-up reactive scheduling for their approach. In order to responds changes in product orders and manufacturing resources, they also employed the match-up rescheduling approaches. They used some rules to match-up the schedule. Unfortunately, they did not report the effectiveness of their study. Furthermore, the system studied is not clearly desirables.

Diaz *et. al.* (2003), analyze performance properties of list scheduling algorithms under various dynamic assumptions and different levels of knowledge available for scheduling, considering the case of unit execution time tasks. They focus on bounds for the ISF (immediate successors first) and MISF (maximum number of immediate successors first) scheduling strategies and show the difference from other bounds obtained for the same problem. They also present case studies and experimental results to assess the average behavior.

Liu *et al.* (2005) analyze the characteristics of the dynamic shop scheduling problem when machine breakdown and new job arrivals occur, and present a framework to model the dynamic shop scheduling problem as a static group-shop-type scheduling problem. Using the proposed framework, they apply a metaheuristic proposed for solving the static shop scheduling problem to a number of dynamic shop scheduling benchmark problems. The authors only implemented tabu Search algorithm for the DMSS problem because the authors believes that many computational experiments have shown that tabu search can compete with all other known metaheuristics by its flexibility and efficiency. The authors conclude that the metaheuristic methodology which has been successfully applied to the static shop scheduling problems can also be applied to solve the dynamic shop scheduling problem efficiently. Unfortunately, the results reveal that the more frequent the dynamic events happen, the more difficult to find the solution equal to the lower bound (LB).

### 2.3.3 Dynamic Scheduling Approaches

Various approaches have been applied to job shop scheduling, including the following: dispatching rules (Panwalkar, 1977), mathematical programming (French, 1982), heuristics (Kusiak, 1990), simulation- based methods (Ramashesh, 1990), and artificial intelligence (AI)-based methods (Geyik, 1997).

It has been recognized that scheduling optimization using mathematical programming is very difficult, because of lengthy computational time. It becomes more difficult to achieve an optimal result when the variety of parameters and constraints is incremented (Maturana, *et. al.*, 1997). Furthermore, job shop scheduling is among the hardest combinatorial optimization problems and is NP-complete (Garey and Johnson, 1979). After some early successes in the 1950's and 60's, such as Johnson's algorithm for sequencing n jobs on two machines, it was found that even the simplest idealized problems, at the same time as they may be able to be formulated sophisticatedly using integer or dynamic programming require an excessive amount of computation time to solve exactly (Higins and Wirth, 1995). That is, for these problems the fastest currently available algorithms (exact solution methods) are exponential time. In other words, the number of computations required to solve the model exactly grows exponentially with the problem size. So the problem of dimensionality remains and forces to search for heuristics, that is fast (polynomial time) procedures which are near optimal in some sense.

A heuristic has been defined as a method which on the basis of experience or judgment seems likely to yield a good solution to a problem, but which cannot be guaranteed to produce an optimum (Foulds, 1984). The difficulty with applying heuristics to scheduling problems is that it is very difficult to decide which information to ignore. The loss of information takes place in two stages. Firstly in order to build an operations research mode, it needs to ignore some aspects of the real problem. For example, it may assume that set-up times are predictable or that the goal is simple profit maximization and is not affected by any hidden agendas. Secondly, once the model has been formulated, it removes it even further from reality by using a heuristic which may ignore further information (Maturana, *et. al.* 1997).

Simulation-based methods have also been receiving attention, because of their flexibility and potential to evaluate manufacturing configurations. By applying different dispatching rules, such as earliest due date (EDD), first in, first out (FIFO) or shortest processing time (SPT), the shop-floor performance can be measured. The dispatching rule that attains the highest level of performance (through a simulated model of the shop-floor operations) is favored to drive the production activity. Moreover, these scheduling strategies provide different results that can be compared against each other to select the most suitable policy to achieve a given production requirement, while satisfying the system constraints. As a compromise, AI methods have gained popularity recently for achieving accurate, timely scheduling results (Geyik, 1997).

Artificial intelligence (AI) is the generic name given to the field of computer science dedicated to the development of programs that attempt to replicate human intelligence. Artificial intelligence (AI), the technology that attempts to preserve domain intelligence (knowledge base) in order to use the same for decision making in the future, has matured enough to redirect the research in scheduling. There are several capabilities of AI that make this technology particularly suitable for scheduling; these include the (Liu, et al, 2005):

- richer, more structured, knowledge representation schemes capable of fully incorporating manufacturing knowledge, constraints, state information, and heuristics;
- reasoning ability enabling the scheduling systems to perform more reactive scheduling in addition to predictive scheduling;
- ease of integrating an AI-based scheduler with other decision support systems in the manufacturing environment, such as diagnostic systems, process controllers, sensor monitors, and process-planning systems; and
- ability to incorporate descriptive, organizationally specific scheduling knowledge usually possessed only by human expert schedulers.

### 2.4 Simulation In Scheduling

Simulation is defined as the imitation of the operation of a real world process or system over time (Banks, 1998). Simulation is a necessary problem solving methodology for the solution of many real world problems. Simulation is used to describe and analyze the behavior of a system, as what-if question about the real system, and aid in the design of real systems. Existing system and conceptual system can be modeled with simulation. In other word (Shannon, 1975): simulation is an experimental techniques and applied methodology which seeks (i) to describe the behavior of system, (ii) To construct theories or hypotheses that account for the observed behavior, and (iii) To use these theories to predict future behavior or the effect produced by changes in the operational input set.

Simulation modeling is a highly flexible technique because its models do not require the many simplifying assumption needed by most analytical techniques. Furthermore, simulation tends to be easier to apply than analytic methods. In addition, simulation data is usually less costly than data collected using a real system. However, constructing simulation models may be costly, particularly because they need to be thoroughly verified and validated. Additionally, the cost of the experiment may be increase nature of simulation requires time increases. The statistical nature of simulation requires that many runs of the same model be done to achieve reliable and accurate results. Although its flexibility, simulation modeling traditionally is not an optimization techniques

Simulation can be used to investigate the effect of scheduling rules on the system performance. These models have been developed using:

- general purpose programming languages (C, FORTRAN, VISUAL BASIC, PASCAL, etc,);
- 2. general simulation languages (GPSS, SLAM, SIMSCRIPT, etc.);
- special purpose simulation packages (WITNESS, SIMFACTORY, ARENA, etc.).

Generally, different authors give different statements of the functions of a simulation packages tool, depending mainly on how detailed this statement is. In summary, the

following advantages and disadvantages (Table 2-3) and capabilities and limitation (Table 2-4) of simulation methodology for modeling can be highlighted:

 Table 2-3
 Advantages and Disadvantages of Simulation

	Advantages of Simulation
٠	Once a model is built, it can be used repeatedly for various analyses.
٠	Simulation data is usually cheaper than data coming from the real system.
•	Simulation methods are usually easier to apply than analytic methods.
٠	Simulation models do not require the many simplifying assumptions of
	analytic methods.
٠	Simulation models may be costly to build.
•	Because of its statistical nature, many runs of the same model are necessary
	to achieve reliable data.
٠	Once the methodology is well understood, there is the tendency to use it even

though analytic techniques would suffice.

station to another.

Capabilities of Simulation							
Provide estimates of measures of performance, e.g.:							
• Time in the system.							
• Worker/Machine utilization.							
• Number in queue.							
• Time in the queue.							
Evaluate <i>the effect of change</i> to system operational parameters:							
• Changes to system inputs / resources such as rate of arrival, rate of service.							
• Number of material handlings available to move material from one work							

Limitations of Simulation								
•	• It cannot optimize performance of the system; it can only describe the res							
	of "what-if" scenarios or questions.							
•	It cannot give accurate results if the inputs are inaccurate.							
•	It cannot describe characteristic that have not been explicitly modeled.							
•	It cannot solve problems; it can only provide information from which solution							
	can be inferred.							

Simulation is often defined as a methodology for conducting experiments using a model of real system. Simulation is merely a tool for problem solving; by itself, it cannot provide an answer (Pichitlamken and Nelson, 2001)

### 2.4.1 Motivation for Simulation

The motivation to employ simulation is multifold. For example:

- (1). Simulation can provide solutions when analytical model fail.
- (2). Model to be simulated can represent a real-world process more realistically because fewer restrictive assumptions are required.
- (3). More than one performance measure may be evaluated at one time.

Unfortunately, simulation also has drawbacks, for example:

- Each run of a stochastic simulation model produce only estimates of a model's true characteristics for a particular set of input parameters.
- (2). Simulation can be expensive and time consuming to develop.
- (3). The volume of data produced through simulation creates a tendency to place greater confidence in a study's result than is justified.
- (4). Validity is difficult to ensure.

#### 2.4.2 The Steps of Simulation

Simulation attempts to provide structure and context to decision-making in complex and sometimes chaotic environment. It does this by providing to the decision-maker a rigorous description of the system or process under study. The following decision-making process framework is a hybrid of several published paradigms. Most formal and many informal decision-making situations require the shown as Figure (Law and McComas, 2000). For more detail see Jensen (1999), Schmidt (1986) and Mehta (2000).



Form: Simulation, Modeling and Analysis, Law, A. M. and McComas, M. G. Proceding of the 2000 winter simulation conference, 2000.

Figure 2.4: Simulation Modeling Process

### 1. Need Recognition.

First, one observes a phenomenon to investigate or question to research. At this stage, questions are often ill-defined and may exist as little more than a hunch that something is wrong or needs adjustment.

# 2. Problem Formulation

After a bit of though and some preliminary investigation a specific question or set of question emerge. This step often includes the identification of alternatives and the choice of a criterion by which to make a decision.

### **3.** Model Construction

Third, one decides on a context in which to ask formulated question. This may include constructing a mental model, building a physical model, conceptualizing an analog, or developing a mathematical representation of the problem. In this class we shall spend a great deal of time constructing mathematical models but it is vital to note that this activity is but one in the framework. Here, we shall concentrate on computer simulation.

### 4. Data Collection

Data collection describes the mean to generate data input for modeling. There are at least as many ways to generate data as there are modeling techniques. A difficult question that must be answered pertains to the amount of data to be

collected and the level of data aggregation required. Sets of simplifying assumptions are usually required.

### 5. Model Solution

A significant advantage of mathematical models is that once they constructed (and the required data is generated) solution is trivial. In most solution, solution procedures can be routinized and then automated. This is often not the case of mental and physical models.

#### 6. Model Reliability and Validity

Once a model is built, a check for reliability is made to insure that multiple solution of the same model yield the same result. After reliability is assured, one may compare the solution with an expectation of reality. If the model behaves as expected then one has some level of confirmation that the model is 'valid'. If not, then a return to model construction may be warranted. In same case, model building leads one to ensure their view of reality.

### 7. Interpretation of Result, Implications and Sensitivity Analysis.

A reliable and valid model is useless unless one can interpret its solution and apply that solution to a given situation. Additionally, one may wish to describe the consequence of slight departures from assumption or model parameters. Any "sensitive" aspect of our model will cause significant differences in solution. These aspects must be closely monitored and controlled.

#### 2.4.3 Scheduling Through Simulation

Each job may have one or more operations remaining before the completion of the order. The sequence of work centers ("machines") through which a job flows constitutes the job's routing. The routings for various jobs will, in general, vary widely. For example, one job may go first to a lathe, then a milling machine, and finally a drill press, while another job may go to a bender and then to a punch press. The operation required at each machine normally includes a machine setup and actual run time. A given job may involve work on a single piece or on multiple pieces that are processed in a single batch. The shop can be scheduled by means of a simulator. Beginning with the existing state of the shop, the flow of work through the shop can be simulated. Upon completion of all jobs in simulated time, the simulated results can be analyzed. Results may be measured in such terms as the total hours of job tardiness and the total time jobs are in the shop (flow time). If the results appear satisfactory, the sequence of events in simulated time can be taken as the scheduled events. If results are not satisfactory, the shop can be simulated again using different machine capacities or different decision rules. This can continue until a satisfactory schedule is found, or until it is concluded that further search is unwarranted.

The basic simulation cycle is triggered with the completion of an operation. It consists of the following steps:

- (1). Determine which machine next finishes an operation.
- (2). Assign to the now free machine the highest priority job in the queue.
- (3). Move the job that just completed an operation to its next machine, or, if all operations have been completed, remove the job from the shop.

# 2.5 Design of Simulation Experimentation

Simulation-based approaches are derivatives of dispatching rule-based approaches. In a simulation-based scenario, one or more dispatching rules may be used to make a decision when a resources becomes available. Simulation-based approaches are restricted mostly to a forward scheduling capability (i.e., where a schedule is constructed by starting from a reference time and then advances the simulation clock as jobs are scheduled on resources). Simulation models are able to represent the detail of scheduling situations, and simulation-based approaches are useful in communicating the specific detail to various levels of personnel because of visual aids (e.g., animation) offered by simulation.

From the simulation view point, a job is considered as a queuing network where an order may require several different operations by different machines and may have to wait in several different queues. If job arrive at the shop randomly over time, the job shop is referred to as a *dynamic* job shop. This chapter present a review of basic factors incorporated into simulation models of dynamic job shops and therefore provide a basic understanding of a job shop simulation model for scheduling analysis. The second goal of this chapter is to provide a basic understanding of scheduling rules and their performance in simulated job shop.

The most likely components of job shop simulation model are as follows:

- 1. Order arrivals
- 2. Processing and setup times
- 3. Machines
- 4. Job routings
- 5. Shop load factor
- 6. Due dates
- 7. Priority rules

# 2.5.1 Order Arrivals

The arrival of orders is modeled in one of the following ways:

- 1. Instantaneous release of order into the shop. In this approaches the next order arrival times is defined at the time of each order arrival. The time between these arrivals is defined as a randomly generated variable.
- 2. Periodical release of all available orders at the beginning of the schedule period (day, week, etc.). This can be modeled in two ways:

- a. All the arriving orders as defined above accumulate at an order entry point. All of these orders are released into the shop at predefined points in time.
- b. At each order release time, a number defined as random variable of orders is generated.
- 3. Order pooling. This is similar to the above, except that a subset of the available orders is released into the shop at the beginning of each scheduling period. The selection of orders to be released into the shop may be based on the shop load and order characteristics.

The first approach is used in most models. The most popular arrival pattern is that of the Poisson process (i.e., the Poisson arrival rate or exponentially distributed inter-arrival times). If the time between arrivals is exponentially distributed, the rate (i.e., the number of arrivals per unit time) has a Poisson distribution. Therefore the Poisson-distributed arrival rate (in orders per unit time) is translated into interarrival time of the corresponding exponential distribution. However, when periodic release or order pooling is utilized, the Poisson may directly represent the number of orders arriving in an hour, day, and so on. The Erlang distribution is the sum of exponential distributions and is also used to model order arrivals. Other distributions for the interarrival time or arrival rates are uniform, geometric, binomial, and empirical (actual shop data) distributions. Constant interarrival times also used in investigating shop performance or the sensitivity of shop performance and the priority rules to some order and shop parameter.

The prevalence of the Poisson process is probably a result of its widespread use in queuing theory and its observed validity in some practical situations (e.g., number of calls arriving at a switchboard). The observed distribution of arrivals in actual shops, however, shows a wide variety in the arrival rate, and the Poisson distribution is not sufficient to explain or fit all the distributions observed. If the number of sources generating orders decreases, applicability of the Poisson assumption diminishes. For example, if orders to the shop are generated by distribution center based on minimum order levels, the consolidated order patterns may be erratic, even if the customer order pattern may be a Poisson process. Several different studies report that the arrival pattern is not important in evaluating the relative effectiveness of priority rules, although shop performance can be affected by the arrival pattern. Studies investigating periodic release and order pooling indicate similar result. In general, shop performance decrease with the increasing variance of the interarrival time distribution. Under periodic release, the following conclusion where obtained in various simulation studies:

- 1. The mean and variance of the inventory level are higher with an increase in the release period (Panwalkar, *et. al.* 1976).
- 2. Utilization is higher than average at the beginning of a scheduling period but is lower at the end (Panwalkar, *et. al.* 1976).
- 3. Fewer jobs are tardy for periodic release; however, the job that are tardy have longer periods of tardiness (Ulgen, O., 1979).
- 4. Due date performance is improved when period release is combined with a scheduling rule (Holloway and Nelson, 1974).
- 5. Job pooling (i.e., releasing a subset of orders at predefined intervals) is more restrictive and usually causes a decrease in shop performance (Ulgen, 1979) However, if the subset is selected to be balance the machine workloads, job pooling has a positive effect on shop and workload balance measures but has no significant effect or worse results on variance of lateness distribution and average tardiness (Irastorza and Deane, 1974).

## 2.5.2 Processing and Setup Times

In most job shop simulation models, the processing times are determined when an order arrives at the shop. Two approaches at this point:

- 1. Generate the actual processing times from a specified distribution; the processing times are random variables from a distribution such as the exponential distribution.
- 2. Generate the estimate processing times; the estimated times are the information available for scheduling purposes. When an order is placed on a machine, a random variable called a *work rate factor* is generated and is multiplied by the estimated time to give the actual time required.

The most common distributions are exponential and uniform for the estimated times and triangular, normal, or uniform for the work rate factor. This approach simulates the fact that in most cases the scheduler's knowledge or the processing times is not accurate and the process times fluctuate during day-of-day operations due to uncontrollable factors.

The specified families of processing time distributions are associated parameter affect shop performance. More important, some priority rules, such as SPT, are more sensitive to processing time distributions than are others. In general, as the variability of the order processing time decrease, performance of the non-duedate scheduling rule improves.

The setup times are included in the processing times in most models. In some models dependent setup times are used, the distribution of these times must be selected along with the parameter values. As the variance increases, the desirability for minimizing the setup times increases. The relative values of mean setup time and the mean processing time are also important considerations. When the mean setup time is large with respect to the mean processing time, there are more benefits obtainable from the scheduling rules that minimize the setup times.

In recent models, due to the increased capability and easy of modeling, a sequence-dependent setup time has been used. The presence of sequence-dependent setups changes both shop performance and the performance of the priority rules. Priority rules, which take setup times into consideration, are more successful than the others when the setup times are strongly sequence dependent (e.g., changing from J1 to J2 takes 10 minutes but changing from J3 to J2 takes 120 minutes).

### 2.5.3 Number of Machines

The number of machines used in simulation models varies greatly. In hypothetical models designed to evaluate the performance of scheduling rules, the number of machines range from 4 to 15. There seem to be a consensus that a fourmachines shop model is large enough so that the result can be extrapolated to the more complex shops. Some comparative studies have investigated the effect of shop size on the relative effectiveness of the priority rules and conclude with similar result: that neither the size nor the configuration of the shop changes the relative effectiveness of the priority rules.

## 2.5.4 Job Routing

Job routing determines the required sequence of operation so as to predict the traveling pattern of orders among the machines. Diversity of order types is imported to the models via a routing matrix, which defines the transition probabilities of orders from one machine to next. The extreme case are the pure flow shop, where there is only one routing, and the pure job shop, where the transient probabilities between the machines are equal for subsequent operations. Pure job shop models are the most common types of models in simulation studies. This is partly because of the easier load control over the shop in pure job shop models.

Often in real system, some or all orders may have alternative routings such that an operation may be performed on any one of number of machines. Two approaches are possible when alternative routing exist:

- 1. Place the order in all feasible operation queues. Perform the operation on the first available machine; remove the order from the other queues when the order is assigned to a machine.
- 2. Assign the order to an idle machine that is capable of performing a feasible operation; if there is no such idle machine, place the order in a queue according to some queue selection rule (e.g., shortest queue length, least work in queue, etc.).

Alternative routing has a significant impact on shop performance and on the relative effectiveness of the priority rules; It provides better performance and reduces the difference between the priority rules.

### 2.5.5 Machine and Shop Utilization

The combined effect of order arrival distribution, job routing, and processing times determine machine utilization. From the standpoint of job shop simulation, machine utilization is important because it affect queue lengths. If the average queue length is too small, the scheduling rules used in the model may not be forced to make discriminating order selections. When this situation occurs, it is difficult or impossible to evaluate the effectiveness of the scheduling rule. Adverse effects also result from machine utilization that is too high. If utilization is near 1.00, transient conditions may extend over long periods and require excessive CPU time in order to obtain a steady state that permits data to be collected for comparison purposes. Machine utilization commonly found in the literature ranges from 0.85 to 0.95. Utilizations in this range usually cause queues to reach a length that permits scheduling rules to select an order from several in the queue but does not lead to very long queues.

Sequence-dependent setup times may require careful consideration due to their effect on machine utilization and hence queue lengths. When some scheduling rules yield significantly different average setup times than some other rules, the model results may produce small queues. On the other hand, if another scheduling rule does not consider setup times, the combined setup plus the processing times may cause a saturation of the shop and thus produce an undesirable effect.

## 2.5.6 Due Date

Several different studies indicates that shop performance and the relative effectiveness of priority rules are affected by due date assignment methods as well by the tightness of due dates. The following considerations related to due date assignment:

1. Through policy (fixed) parameters, each order is assigned a due date when it arrives at the shop. The due date assignment method may or may not use current shop information:

- a. Static due date assignment rules consider only order data such as the arrival time, routing, and operation processing times of an order. Hence the order allowance time is a fixed amount for a given order of data and does not depend on the shop status when the order arrives.
- b. Dynamic due date assignment methods employ order and shop data. In addition to the arrival times, operation times, and routing, other factors in due date determination may include the current shop load and the average waiting time of the orders.
- 2. Due date assignment and order sequencing decision may be considered together and simultaneously as two dependent factors in the planning process. This leads to a new problem that requires determination of both the optimal set of due date and schedule for a given situation involving the shop status and order parameters.

## 2.5.7 Priority Rules

In the scheduling literature, a variety of terms, such as *scheduling rule*, *priority rule*, *dispatching rule*, or *heuristic*, refer to the rule that select an order from the order waiting in a queue to be processed next by the machine. However, a distinction is possible for clarification purpose: Usually, a priority rule is defined as a method of assigning a scalar value to each order in a queue fro scheduling purpose. A dispatching rule is defined similarly but implies that after the priorities are assigned, the job with the most priority will be dispatched to an available machine. A heuristic implies that more complex mathematical rules are used in determining the priorities. Finally, a scheduling rule may employ one or more priority rules and/or more complex mathematical or heuristic concepts in determining the next order to be

processed. In practice, the basic term *priority* or *dispatching rule* is used for all of the above.

Priority rules may be classified according to their time dependency (static versus dynamic rules), the type of data they use (local versus global rules), or both. A static rule determines only one priority value for each operation of an order during its existence in the shop. A dynamic priority value, in contrast, change over time, to assign the right order (i.e., the order that has the highest actual priority) to an available machine. The priority values of order must be updated before each decision is made. Hence more calculation is involved in dynamic rules. Adam and Surkis (1980). Priority update interval and anomalies in dynamic ratio type job shop scheduling rules, investigated the effect of updating policy and of updating the intervals on computational requirements and the effectiveness of priority rules. They concluded that due date performance is sensitive to the updating policy and to the updating intervals especially at high utilization (i.e., 92 to 96%).

Panwalkar and Iskander (2001) describe and categorized 113 priority rules. The functional categorization is given below.

- (a). Simple priority rules are based on order and/or shop data such as processing times, due date number of operations, cost(values), setup times, arrival times, and slack.
  - (b). The combinations of simple priority rules are the applications of two or more priority rules with the selection of which rule to use at a specific time being a function of the queue and order characteristics.
  - (c). Weighted priority rules involve the application of rules in 1(a) and/or 1(b) combined with different weights.
- 2. Heuristic involve more complex considerations, such as the solving of static problem at the beginning of each scheduling period, look-ahead, and so on.
- 3. Other rules.

The body of job shop simulation research established the validity of the basic assumption that given all the other shop parameters are the same, shop performance is strongly affected by the priority rules being used. However, there is no clear winner claimed for all the performance measures.

### 2.6 Simulation and Its Application on Scheduling

Mathematical models are a formalism whereby we can summarize our understanding of the physical world and utilize this knowledge in calculations of engineering interest. An important feature of any model is that it accurately reflects only those phenomena relevant to the current activity. On the one hand, accuracy is crucial to the utility of the results, and, on the other, relevance avoids unnecessary computation in achieving results and avoids obscuring important conclusions in the details.

Simulation is defined as the imitation of the operation of a real world process or system over time (Banks, 1998). Simulation is a necessary problem solving methodology for the solution of many real world problems. Simulation is used to describe and analyze the behavior of a system, as what-if question about the real system, and aid in the design of real systems. Existing system and conceptual system can be modeled with simulation. In other word (Shannon, 1975): simulation is an experimental techniques and applied methodology which seeks (i) to describe the behavior of system, (ii) To construct theories or hypotheses that account for the observed behavior, and (iii) To use these theories to predict future behavior or the effect produced by changes in the operational input set.

Many researches has used simulation methodology to solved scheduling problems (Yang and Wang, 2001, Cheng, Gen, and Tsujimura, 1996, Fonseca and Navaresse, 2002, Maturana, *et. al.*, 1997, Kacem, Hammadi, and Borne, 2002, Ying, 1996, and Sadeh and Fox, 1996.) Karatza, 2000, Chong and Sivakumar, 2003. In Term of Dynamic Simulation (Maturana, *et al.*, 1997, Kacem, Hammadi and Borne, 2002, Ying, 1996, and Sadeh and Fox, 1996.). or Stochastic Simulation Yang and Wang, 2001, Fonseca and Navaresse, 2002.

Simulation modeling is a highly flexible technique because its models do not require the many simplifying assumption needed by most analytical techniques. Furthermore, simulation tends to be easier to apply than analytic methods. In addition, simulation data is usually less costly than data collected using a real system. However, constructing simulation models may be costly, particularly because they need to be thoroughly verified and validated. Additionally, the cost of the experiment may be increase nature of simulation requires time increases. The statistical nature of simulation requires that many runs of the same model be done to achieve reliable and accurate results. Although its flexibility, simulation modeling traditionally is not an optimization techniques

Simulation system has become a powerful decision making instrument for scheduling. It requires a few simplifying assumptions, captures many of the true characteristics of the real model, and provides good insights about the interactions and relationships between qualitative and quantitative variables. This section describe recent research on simulation in scheduling by many authors.

Chong and Sivakumar, (2003) presented A simulation-based real-time scheduling mechanism for dynamic discrete manufacturing. The authors use mean flow time performance for different scheduling approaches, subjects to disturbances such as machine breakdowns. Discrete event simulation is used on-line to evaluate the selected approaches and the corresponding schedules to determine the best solution. The authors conclude that discrete event simulation has been an essential tool for detailed scheduling under a highly dynamic and unpredictable manufacturing system.

Cave, Nahavandi, and Kouzani (2002) introduce simulated annealing for simulation optimization of a real scheduling problem in industry. The authors showed that when using this method, high quality schedules can be produced within reasonable time constraints, but still not less computational yet.

Karatza (2000) Studied scheduling simulation model to address performance issues associated with scheduling. Three policies which combine processor and I/O scheduling are used to schedule parallel jobs for a variety of workloads. Simulated results reveal that all scheduling methods have merit, but one method significantly improves the overall performance and also provides a guarantee for fairness in individual job execution.

### 2.5 ANN for Solving Scheduling Problems

An artificial neural network (ANNs) is one of the AI techniques that have gained an important role in solving problems with extreme difficult or unknown analytical solutions (Lawrence, 1994). An ANN consists of an interconnected web of special units, called neurons, with associated connection weights that, after receiving a proper training, are capable of achieving a desired response to new inputs. Its ability of learning from examples makes ANN an extremely powerful programming tool when domain rules are not completely certain or when some amount of inaccuracy or conflicting data exist (Medsker, 1994). An ANN is used to learn a functional relationship between a set of jobs and the corresponding to the set of machine in the shop that optimize the stated performance criterion. The 'trained' neural network is then able to apply the learnt relationship to new problems.

There are some approaches developed based on artificial intelligence techniques such as neural networks, expert systems, fuzzy logic and genetic algorithms. There are some approaches developed based on artificial intelligence techniques such as neural networks, expert systems, fuzzy logic and genetic algorithms. Among them, Bilkay *et al.* (2004) proposed algorithm for flexible manufacturing system by using fuzzy logic. Yu and Ling (2001) involved neural network and genetic algorithm to solve the expanded job-shop scheduling problem. Genetic algorithms (GAs) are also used independently for JSS by some researches, among them Brizuela and Sannomiya (1999), Madureira and Ramos, (2001), Zhou *et al.* (2001). Watanabe, 2003 using ANN for solves Job shop scheduling.

Sabuncuoglu and Gurgun (1996) propose a new neural network approach to solve the single machine mean tardiness scheduling problem and the minimum makespan job shop scheduling problem. The proposed network combines the characteristics of neural networks and algorithmic approaches. The performance of the network is compared with the existing scheduling algorithms under various experimental conditions. A comprehensive bibliography is also provided in the paper.

El-Bouri *et al.* (2000) presented an approach for single machine job sequencing problems that is based on artificial neural networks. A problem is classified first by one type of neural network into one of a number of categories. The categorization is based on the problems characteristics. Then another neural network, which is specialized for a particular category, applies a previously learning relationship to produce a job sequence that aims to better satisfy the given objective. The learning is acquired in these networks after a training process in which the network is exposed repeatedly to a set of example problems and their solutions. The trained network thereby learns predominant relationships between given problems, and the output sequences that optimally meet the desired objective. The advantage of such an approach is that it allows what amounts to a "customized" heuristic to be established for problem subsets and various objectives without having to deduce an algorithm in advance. The methodology and its implementation is described for several of the more common sequencing objectives, as well as for a hypothetical objective that minimizes a cost function exhibiting a limited exponential behavior.

Lee and Shaw (2000) consider the classic problem of sequencing a set of jobs that arrive in different combinations over time in a manufacturing flow-shop. They focus on the development of a two-level neural network that incrementally learns sequencing knowledge. Based on the knowledge gained from learning using a set of training exemplars, the neural network makes real time sequencing decisions for a set of jobs that arrive in different job combinations. In addition to explain the details regarding the workings of the neural network, they also evaluate its performance for flow-shop sequencing problems. The practical benefit of the neural-net approach is that the neural network incrementally learns the sequencing knowledge and can apply the knowledge for sequencing a set of jobs on a real time basis. They also show that the neural network can be used to develop hybrid genetic algorithms. The experimental results demonstrate that (1) the neural-net approach produces consistently superior solution quality (i.e., makespan) with significantly less computational time than the traditional heuristic approaches; (2) when compared to genetic algorithms the neural-net approach's performances are within 3.4% of those of genetic algorithms, but using only less than 0.2% of the computational time needed by genetic algorithms; and (3) the neural-net approach further improves solution quality and computational time by combining it with genetic algorithms.

Yang and Wang (2001), presented a new adaptive neural network and heuristics hybrid approach for job-shop scheduling is presented. The neural network has the property of adapting its connection weights and biases of neural units while solving the feasible solution. Two heuristics are presented, which can be combined with the neural network. One heuristic is used to accelerate the solving process of the neural network and guarantee its convergence; the other heuristic is used to obtain non-delay schedules from the feasible solutions gained by the neural network. Computer simulations have shown that the proposed hybrid approach is of high speed and efficiency. The strategy for solving practical job-shop scheduling problems is provided.

Yu and Liang (2001), presented a hybrid approach involving neural network and genetic algorithm (GA) to solve the expanded job-shop scheduling problem (EJSSP). The GA is used for optimization of sequence and a neural network (NN) is used for optimizing of operation start times with a fixed sequence. The authors reported that the approach has been shown powerful for competes expanded job-shop scheduling problem.

### 2.5 Summary of Chapter 2

This chapter has provided a broad and specific review on issues related to scheduling. In particular, scheduling classification and scheduling rules were reviewed to provide general background information on the field of study. It also provides specific reviews on job shop scheduling and dynamic scheduling since these are the focus problem in this study. This reviews also covered previous studies conducted by various researchers on dynamic scheduling. Background on the simulation techniques and its application in scheduling studies were also reviewed. In addressing the dynamic job shop scheduling problem, close-form mathematical and optimization procedures would have difficulty in capturing the complexities and not capable to provide solution in a reasonable amount of time. Artificial neural network has been identified as a promising information processing tools in many fields of studies. Its applications in solving scheduling problems were also reviewed in this report.

## **CHAPTER 3**

# **RESEARCH METHODOLOGY**

This chapter describes the methodology adopted in this research. It begins with description of the traditional and proposed frameworks for producing production schedules. Then it describes the operational framework, research questions and development phases.

# 3.1 Traditional and Proposed Framework

Since the job shop scheduling problem is a well-known NP hard problem, a realistic size of the problem can not be solved by searching and evaluating all the alternative solutions. Generally, there are no optimization algorithms which can solve a NP hard problem in a polynomial time. However, such problem may be solved using heuristics algorithms with approximated optimal solution. There are many literatures which report various heuristic methods to solve such problems. One alternative technique is through simulation. This approach has been extensively applied in many application areas including the job shop-scheduling problem. The main problem in applying this approach is that the user needs to re-run the simulation whenever there are changes in the system. This traditional approach is time consuming and not practical for a dynamically changing manufacturing environment.

Thus, this study proposes a new theoretical framework for addressing the need of rescheduling in dynamic environment as shown in Figure 3-2.



Figure 3-1: Traditional Theoretical Framework



Figure 3-2: Proposed Theoretical Framework

## **3.2 Operational Framework**

Figure 3-3 shows the intended operational framework of the proposed scheduling system. It shows the relationships among the scheduling system, user (production scheduler) and manufacturing processes. Assuming a manufacturing system begins its operation following an initial schedule prepared according to the

present job shop condition. However, when changes emerge in demand or capacity, the production scheduler has to immediately update the system with new information. Then, the scheduling system would instantaneously generate the revised schedules without a need to evaluate or simulate the new manufacturing scenarios.



Figure 3-3: Operational Framework

## **3.3** Research Questions

The literature reviews as discussed in Chapter 2 reveal some research questions regarding potential and applicability of neural network technique in development of a scheduling system for a dynamic job shop. Among the unanswered question are:

- Can ANN supplement or replace the existing method in the process of generating schedules?
- Can ANN supplement or replace the existing method for selecting the best schedule/decision for a given set of conditions for dynamic job shop scheduling?

This research also seeks to address the above questions.

# **3.4 Development Phases**

The development phases used in this study comprises two phases as shown in Figure 3-4:

Phase 1: Simulation studies of various scheduling scenarios.

Phase 2: Design and development of a dynamic scheduling system by using artificial neural network (ANN).



Figure 3-4: Development Phases

## **CHAPTER 4**

## MODEL DEVELOPMENT

# 4.1 **Problem Definition**

A case study of 6 by 6 job shop scheduling problem from Fisher and Thompson (1963) was adapted in this study since the same case study has been widely referred by other researchers. The case study is shown in Table 4-1. For the purpose of this research, uncertainty elements were added to the original data set. This job shop consists of six machines, labeled as A, B, C, D, E, and F. The tasks were to manufacture six different parts.

	Operation No							
Job No.	1	2	3	4	5	6		
1	C,3	A,10	B,9	D,5	F,3	E,10		
2	B,6	C,8	E,1	F,5	A,3	D,3		
3	C,1	D,5	F,5	A,5	B,9	E,1		
4	B,7	A,5	C,4	D,3	E,1	F,3		
5	C,6	B,11	E,7	F,8	A,5	D,4		
6	B,3	D,10	F,8	A,9	E,4	C,9		

**Table 4-1**A case study of 6 x 6 job shop scheduling problem (Fisher and<br/>Thompson, 1963).

This job shop was modeled using ARENA simulation software which run on Pentium IV personal computer. The simulation model was designed to simulate the six-machine with each machine adopting similar dispatching rule. The job to be processed by a machine is selected from its respective queue. The physical system configuration is shown in Figure 4-1.



Figure 4-1: Physical configuration of a six-machine dynamic job shop.

Figure 4.1 shows each job comes directly through an entrance gate and passes to various machine according to its predetermined route. Each incoming job will posses a specific task characteristic assigned before entering the job shop. The task characteristics for each job are as the following:

- Routings details
- Job processing time on each machine where operation will be performed
- Scheduling rule

### 4-2 Simulation Model

As noted earlier, a computer simulation model to represent the job shop system was designed using ARENA. The performances of various job shop conditions when using scheduling rules, namely, first-in-first-out (FIFO), earliestdue-date (EDD), and shortest processing time (SPT) were evaluated.

The job shop used in this study consists of 6 unique work centers. The jobs were planned to arrive continuously with inter-arrival times generated from an empirical discrete distribution. The mean value chosen was chosen to create a certain expected shop utilization rate. Each job underwent 6 operations which were drawn from a normal distribution with means extracted from the original data (Fisher and Thompson,1963). The schedule adopted a pure job shop routing whereby when a job left a work center, it was equally likely to go to each of the other work centers. Work center processing times were drawn from a normal distribution with means extracted from the other work centers. Work center processing times were drawn from a normal distribution with means extracted from Fisher and Thompson (1963). Other assumptions adopted in the development of the model are :

- the resources were available continuously
- preemption of a job was not allowed
- set-up times were included in the processing times
- transportation times were excluded, and
- processing times of the jobs were known after their arrivals at the shop.

#### **4.2.1** Steady-state Condition of the Shop (Warm up period)

In order to ascertain when the system has achieved a steady state, the shop parameters, such as the machine utilization level and mean flow-time of jobs need to be observed. It was found that the simulated system reached a steady state after the arrival of about 500 time units.

#### 4.2.2 Run Length and Number of Replications

Job arrivals were generated using an exponential distribution. Three machine utilization levels, namely, "low", "medium", and "high" were studied. Thus, in all, for one type of process time distribution, one due date setting and three different utilization levels would resulted in a total of three experimental sets for every dispatching rule. Hence, for the three scheduling rules (FCFS, EDD and SPT), a total of nine simulation experiments were conducted. Each simulation experiment was replicated in twenty different runs. In each run, the job shop was continuously loaded with job orders that were numbered on arrival.

# 4.3 Artificial Neural Network Model

The construction of the artificial neural network (ANN) model involves a learning process. Figure 4-2 illustrates the neural network model developed for this research. The network was developed using a multilayer perceptron (MLP) architecture and the learning process was based on back-propagation algorithm. The datasets for training and testing were stored in a text file. The ANN learning involves computation of the predicted output against the target output. Adjustment of the weight was made to minimize the mean absolute error (MAE) as shown in Figure 4-3.



Figure 4-2, ANN Scheduling Model



Figure 4-3, Error Adjusted for ANN model.
# 4.4 Sequence Codification Scheme (SCS)

The ANN structure with one input layer, one hidden layer, and one output layer as shown in Figure 4-2 was used in this study. Data representation is an important issue that directly influences the decision on the ANN architecture, specifically, the number of input neurons. The number of input neurons required to represent any given job sequence depends on the definition of these sequence codification scheme (SCS). The codification rules adopted in this research was based on the guidelines proposed by Lawrence (1994). A brief description of the SCS is provided in the Appendix E.

### **CHAPTER 5**

#### **RESULTS AND DISCUSSION**

# 5.1 Simulation Results

This chapter provides training results for the ANN scheduling model. Tables 5.1 to 5.9 present the results for FIFO, EDD, and SPT scheduling rules with the respective "Low", "Medium", and "High" job arrivals. Appendix B provides the flowcharts for FIFO, SPT, and EDD algorithm.

### 5.2 ANN Training Results

The scheduling scenarios evaluated through ARENA simulation provided valuable input data sets and they were used for training the ANN scheduling model. Detailed results from ARENA simulation are provided in Appendix D.

The training parameters used for the ANN model is shown in Table 5-10. A total of 180 training samples were used with a learning rate = 0.1.

Nu	m of Co	omplete	ed job	s (Pa	rts)		Max	imum Flow	time (Time	Unit)			Averag	e Machin	e Utiliza	tion (%)		Avera	age Job (	Q length	for the m	nachine (	Parts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	МВ	МС	MD	ME	MF
7	11	16	9	11	16	68.529	69.832	73.097	71.524	63.000	66.417	0.311	0.191	0.196	0.190	0.309	0.340	0.033	0.046	0.027	0.010	0.083	0.146
9	13	20	9	18	11	60.333	77.491	75.917	87.158	80.251	65.973	0.336	0.259	0.270	0.210	0.341	0.371	0.024	0.812	0.093	0.020	0.120	0.090
12	18	12	13	20	16	56.377	132.640	88.820	111.280	132.210	83.092	0.340	0.273	0.306	0.189	0.390	0.401	0.031	0.086	0.093	0.013	0.167	0.261
10	14	9	13	25	4	57.845	69.990	77.711	67.263	89.552	58.189	0.260	0.252	0.286	0.173	0.324	0.300	0.012	0.087	0.016	0.027	0.049	0.052
12	17	14	15	12	11	68.311	79.969	69.770	80.000	82.124	67.149	0.366	0.291	0.264	0.217	0.397	0.404	0.166	0.090	0.035	0.160	0.052	0.052
12	9	11	13	14	11	68.163	68.151	65.722	69.000	82.406	58.367	0.269	0.226	0.207	0.198	0.323	0.340	0.029	0.062	0.029	0.042	0.037	0.051
10	14	14	16	11	13	55.598	67.281	81.452	68.888	74.928	65.774	0.350	0.260	0.256	0.206	0.367	0.410	0.020	0.078	0.042	0.088	0.056	0.066
8	8	12	11	12	13	60.000	69.506	61.044	68.956	61.000	63.622	0.270	0.170	0.184	0.145	0.257	0.299	0.007	0.038	0.030	0.017	0.074	0.021
10	11	9	17	10	10	64.448	78.695	64.777	110.760	103.880	74.135	0.274	0.230	0.218	0.180	0.313	0.353	0.025	0.036	0.046	0.026	0.091	0.175
16	11	16	9	11	10	62.166	67.548	71.529	61.000	89.959	84.386	0.316	0.230	0.202	0.228	0.337	0.354	0.019	0.056	0.067	0.179	0.072	0.031
12	13	14	14	12	10	83.254	70.049	71.467	75.522	74.000	66.199	0.308	0.242	0.230	0.204	0.339	0.356	0.027	0.063	0.054	0.028	0.057	0.108
9	10	13	13	12	11	63.161	90.497	64.359	80.320	67.436	68.003	0.296	0.209	0.230	0.188	0.310	0.335	0.050	0.029	0.090	0.014	0.068	0.068
10	19	14	11	13	13	75.936	89.083	72.743	95.162	83.691	70.543	0.335	0.267	0.270	0.175	0.371	0.390	0.063	0.075	0.121	0.021	0.126	0.124
8	15	16	14	16	10	61.516	96.991	120.210	97.744	102.460	106.620	0.316	0.251	0.265	0.196	0.373	0.360	0.090	0.069	0.061	0.016	0.168	0.172
8	13	7	12	14	14	52.967	69.807	65.975	71.000	64.137	77.115	0.260	0.219	0.227	0.167	0.312	0.346	0.014	0.032	0.040	0.013	0.042	0.144
12	12	10	11	12	19	67.873	69.600	70.897	74.158	81.617	67.269	0.318	0.221	0.224	0.178	0.321	0.355	0.016	0.044	0.049	0.018	0.051	0.102
10	12	10	13	11	10	65.000	76.149	93.537	56.862	64.884	68.924	0.267	0.216	0.206	0.163	0.299	0.332	0.029	0.035	0.063	0.021	0.057	0.079
12	13	13	15	12	18	62.475	73.529	70.889	67.263	76.113	69.287	0.335	0.262	0.228	0.208	0.369	0.420	0.027	0.039	0.036	0.019	0.085	0.162
11	11	14	13	16	12	65.822	73.404	73.687	68.021	76.632	71.379	0.308	0.730	1.250	0.792	2.817	1.620	0.015	0.037	0.064	0.040	0.144	0.083
6	14	7	16	10	7	73.038	76.691	75.000	74.041	82.396	62.999	0.488	0.411	0.981	0.330	2.080	1.420	0.256	0.205	0.211	0.153	0.300	0.309

**Table 5-1**Simulation Results where Scheduling Rule = FIFO, Job Arrival = "Low"

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

	Num	of Co	mpleted	jobs (Par	ts)		Ма	iximum Flo	wtime (Time	e Unit)			Averag	e Machir	ne Utiliza	tion (%)		Avera	age Job (	Q length	for the m	achine (	Parts)
J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	MB	МС	MD	ME	MF	F
8	13	17	11	13	18	69.529	71.832	74.097	73.524	65.000	68.417	0.344	0.258	0.229	0.257	0.376	0.407	0.034	0.048	0.028	0.012	0.085	0.148
11	15	23	12	19	12	63.333	80.491	77.917	89.158	81.251	66.973	0.436	0.359	0.337	0.277	0.374	0.404	0.027	0.815	0.095	0.022	0.121	0.091
15	20	15	14	22	17	59.377	133.640	91.820	113.280	134.210	84.092	0.440	0.306	0.406	0.256	0.457	0.434	0.034	0.087	0.096	0.015	0.169	0.262
11	17	9	16	25	4	57.845	72.990	78.711	70.263	89.552	58.189	0.260	0.352	0.319	0.273	0.324	0.300	0.012	0.090	0.017	0.030	0.049	0.052
14	20	16	16	14	11	70.311	80.969	71.770	83.000	84.124	67.149	0.433	0.324	0.331	0.317	0.464	0.404	0.168	0.091	0.037	0.163	0.054	0.052
14	9	14	14	15	11	71.163	69.151	67.722	69.000	83.406	58.367	0.369	0.259	0.274	0.198	0.356	0.340	0.032	0.063	0.031	0.042	0.038	0.051
13	14	15	18	12	13	56.598	69.281	84.452	68.888	75.928	65.774	0.383	0.327	0.356	0.206	0.400	0.410	0.021	0.080	0.045	0.088	0.057	0.066
11	11	13	13	13	13	61.000	71.506	64.044	71.956	62.000	63.622	0.303	0.237	0.284	0.245	0.290	0.299	0.008	0.040	0.033	0.020	0.075	0.021
11	12	11	19	13	13	66.448	80.695	65.777	111.760	106.880	77.135	0.341	0.297	0.251	0.213	0.413	0.453	0.027	0.038	0.047	0.027	0.094	0.178
19	12	18	9	11	11	64.166	67.548	74.529	62.000	89.959	85.386	0.383	0.230	0.302	0.261	0.337	0.387	0.021	0.056	0.070	0.180	0.072	0.032
12	16	14	14	12	10	83.254	70.049	71.467	78.522	74.000	66.199	0.308	0.242	0.230	0.304	0.339	0.356	0.027	0.063	0.054	0.031	0.057	0.108
10	12	14	16	12	11	64.161	93.497	65.359	82.320	67.436	68.003	0.329	0.309	0.263	0.255	0.310	0.335	0.051	0.032	0.091	0.016	0.068	0.068
12	21	17	12	14	13	78.936	90.083	74.743	97.162	84.691	70.543	0.435	0.300	0.337	0.242	0.404	0.390	0.066	0.076	0.123	0.023	0.127	0.124
8	15	16	14	19	13	61.516	96.991	120.210	97.744	105.460	109.620	0.316	0.251	0.265	0.196	0.473	0.460	0.090	0.069	0.061	0.016	0.171	0.175
11	14	9	13	16	15	54.967	70.807	68.975	72.000	66.137	78.115	0.327	0.252	0.327	0.200	0.379	0.379	0.016	0.033	0.043	0.014	0.044	0.145
12	15	10	13	14	22	67.873	71.600	70.897	77.158	83.617	70.269	0.318	0.288	0.224	0.278	0.388	0.455	0.016	0.046	0.049	0.021	0.053	0.105
11	14	11	13	11	10	66.000	76.149	94.537	58.862	64.884	68.924	0.300	0.216	0.239	0.230	0.299	0.332	0.030	0.035	0.064	0.023	0.057	0.079
14	15	16	18	14	21	65.475	76.529	72.889	69.263	78.113	72.287	0.435	0.362	0.295	0.275	0.436	0.520	0.030	0.042	0.038	0.021	0.087	0.165
11	11	17	14	18	13	68.822	74.404	73.687	68.021	78.632	72.379	0.408	0.763	1.250	0.792	2.884	1.653	0.018	0.038	0.064	0.040	0.146	0.084
6	14	7	16	10	7	73.038	76.691	75.000	74.041	82.396	62.999	0.488	0.411	0.981	0.330	2.080	1.420	0.256	0.205	0.211	0.153	0.300	0.309

**Table 5-2**Simulation Results where Scheduling Rule = EDD, Job Arrival = "Low"

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

	Num	of Co	mpleted	jobs (Par	rts)		Ма	aximum Flo	wtime (Time	e Unit)			Averag	e Machir	ne Utiliza	tion (%)		Avera	age Job (	2 length	for the m	achine (	Parts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	MB	МС	MD	ME	MF
6	9	15	7	9	14	67.529	67.832	72.097	69.524	61.000	64.417	0.278	0.124	0.163	0.123	0.242	0.273	0.032	0.043	0.026	0.008	0.081	0.144
7	11	17	6	17	10	57.333	74.491	73.917	85.158	79.251	64.973	0.236	0.159	0.203	0.143	0.308	0.338	0.021	0.809	0.091	0.018	0.119	0.089
9	16	9	12	18	15	53.377	131.640	85.820	109.280	130.210	82.092	0.240	0.240	0.206	0.122	0.323	0.368	0.028	0.085	0.090	0.011	0.165	0.260
9	11	9	10	25	4	57.845	66.990	76.711	64.263	89.552	58.189	0.260	0.152	0.253	0.073	0.324	0.300	0.012	0.084	0.015	0.024	0.049	0.052
10	14	12	14	10	11	66.311	78.969	67.770	77.000	80.124	67.149	0.299	0.258	0.197	0.117	0.330	0.404	0.164	0.089	0.033	0.157	0.050	0.052
10	9	8	12	13	11	65.163	67.151	63.722	69.000	81.406	58.367	0.169	0.193	0.140	0.198	0.290	0.340	0.026	0.061	0.027	0.042	0.036	0.051
7	14	13	14	10	13	54.598	65.281	78.452	68.888	73.928	65.774	0.317	0.193	0.156	0.206	0.334	0.410	0.019	0.076	0.039	0.088	0.055	0.066
5	5	11	9	11	13	59.000	67.506	58.044	65.956	60.000	63.622	0.237	0.103	0.084	0.045	0.224	0.299	0.006	0.036	0.027	0.014	0.073	0.021
9	10	7	15	7	7	62.448	76.695	63.777	109.760	100.880	71.135	0.207	0.163	0.185	0.147	0.213	0.253	0.023	0.034	0.045	0.025	0.088	0.172
13	10	14	9	11	9	60.166	67.548	68.529	60.000	89.959	83.386	0.249	0.230	0.102	0.195	0.337	0.321	0.017	0.056	0.064	0.178	0.072	0.030
12	10	14	14	12	10	83.254	70.049	71.467	72.522	74.000	66.199	0.308	0.242	0.230	0.104	0.339	0.356	0.027	0.063	0.054	0.025	0.057	0.108
8	8	12	10	12	11	62.161	87.497	63.359	78.320	67.436	68.003	0.263	0.109	0.197	0.121	0.310	0.335	0.049	0.026	0.089	0.012	0.068	0.068
8	17	11	10	12	13	72.936	88.083	70.743	93.162	82.691	70.543	0.235	0.234	0.203	0.108	0.338	0.390	0.060	0.074	0.119	0.019	0.125	0.124
8	15	16	14	13	7	61.516	96.991	120.210	97.744	99.460	103.620	0.316	0.251	0.265	0.196	0.273	0.260	0.090	0.069	0.061	0.016	0.165	0.169
5	12	5	11	12	13	50.967	68.807	62.975	70.000	62.137	76.115	0.193	0.186	0.127	0.134	0.245	0.313	0.012	0.031	0.037	0.012	0.040	0.143
12	9	10	9	10	16	67.873	67.600	70.897	71.158	79.617	64.269	0.318	0.154	0.224	0.078	0.254	0.255	0.016	0.042	0.049	0.015	0.049	0.099
9	10	9	13	11	10	64.000	76.149	92.537	54.862	64.884	68.924	0.234	0.216	0.173	0.096	0.299	0.332	0.028	0.035	0.062	0.019	0.057	0.079
10	11	10	12	10	15	59.475	70.529	68.889	65.263	74.113	66.287	0.235	0.162	0.161	0.141	0.302	0.320	0.024	0.036	0.034	0.017	0.083	0.159
11	11	11	12	14	11	62.822	72.404	73.687	68.021	74.632	70.379	0.208	0.697	1.250	0.792	2.750	1.587	0.012	0.036	0.064	0.040	0.142	0.082
6	14	7	16	10	7	73.038	76.691	75.000	74.041	82.396	62.999	0.488	0.411	0.981	0.330	2.080	1.420	0.256	0.205	0.211	0.153	0.300	0.309

**Table 5-3**Simulation Results where Scheduling Rule = SPT, Job Arrival = "Low"

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

	Num	of Co	mpleted	jobs (Par	ts)		Maxi	mum Flow	time (Tim	e Unit)			Averag	e Machir	ne Utiliza	tion (%)		Avera	age Job (	length	for the m	achine (	Parts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	MB	MC	MD	ME	MF
21	23	22	30	26	27	73.162	77.137	75.349	68.000	123.190	88.243	0.548	0.471	0.434	0.370	0.633	0.696	0.975	0.127	0.109	0.086	0.296	0.497
19	25	32	20	30	22	69.117	80.157	77.291	75.420	78.520	100.130	0.563	0.458	0.476	0.346	0.652	0.676	0.129	0.137	0.182	0.050	0.334	0.382
26	28	17	27	29	21	63.528	70.138	64.570	69.590	127.100	129.980	0.522	0.497	0.413	0.375	0.634	0.667	0.107	0.168	0.118	0.067	0.341	0.520
18	32	16	39	38	9	93.196	72.873	75.171	76.371	131.380	130.600	0.510	0.529	0.514	0.339	0.716	0.660	0.092	0.182	0.205	0.085	0.402	0.295
23	28	27	29	26	17	83.249	80.503	93.652	79.158	135.240	117.360	0.599	0.496	0.458	0.385	0.687	0.667	0.216	0.193	0.191	0.076	0.416	0.423
28	31	16	31	29	20	75.681	82.620	78.238	75.822	102.480	165.400	0.550	0.525	0.455	0.383	0.693	0.662	0.128	0.188	0.173	0.073	0.457	0.450
21	19	23	31	30	26	83.000	71.887	77.010	78.021	97.461	92.361	0.516	0.470	0.488	0.327	0.648	0.661	0.096	0.125	0.231	0.043	0.281	0.436
19	19	22	31	36	27	65.218	69.837	81.248	68.004	92.979	101.470	0.536	0.468	0.500	0.351	0.656	0.675	0.090	0.118	0.200	0.072	0.374	0.414
16	31	24	28	29	25	84.098	81.137	83.476	72.620	81.102	110.440	0.552	0.486	0.480	0.334	0.664	0.692	0.097	0.146	0.198	0.065	0.288	0.399
27	23	23	29	25	24	68.965	73.749	80.684	65.395	84.173	82.746	0.516	0.472	0.423	0.379	0.650	0.633	0.102	0.154	0.146	0.062	0.244	0.402
22	27	25	28	19	28	77.584	75.171	76.497	72.127	78.887	90.236	0.582	0.466	0.394	0.384	0.652	0.727	0.088	0.110	0.126	0.075	0.318	0.526
22	25	28	23	33	24	85.087	82.318	80.709	80.915	109.850	120.860	0.578	0.483	0.492	0.353	0.662	0.693	0.191	0.151	0.243	0.063	0.447	0.503
23	31	25	22	29	23	84.062	80.855	71.356	82.649	157.230	116.540	0.574	0.485	0.486	0.358	0.673	0.692	0.109	0.122	0.213	0.048	0.299	0.565
18	26	34	26	31	20	90.444	86.984	92.983	70.783	98.421	127.420	0.539	0.437	0.484	0.359	0.662	0.670	0.087	0.149	0.169	0.072	0.386	0.427
16	42	18	21	25	23	102.860	78.607	86.486	74.865	75.786	121.730	0.562	0.531	0.452	0.339	0.671	0.694	0.148	0.207	0.231	0.074	0.422	0.486
20	15	29	32	26	29	90.941	81.708	88.445	65.858	88.710	97.379	0.558	0.425	0.448	0.341	0.620	0.677	0.118	0.122	0.186	0.055	0.285	0.473
15	22	30	31	31	27	74.573	77.856	80.151	73.534	110.020	109.190	0.579	0.463	0.501	0.338	0.654	0.705	0.162	0.208	0.197	0.038	0.299	0.529
27	27	29	23	26	22	77.286	95.107	80.134	68.390	98.357	99.360	0.552	0.486	0.424	0.392	0.635	0.677	0.137	0.105	0.148	0.120	0.302	0.475
22	24	28	23	27	23	96.983	87.132	71.989	69.649	110.110	116.030	0.552	0.447	0.442	0.364	0.616	0.670	0.068	0.140	0.138	0.057	0.276	0.432
23	22	16	33	33	26	67.204	74.426	82.529	69.696	91.024	106.640	0.554	0.485	0.482	0.328	0.677	0.637	0.099	0.112	0.260	0.046	0.252	0.350

# Simulation Results where Scheduling Rule = FIFO, Job Arrival = "Medium" ated jobs (Parts) Maximum Flowtime (Time Unit) Average Machine Uti Table 5-4

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

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	Num of Completed jobs (Part           1         J2         J3         J4         J5						Maxii	mum Flow	time (Tim	e Unit)			Averag	e Machir	ne Utiliza	tion (%)		Avera	age Job (	2 length	for the m	achine (	Parts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	MB	МС	MD	ME	MF
22	25	23	32	28	29	74.162	79.137	76.349	70.000	125.190	90.243	0.648	0.671	0.534	0.570	0.833	0.896	0.985	0.147	0.119	0.106	0.316	0.517
21	27	35	23	31	23	72.117	83.157	79.291	77.420	79.520	101.130	0.863	0.758	0.676	0.546	0.752	0.776	0.159	0.167	0.202	0.070	0.344	0.392
29	30	20	28	31	22	66.528	71.138	67.570	71.590	129.100	130.980	0.822	0.597	0.713	0.575	0.834	0.767	0.137	0.178	0.148	0.087	0.361	0.530
19	35	16	42	38	9	93.196	75.873	76.171	79.371	131.380	130.600	0.510	0.829	0.614	0.639	0.716	0.660	0.092	0.212	0.215	0.115	0.402	0.295
25	31	29	30	28	17	85.249	81.503	95.652	82.158	137.240	117.360	0.799	0.596	0.658	0.685	0.887	0.667	0.236	0.203	0.211	0.106	0.436	0.423
30	31	19	32	30	20	78.681	83.620	80.238	75.822	103.480	165.400	0.850	0.625	0.655	0.383	0.793	0.662	0.158	0.198	0.193	0.073	0.467	0.450
24	19	24	33	31	26	84.000	73.887	80.010	78.021	98.461	92.361	0.616	0.670	0.788	0.327	0.748	0.661	0.106	0.145	0.261	0.043	0.291	0.436
22	22	23	33	37	27	66.218	71.837	84.248	71.004	93.979	101.470	0.636	0.668	0.800	0.651	0.756	0.675	0.100	0.138	0.230	0.102	0.384	0.414
17	32	26	30	32	28	86.098	83.137	84.476	73.620	84.102	113.440	0.752	0.686	0.580	0.434	0.964	0.992	0.117	0.166	0.208	0.075	0.318	0.429
30	24	25	29	25	25	70.965	73.749	83.684	66.395	84.173	83.746	0.716	0.472	0.723	0.479	0.650	0.733	0.122	0.154	0.176	0.072	0.244	0.412
22	30	25	28	19	28	77.584	75.171	76.497	75.127	78.887	90.236	0.582	0.466	0.394	0.684	0.652	0.727	0.088	0.110	0.126	0.105	0.318	0.526
23	27	29	26	33	24	86.087	85.318	81.709	82.915	109.850	120.860	0.678	0.783	0.592	0.553	0.662	0.693	0.201	0.181	0.253	0.083	0.447	0.503
25	33	28	23	30	23	87.062	81.855	73.356	84.649	158.230	116.540	0.874	0.585	0.686	0.558	0.773	0.692	0.139	0.132	0.233	0.068	0.309	0.565
18	26	34	26	34	23	90.444	86.984	92.983	70.783	101.421	130.420	0.539	0.437	0.484	0.359	0.962	0.970	0.087	0.149	0.169	0.072	0.416	0.457
19	43	20	22	27	24	104.860	79.607	89.486	75.865	77.786	122.730	0.762	0.631	0.752	0.439	0.871	0.794	0.168	0.217	0.261	0.084	0.442	0.496
20	18	29	34	28	32	90.941	83.708	88.445	68.858	90.710	100.379	0.558	0.625	0.448	0.641	0.820	0.977	0.118	0.142	0.186	0.085	0.305	0.503
16	24	31	31	31	27	75.573	77.856	81.151	75.534	110.020	109.190	0.679	0.463	0.601	0.538	0.654	0.705	0.172	0.208	0.207	0.058	0.299	0.529
29	29	32	26	28	25	80.286	98.107	82.134	70.390	100.357	102.360	0.852	0.786	0.624	0.592	0.835	0.977	0.167	0.135	0.168	0.140	0.322	0.505
22	24	31	24	29	24	99.983	88.132	71.989	69.649	112.110	117.030	0.852	0.547	0.442	0.364	0.816	0.770	0.098	0.150	0.138	0.057	0.296	0.442
23	22	16	33	33	26	67.204	74.426	82.529	69.696	91.024	106.640	0.554	0.485	0.482	0.328	0.677	0.637	0.099	0.112	0.260	0.046	0.252	0.350

 Table 5-5
 Simulation Results where Scheduling Rule = EDD, Job Arrival = "Medium"

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

	Num	of Co	mpleted	jobs (Par	rts)		Maxi	mum Flow	/time (Tim	e Unit)			Averag	e Machir	ne Utiliza	tion (%)		Avera	age Job (	2 length	for the m	achine (	Parts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	MB	МС	MD	ME	MF
20	21	21	28	24	25	72.162	75.137	74.349	66.000	121.190	86.243	0.448	0.271	0.334	0.170	0.433	0.496	0.965	0.107	0.099	0.066	0.276	0.477
17	23	29	17	29	21	66.117	77.157	75.291	73.420	77.520	99.130	0.263	0.158	0.276	0.146	0.552	0.576	0.099	0.107	0.162	0.030	0.324	0.372
23	26	14	26	27	20	60.528	69.138	61.570	67.590	125.100	128.980	0.222	0.397	0.113	0.175	0.434	0.567	0.077	0.158	0.088	0.047	0.321	0.510
17	29	16	36	38	9	93.196	69.873	74.171	73.371	131.380	130.600	0.510	0.229	0.414	0.039	0.716	0.660	0.092	0.152	0.195	0.055	0.402	0.295
21	25	25	28	24	17	81.249	79.503	91.652	76.158	133.240	117.360	0.399	0.396	0.258	0.085	0.487	0.667	0.196	0.183	0.171	0.046	0.396	0.423
26	31	13	30	28	20	72.681	81.620	76.238	75.822	101.480	165.400	0.250	0.425	0.255	0.383	0.593	0.662	0.098	0.178	0.153	0.073	0.447	0.450
18	19	22	29	29	26	82.000	69.887	74.010	78.021	96.461	92.361	0.416	0.270	0.188	0.327	0.548	0.661	0.086	0.105	0.201	0.043	0.271	0.436
16	16	21	29	35	27	64.218	67.837	78.248	65.004	91.979	101.470	0.436	0.268	0.200	0.051	0.556	0.675	0.080	0.098	0.170	0.042	0.364	0.414
15	30	22	26	26	22	82.098	79.137	82.476	71.620	78.102	107.440	0.352	0.286	0.380	0.234	0.364	0.392	0.077	0.126	0.188	0.055	0.258	0.369
24	22	21	29	25	23	66.965	73.749	77.684	64.395	84.173	81.746	0.316	0.472	0.123	0.279	0.650	0.533	0.082	0.154	0.116	0.052	0.244	0.392
22	24	25	28	19	28	77.584	75.171	76.497	69.127	78.887	90.236	0.582	0.466	0.394	0.084	0.652	0.727	0.088	0.110	0.126	0.045	0.318	0.526
21	23	27	20	33	24	84.087	79.318	79.709	78.915	109.850	120.860	0.478	0.183	0.392	0.153	0.662	0.693	0.181	0.121	0.233	0.043	0.447	0.503
21	29	22	21	28	23	81.062	79.855	69.356	80.649	156.230	116.540	0.274	0.385	0.286	0.158	0.573	0.692	0.079	0.112	0.193	0.028	0.289	0.565
18	26	34	26	28	17	90.444	86.984	92.983	70.783	95.421	124.420	0.539	0.437	0.484	0.359	0.362	0.370	0.087	0.149	0.169	0.072	0.356	0.397
13	41	16	20	23	22	100.860	77.607	83.486	73.865	73.786	120.730	0.362	0.431	0.152	0.239	0.471	0.594	0.128	0.197	0.201	0.064	0.402	0.476
20	12	29	30	24	26	90.941	79.708	88.445	62.858	86.710	94.379	0.558	0.225	0.448	0.041	0.420	0.377	0.118	0.102	0.186	0.025	0.265	0.443
14	20	29	31	31	27	73.573	77.856	79.151	71.534	110.020	109.190	0.479	0.463	0.401	0.138	0.654	0.705	0.152	0.208	0.187	0.018	0.299	0.529
25	25	26	20	24	19	74.286	92.107	78.134	66.390	96.357	96.360	0.252	0.186	0.224	0.192	0.435	0.377	0.107	0.075	0.128	0.100	0.282	0.445
22	24	25	22	25	22	93.983	86.132	71.989	69.649	108.110	115.030	0.252	0.347	0.442	0.364	0.416	0.570	0.038	0.130	0.138	0.057	0.256	0.422
23	22	16	33	33	26	67.204	74.426	82.529	69.696	91.024	106.640	0.554	0.485	0.482	0.328	0.677	0.637	0.099	0.112	0.260	0.046	0.252	0.350

Table 5-6	Simulation Results where	Scheduling Rule = SPT	, Job Arrival = "Medium"
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Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

Nu	m of C	comp	leted j	obs (l	Parts)		Maxi	imum Flow	time (Time	Unit)			Averag	e Machir	e Utiliza	tion (%)		Av	erage Job	Q length	n for the m	achine (P	arts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	MB	МС	MD	ME	MF
35	36	31	40	33	30	722.540	641.800	685.320	729.620	648.610	635.690	0.999	0.791	0.704	0.639	1.000	1.000	5.800	1.660	1.010	0.424	37.335	34.225
30	32	41	29	44	31	617.520	707.920	639.650	690.580	718.330	627.130	0.992	0.768	0.714	0.599	1.000	1.000	0.431	33.461	7.139	34.148	1.065	1.224
40	36	20	36	35	34	718.910	665.300	660.960	736.940	652.920	693.080	0.997	0.771	0.697	0.667	1.000	1.000	0.590	35.663	7.995	37.049	0.883	1.083
21	35	20	40	36	14	631.830	740.750	648.650	748.530	736.880	648.480	0.998	0.823	0.786	0.592	1.000	1.000	0.516	48.710	3.916	28.063	2.053	1.481
38	39	32	42	34	30	723.540	643.800	688.320	732.620	649.610	635.690	1.000	0.991	1.000	0.939	1.000	1.000	5.810	1.680	1.040	0.454	37.345	34.225
31	33	43	31	47	34	619.520	709.920	640.650	691.580	721.330	630.130	1.000	0.968	0.814	0.699	1.000	1.000	0.451	33.481	7.149	34.158	1.095	1.254
43	37	22	36	35	35	720.910	665.300	663.960	737.940	652.920	694.080	1.000	0.771	0.997	0.767	1.000	1.000	0.610	35.663	8.025	37.059	0.883	1.093
21	38	20	40	36	14	631.830	740.750	648.650	751.530	736.880	648.480	0.998	0.823	0.786	0.892	1.000	1.000	0.516	48.710	3.916	28.093	2.053	1.481
39	41	33	45	34	30	724.540	646.800	689.320	734.620	649.610	635.690	1.000	1.000	1.000	1.139	1.000	1.000	5.820	1.710	1.050	0.474	37.345	34.225
43	39	21	38	36	34	719.910	667.300	663.960	739.940	653.920	693.080	1.000	0.971	0.997	0.967	1.000	1.000	0.600	35.683	8.025	37.079	0.893	1.083
22	36	22	42	39	17	633.830	742.750	649.650	749.530	739.880	651.480	1.000	1.000	0.886	0.692	1.000	1.000	0.536	48.730	3.926	28.073	2.083	1.511
41	40	34	42	34	31	725.540	643.800	691.320	733.620	649.610	636.690	1.000	0.991	1.000	1.039	1.000	1.000	5.830	1.680	1.070	0.464	37.345	34.235
31	36	43	31	47	34	619.520	709.920	640.650	694.580	721.330	630.130	1.000	0.968	0.814	0.999	1.000	1.000	0.451	33.481	7.149	34.188	1.095	1.254
42	36	23	37	36	34	721.910	666.300	662.960	736.940	653.920	693.080	1.000	0.871	0.897	0.667	1.000	1.000	0.620	35.673	8.015	37.049	0.893	1.083
24	35	21	42	37	14	632.830	742.750	651.650	748.530	737.880	648.480	1.000	1.000	1.000	0.592	1.000	1.000	0.526	48.730	3.946	28.063	2.063	1.481
41	42	33	44	35	30	724.540	645.800	691.320	735.620	650.610	635.690	1.000	1.000	1.000	1.000	1.000	1.000	5.820	1.700	1.070	0.484	37.355	34.225
32	34	45	33	50	37	621.520	711.920	641.650	692.580	724.330	633.130	1.000	1.000	0.914	0.799	1.000	1.000	0.471	33.501	7.159	34.168	1.125	1.284
46	38	24	36	35	36	722.910	665.300	666.960	738.940	652.920	695.080	1.000	0.771	1.000	0.867	1.000	1.000	0.630	35.663	8.055	37.069	0.883	1.103
21	41	20	40	36	14	631.830	740.750	648.650	754.530	736.880	648.480	0.998	0.823	0.786	1.000	1.000	1.000	0.516	48.710	3.916	28.123	2.053	1.481
40	44	33	48	34	30	724.540	649.800	690.320	737.620	649.610	635.690	1.000	1.000	1.000	1.000	1.000	1.000	5.820	1.740	1.060	0.504	37.345	34.225

**Table 5-7**Simulation Results where Scheduling Rule = FIFO, Job Arrival = "High"

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

Nu	m of C	Compl	leted jo	obs (Pa	arts)		Maxi	imum Flow	time (Time	Unit)			Averag	e Machir	e Utiliza	tion (%)		Av	erage Job	Q length	for the m	achine (P	arts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	МС	MD	ME	MF	MA	MB	MC	MD	ME	MF
36	39	31	43	33	30	722.540	644.800	686.320	732.620	648.610	635.690	0.999	1.000	0.804	0.939	1.000	1.000	5.800	1.690	1.020	0.454	37.335	34.225
32	35	43	30	46	31	619.520	708.920	641.650	693.580	720.330	627.130	1.000	0.868	0.914	0.899	1.000	1.000	0.451	33.471	7.159	34.178	1.085	1.224
42	36	23	37	36	34	721.910	666.300	662.960	736.940	653.920	693.080	1.000	0.871	0.897	0.667	1.000	1.000	0.620	35.673	8.015	37.049	0.893	1.083
24	35	21	42	37	14	632.830	742.750	651.650	748.530	737.880	648.480	1.000	1.000	1.000	0.592	1.000	1.000	0.526	48.730	3.946	28.063	2.063	1.481
41	42	33	44	35	30	724.540	645.800	691.320	735.620	650.610	635.690	1.000	1.000	1.000	1.000	1.000	1.000	5.820	1.700	1.070	0.484	37.355	34.225
32	34	45	33	50	37	621.520	711.920	641.650	692.580	724.330	633.130	1.000	1.000	0.914	0.799	1.000	1.000	0.471	33.501	7.159	34.168	1.125	1.284
46	38	24	36	35	36	722.910	665.300	666.960	738.940	652.920	695.080	1.000	0.771	1.000	0.867	1.000	1.000	0.630	35.663	8.055	37.069	0.883	1.103
21	41	20	40	36	14	631.830	740.750	648.650	754.530	736.880	648.480	0.998	0.823	0.786	1.000	1.000	1.000	0.516	48.710	3.916	28.123	2.053	1.481
40	44	33	48	34	30	724.540	649.800	690.320	737.620	649.610	635.690	1.000	1.000	1.000	1.000	1.000	1.000	5.820	1.740	1.060	0.504	37.345	34.225
45	42	23	39	38	34	721.910	668.300	665.960	742.940	655.920	693.080	1.000	1.000	1.000	1.000	1.000	1.000	0.620	35.693	8.045	37.109	0.913	1.083
24	36	25	43	40	17	636.830	743.750	651.650	749.530	740.880	651.480	1.000	1.000	1.000	0.692	1.000	1.000	0.566	48.740	3.946	28.073	2.093	1.511
44	40	35	44	35	31	726.540	645.800	694.320	733.620	650.610	636.690	1.000	1.000	1.000	1.000	1.000	1.000	5.840	1.700	1.100	0.464	37.355	34.235
34	39	44	33	48	34	620.520	711.920	643.650	697.580	722.330	630.130	1.000	1.000	1.000	1.000	1.000	1.000	0.461	33.501	7.179	34.218	1.105	1.254
43	37	25	39	39	37	723.910	668.300	663.960	737.940	656.920	696.080	1.000	1.000	0.997	0.767	1.000	1.000	0.640	35.693	8.025	37.059	0.923	1.113
27	36	23	42	37	15	634.830	742.750	654.650	749.530	737.880	649.480	1.000	1.000	1.000	0.692	1.000	1.000	0.546	48.730	3.976	28.073	2.063	1.491
41	45	33	44	35	30	724.540	645.800	691.320	738.620	650.610	635.690	1.000	1.000	1.000	1.000	1.000	1.000	5.820	1.700	1.070	0.514	37.355	34.225
33	36	46	36	50	37	622.520	714.920	642.650	694.580	724.330	633.130	1.000	1.000	1.000	0.999	1.000	1.000	0.481	33.531	7.169	34.188	1.125	1.284
48	40	27	37	36	36	725.910	666.300	668.960	740.940	653.920	695.080	1.000	0.871	1.000	1.000	1.000	1.000	0.660	35.673	8.075	37.089	0.893	1.103
22	43	21	43	36	14	632.830	743.750	649.650	756.530	736.880	648.480	1.000	1.000	0.886	1.000	1.000	1.000	0.526	48.740	3.926	28.143	2.053	1.481
42	46	36	49	35	30	727.540	650.800	692.320	739.620	650.610	635.690	1.000	1.000	1.000	1.000	1.000	1.000	5.850	1.750	1.080	0.524	37.355	34.225

# **Table 5-8**Simulation Results where Scheduling Rule = EDD, Job Arrival = "High"

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

Num	of Co	omple	ted jo	bs (P	arts)		Maxim	um Flow	time (Tim	e Unit)			Averag	e Machir	ne Utilizat	tion (%)		Avera	age Job	Q length	for the m	achine (F	Parts)
J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	MA	MB	MC	MD	ME	MF	MA	MB	MC	MD	ME	MF
34	33	31	37	33	30	722.540	638.800	684.320	726.620	648.610	635.690	0.999	0.491	0.604	0.339	1.000	1.000	5.800	1.630	1.000	0.394	37.335	34.225
28	29	39	28	42	31	615.520	706.920	637.650	687.580	716.330	627.130	0.792	0.668	0.514	0.299	0.800	1.000	0.411	33.451	7.119	34.118	1.045	1.224
38	36	17	35	34	34	715.910	664.300	658.960	736.940	651.920	693.080	0.697	0.671	0.497	0.667	0.900	1.000	0.560	35.653	7.975	37.049	0.873	1.083
18	35	19	38	35	14	630.830	738.750	645.650	748.530	735.880	648.480	0.898	0.623	0.486	0.592	0.900	1.000	0.506	48.690	3.886	28.063	2.043	1.481
35	36	31	40	33	30	722.540	641.800	685.320	729.620	648.610	635.690	0.900	0.791	0.700	0.639	0.900	1.000	5.800	1.660	1.010	0.424	37.335	34.225
30	32	41	29	44	31	617.520	707.920	639.650	690.580	718.330	627.130	0.800	0.768	0.714	0.599	0.700	0.700	0.431	33.461	7.139	34.148	1.065	1.224
40	36	20	36	35	34	718.910	665.300	660.960	736.940	652.920	693.080	0.800	0.771	0.697	0.667	1.000	0.900	0.590	35.663	7.995	37.049	0.883	1.083
21	35	20	40	36	14	631.830	740.750	648.650	748.530	736.880	648.480	0.998	0.823	0.786	0.592	1.000	1.000	0.516	48.710	3.916	28.063	2.053	1.481
38	38	33	42	34	30	724.540	643.800	688.320	731.620	649.610	635.690	1.000	0.700	0.900	0.839	1.000	1.000	5.820	1.680	1.040	0.444	37.345	34.225
41	36	19	37	34	34	717.910	666.300	661.960	736.940	651.920	693.080	0.800	0.871	0.797	0.667	0.800	1.000	0.580	35.673	8.005	37.049	0.873	1.083
20	36	19	41	38	17	630.830	741.750	647.650	749.530	738.880	651.480	0.700	0.900	0.686	0.692	1.000	1.000	0.506	48.720	3.906	28.073	2.073	1.511
38	40	33	40	33	31	724.540	641.800	688.320	733.620	648.610	636.690	1.000	0.791	0.700	1.000	0.900	1.000	5.820	1.660	1.040	0.464	37.335	34.235
28	33	42	29	46	34	618.520	707.920	637.650	691.580	720.330	630.130	0.900	0.768	0.514	0.699	0.900	1.000	0.441	33.461	7.119	34.158	1.085	1.254
41	35	21	35	33	31	719.910	664.300	661.960	735.940	650.920	690.080	1.000	0.671	0.797	0.567	0.700	0.700	0.600	35.653	8.005	37.039	0.863	1.053
21	34	19	42	37	13	630.830	742.750	648.650	747.530	737.880	647.480	0.800	1.000	0.700	0.492	1.000	0.900	0.506	48.730	3.916	28.053	2.063	1.471
41	39	33	44	35	30	724.540	645.800	691.320	732.620	650.610	635.690	1.000	1.000	1.000	0.700	1.000	1.000	5.820	1.700	1.070	0.454	37.355	34.225
31	32	44	30	50	37	620.520	708.920	640.650	690.580	724.330	633.130	1.000	0.700	0.814	0.599	1.000	1.000	0.461	33.471	7.149	34.148	1.125	1.284
44	36	21	35	34	36	719.910	664.300	664.960	736.940	651.920	695.080	0.700	0.671	1.000	0.667	0.900	1.000	0.600	35.653	8.035	37.049	0.873	1.103
20	39	19	37	36	14	630.830	737.750	647.650	752.530	736.880	648.480	0.898	0.523	0.686	0.800	1.000	1.000	0.506	48.680	3.906	28.103	2.053	1.481
38	42	30	47	33	30	721.540	648.800	688.320	735.620	648.610	635.690	0.700	1.000	0.800	1.000	0.900	1.000	5.790	1.730	1.040	0.484	37.335	34.225

Simulation Results where Scheduling Rule = SPT, Job Arrival = "High" Table 5-9

Jn = Job #1	MA = Machine A
Jn = Job #2	MB = Machine B
Jn = Job #3	MC = Machine C
Jn = Job #4	MD = Machine D
Jn = Job #5	ME = Machine E
Jn = Job #6	ME = Machine F

#### 5.2.1 Parameter used in the BP-MLP

Parameter	Value
Number of sample	180
Network structure	36-37-24
Stop Condition	
Maximum Training times	10000
• Error	0.01
Learning Rate	0.1

**Table 5-10**Training Parameters .

### 5.2.2 The Training Convergent Curve

The Mean Absolute Error (MAE) training convergent curve of the whole training process is shown in Figure 5-1. According to the curve, it can be seen that the slope decreases significantly prior to 150 training epoch.



Figure 5-1: Mean Absolute Error Convergent curve of Training

### **5-3** Comparison Between Simulation Results and Predict Results

Comparison between the results from ARENA simulation and the ANN scheduling model are summarized in Tables 5.11 to 5.14. Note that only samples of results are included in the tables.

Sched.	Job		ARENA	<u>SIMULA</u>	TION R	ESULTS				ANN M	IODEL				C	DIFFERE	NCE (%	)	
Rule	Arrival	J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6
FIFO	Low	12	17	14	15	12	11	15	66	31	48	46	31	0.20	0.74	0.55	0.69	0.74	0.65
FIFO	Low	12	12	10	11	12	19	43	63	20	59	23	21	0.72	0.81	0.50	0.81	0.48	0.10
FIFO	Low	11	11	14	13	16	12	41	45	36	49	40	37	0.73	0.76	0.61	0.73	0.60	0.68
EDD	Low	15	20	15	14	22	17	40	74	25	49	47	20	0.63	0.73	0.40	0.71	0.53	0.15
EDD	Low	13	14	15	18	12	13	34	37	63	41	33	38	0.62	0.62	0.76	0.56	0.64	0.66
EDD	Low	14	15	16	18	14	21	38	17	32	39	37	29	0.63	0.12	0.50	0.54	0.62	0.28
SPT	Low	9	16	9	12	18	15	29	31	31	26	24	16	0.69	0.48	0.71	0.54	0.25	0.06
SPT	Low	8	8	12	10	12	11	36	45	33	27	22	19	0.78	0.82	0.64	0.63	0.45	0.42
SPT	Low	9	10	9	13	11	10	13	65	20	61	28	11	0.31	0.85	0.55	0.79	0.61	0.09
FIFO	Medium	23	28	27	29	26	17	58	38	29	91	39	25	0.60	0.26	0.07	0.68	0.33	0.32
FIFO	Medium	22	25	28	23	33	24	26	34	45	65	46	34	0.15	0.26	0.38	0.65	0.28	0.29
FIFO	Medium	22	24	28	23	27	23	56	41	50	79	73	29	0.61	0.41	0.44	0.71	0.63	0.21
EDD	Medium	21	27	35	23	31	23	37	75	42	60	47	42	0.43	0.64	0.17	0.62	0.34	0.45
EDD	Medium	22	30	25	28	19	28	32	92	39	39	35	41	0.31	0.67	0.36	0.28	0.46	0.32
EDD	Medium	22	24	31	24	29	24	28	42	45	72	45	50	0.21	0.43	0.31	0.67	0.36	0.52
SPT	Medium	23	26	14	26	27	20	41	40	88	74	95	59	0.44	0.35	0.84	0.65	0.72	0.66
SPT	Medium	24	22	21	29	25	23	64	24	59	36	26	36	0.63	0.08	0.64	0.19	0.04	0.36
SPT	Medium	23	22	16	33	33	26	34	42	23	87	38	49	0.32	0.48	0.30	0.62	0.13	0.47
FIFO	High	40	36	20	36	35	34	48	64	56	43	64	47	0.17	0.44	0.64	0.16	0.45	0.28
FIFO	High	42	36	23	37	36	34	116	74	62	42	49	51	0.64	0.51	0.63	0.12	0.27	0.33
FIFO	High	40	44	33	48	34	30	78	62	81	87	81	64	0.49	0.29	0.59	0.45	0.58	0.53
EDD	High	41	42	33	44	35	30	97	69	50	70	49	52	0.58	0.39	0.34	0.37	0.29	0.42
EDD	High	44	40	35	44	35	31	51	65	74	67	55	87	0.14	0.38	0.53	0.34	0.36	0.64
EDD	High	43	37	25	39	39	37	56	55	30	53	49	50	0.23	0.33	0.17	0.26	0.20	0.26
SPT	High	40	36	20	36	35	34	69	43	31	63	69	53	0.42	0.16	0.35	0.43	0.49	0.36
SPT	High	41	36	19	37	34	34	54	55	32	82	48	57	0.24	0.35	0.41	0.55	0.29	0.40
SPT	High	41	39	33	44	35	30	42	65	38	84	56	44	0.02	0.40	0.13	0.48	0.38	0.32
Jn = Job #1	Jn	= Job #2	Jr	i = Job #3		Jn = Job #4		Jn = Job #5	i	Jn = Job #	ŧ6								

# Table 5.11 Comparison of Number Completed Jobs.

Sched.	Job		SIM	ULATIO	N RESU	LTS				ANN	MODEL				D	IFFERE	ENCE (	%)	
Rule	Arrival	J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6
FIFO	Low	60.3	77.5	75.9	87.2	80.3	66.0	72.1	286.7	126.5	305.1	171.4	77.6	0.16	0.73	0.40	0.71	0.53	0.15
FIFO	Low	62.2	67.5	71.5	61.0	90.0	84.4	113.7	178.5	300.4	138.9	247.4	246.7	0.45	0.62	0.76	0.56	0.64	0.66
FIFO	Low	62.5	73.5	70.9	67.3	76.1	69.3	86.4	83.3	141.8	145.7	201.2	95.7	0.28	0.12	0.50	0.54	0.62	0.28
EDD	Low	63.3	80.5	77.9	89.2	81.3	67.0	159.7	109.2	83.7	279.8	121.9	98.5	0.60	0.26	0.07	0.68	0.33	0.32
EDD	Low	61.0	71.5	64.0	72.0	62.0	63.6	72.1	97.2	102.9	203.4	86.4	90.1	0.15	0.26	0.38	0.65	0.28	0.29
EDD	Low	73.0	76.7	75.0	74.0	82.4	63.0	185.9	131.0	133.9	254.3	222.8	79.4	0.61	0.41	0.44	0.71	0.63	0.21
SPT	Low	57.8	67.0	76.7	64.3	89.6	58.2	90.9	188.0	218.3	79.8	107.0	66.1	0.36	0.64	0.65	0.19	0.16	0.12
SPT	Low	60.2	67.5	68.5	60.0	90.0	83.4	75.6	91.3	241.1	62.4	164.5	113.5	0.20	0.26	0.72	0.04	0.45	0.27
SPT	Low	59.5	70.5	68.9	65.3	74.1	66.3	117.3	109.9	203.2	102.2	102.5	99.4	0.49	0.36	0.66	0.36	0.28	0.33
FIFO	Medium	83.0	71.9	77.0	78.0	97.5	92.4	221.3	78.4	216.4	96.9	101.4	144.6	0.63	0.08	0.64	0.19	0.04	0.36
FIFO	Medium	69.0	73.7	80.7	65.4	84.2	82.7	101.9	140.8	116.0	172.4	96.9	155.9	0.32	0.48	0.30	0.62	0.13	0.47
FIFO	Medium	90.9	81.7	88.4	65.9	88.7	97.4	109.1	145.3	247.6	78.7	162.2	134.6	0.17	0.44	0.64	0.16	0.45	0.28
EDD	Medium	84.0	73.9	80.0	78.0	98.5	92.4	97.4	120.1	169.2	118.8	118.2	358.6	0.14	0.38	0.53	0.34	0.17	0.74
EDD	Medium	77.6	75.2	76.5	75.1	78.9	90.2	101.0	111.7	91.8	102.1	140.2	473.7	0.23	0.33	0.17	0.26	0.44	0.81
EDD	Medium	80.3	98.1	82.1	70.4	99.4	92.4	138.5	117.2	127.3	123.2	278.2	377.8	0.42	0.16	0.35	0.43	0.64	0.76
SPT	Medium	72.2	75.1	74.3	66.0	121.2	86.2	159.8	240.4	285.0	186.0	390.5	167.1	0.55	0.69	0.74	0.65	0.69	0.48
SPT	Medium	82.0	69.9	74.0	78.0	96.5	92.4	164.0	374.8	141.9	86.2	434.1	519.5	0.50	0.81	0.48	0.10	0.78	0.82
SPT	Medium	74.3	92.1	78.1	66.4	96.4	96.4	191.0	347.2	195.3	204.7	139.2	626.3	0.61	0.73	0.60	0.68	0.31	0.85
FIFO	High	617.5	707.9	639.7	690.6	718.3	627.1	2127.0	1533.8	852.9	736.6	1044.8	1923.2	0.71	0.54	0.25	0.06	0.31	0.67
FIFO	High	631.8	740.8	648.7	751.5	736.9	648.5	1737.5	2000.0	1189.2	1298.1	937.8	1134.8	0.64	0.63	0.45	0.42	0.21	0.43
FIFO	High	621.5	711.9	641.7	692.6	724.3	633.1	1381.2	3340.5	1633.3	761.8	1291.2	974.0	0.55	0.79	0.61	0.09	0.44	0.35
EDD	High	632.8	742.8	651.7	748.5	737.9	648.5	861.4	1114.1	1161.6	1996.1	885.5	1791.0	0.27	0.33	0.44	0.63	0.17	0.64
EDD	High	631.8	740.8	648.7	754.5	736.9	648.5	1505.2	1580.3	997.9	823.1	1310.0	1333.0	0.58	0.53	0.35	0.08	0.44	0.51
EDD	High	634.8	742.8	654.7	749.5	737.9	649.5	888.8	1287.4	4114.9	2105.8	2066.1	1750.8	0.29	0.42	0.84	0.64	0.64	0.63
SPT	High	630.8	738.8	645.7	748.5	735.9	648.5	984.1	1029.0	1189.4	1096.1	2032.4	1333.0	0.36	0.28	0.46	0.32	0.64	0.51
SPT	High	618.5	707.9	637.7	691.6	720.3	630.1	897.9	2123.8	989.5	1440.8	1404.6	887.9	0.31	0.67	0.36	0.52	0.49	0.29
SPT	High	620.5	708.9	640.7	690.6	724.3	633.1	3900.4	2017.7	2254.1	2037.2	1713.7	1040.142	0.84	0.65	0.72	0.66	0.58	0.39
Jn = Job #1	Jn	= Job #2	J	n = Job #3		Jn = Job #4	1	Jn = Job #3	5	Jn = Job #6									

Table 5.12Comparison of Maximum Flowtime Job.

Sched.	Job		SIM	ULATIO	N RESU	LTS				ANN N	IODEL				0	DIFFERE	NCE (%)		
Rule	Arrival	MA	MB	MC	MD	ME	MF	MA	MB	MC	MD	ME	MF	MA	MB	МС	MD	ME	MF
FIFO	Low	0.336	0.259	0.270	0.210	0.341	0.371	0.358	0.447	0.297	0.309	0.483	0.468	0.06	0.42	0.09	0.32	0.29	0.21
FIFO	Low	0.350	0.260	0.256	0.206	0.367	0.410	1.254	1.365	0.512	1.105	0.703	0.453	0.72	0.81	0.50	0.81	0.48	0.10
FIFO	Low	0.318	0.221	0.224	0.178	0.321	0.355	1.185	0.904	0.576	0.671	0.803	1.095	0.73	0.76	0.61	0.73	0.60	0.68
EDD	Low	0.344	0.258	0.229	0.257	0.376	0.407	0.918	0.953	0.382	0.898	0.803	0.478	0.63	0.73	0.40	0.71	0.53	0.15
EDD	Low	0.329	0.309	0.263	0.255	0.310	0.335	0.861	0.817	1.106	0.580	0.853	0.979	0.62	0.62	0.76	0.56	0.64	0.66
EDD	Low	0.318	0.288	0.224	0.278	0.388	0.455	0.863	0.326	0.448	0.602	1.025	0.628	0.63	0.12	0.50	0.54	0.62	0.28
SPT	Low	0.299	0.258	0.197	0.117	0.330	0.404	0.965	0.499	0.680	0.254	0.440	0.431	0.69	0.48	0.71	0.54	0.25	0.06
SPT	Low	0.308	0.242	0.230	0.104	0.339	0.356	1.386	1.361	0.633	0.281	0.622	0.615	0.78	0.82	0.64	0.63	0.45	0.42
SPT	Low	0.318	0.154	0.224	0.078	0.254	0.255	0.459	1.003	0.498	0.366	0.647	0.281	0.31	0.85	0.55	0.79	0.61	0.09
FIFO	Medium	0.563	0.458	0.476	0.346	0.652	0.676	1.420	0.622	0.511	1.086	0.978	0.994	0.60	0.26	0.07	0.68	0.33	0.32
FIFO	Medium	0.552	0.486	0.480	0.334	0.664	0.692	0.652	0.661	0.771	0.944	0.926	0.980	0.15	0.26	0.38	0.65	0.28	0.29
FIFO	Medium	0.579	0.463	0.501	0.338	0.654	0.705	1.474	0.791	0.895	1.161	1.768	0.889	0.61	0.41	0.44	0.71	0.63	0.21
EDD	Medium	0.648	0.671	0.534	0.570	0.833	0.896	1.142	1.863	0.641	1.487	1.263	1.636	0.43	0.64	0.17	0.62	0.34	0.45
EDD	Medium	0.582	0.466	0.394	0.684	0.652	0.727	0.847	1.429	0.615	0.953	1.201	1.065	0.31	0.67	0.36	0.28	0.46	0.32
EDD	Medium	0.679	0.463	0.601	0.538	0.654	0.705	0.864	0.810	0.872	1.614	1.015	1.469	0.21	0.43	0.31	0.67	0.36	0.52
SPT	Medium	0.510	0.229	0.414	0.039	0.716	0.660	0.909	0.352	2.602	0.111	2.519	1.947	0.44	0.35	0.84	0.65	0.72	0.66
SPT	Medium	0.582	0.466	0.394	0.084	0.652	0.727	1.552	0.508	1.107	0.104	0.678	1.138	0.63	0.08	0.64	0.19	0.04	0.36
SPT	Medium	0.554	0.485	0.482	0.328	0.677	0.637	0.819	0.926	0.693	0.865	0.780	1.201	0.32	0.48	0.30	0.62	0.13	0.47
FIFO	High	0.999	0.791	0.704	0.639	1.000	1.000	1.199	1.406	1.971	0.763	1.829	1.382	0.17	0.44	0.64	0.16	0.45	0.28
FIFO	High	0.998	0.823	0.786	0.892	1.000	1.000	2.756	1.692	2.119	1.013	1.361	1.500	0.64	0.51	0.63	0.12	0.27	0.33
FIFO	High	0.998	0.823	0.786	1.000	1.000	1.000	1.946	1.160	1.929	1.813	2.382	2.133	0.49	0.29	0.59	0.45	0.58	0.53
EDD	High	0.999	1.000	0.804	0.939	1.000	1.000	2.363	1.643	1.218	1.494	1.400	1.733	0.58	0.39	0.34	0.37	0.29	0.42
EDD	High	0.998	0.823	0.786	1.000	1.000	1.000	1.157	1.337	1.662	1.523	1.571	2.806	0.14	0.38	0.53	0.34	0.36	0.64
EDD	High	1.000	1.000	0.997	0.767	1.000	1.000	1.302	1.486	1.196	1.042	1.256	1.351	0.23	0.33	0.17	0.26	0.20	0.26
SPT	High	0.792	0.668	0.514	0.299	0.800	1.000	1.366	0.798	0.797	0.523	1.577	1.559	0.42	0.16	0.35	0.43	0.49	0.36
SPT	High	0.800	0.871	0.797	0.667	0.800	1.000	1.054	1.331	1.342	1.478	1.129	1.676	0.24	0.35	0.41	0.55	0.29	0.40
SPT	High	0.898	0.523	0.686	0.800	1.000	1.000	0.920	0.872	0.790	1.527	1.600	1.467	0.02	0.40	0.13	0.48	0.38	0.32
MA = Machi	ne A MI	B = Machine	B N	1C = Machin	ne C	MD = Mach	ine D	ME = Mac	hine E	ME = Ma	chine F								

#### Comparison of Average Machine Utilization. Table 5.13

ME = Machine F

Sched.	Job		SIM	ULATIO	N RESUL	TS				ANN M	ODEL				D	IFFER	ENCE (	(%)	
Rule	Arrival	MA	MB	MC	MD	ME	MF	MA	MB	MC	MD	ME	MF	MA	MB	MC	MD	ME	MF
FIFO	Low	0.033	0.046	0.027	0.010	0.083	0.146	0.040	0.081	0.076	0.012	0.152	0.202	0.17	0.44	0.64	0.16	0.45	0.28
FIFO	Low	0.029	0.062	0.029	0.042	0.037	0.051	0.113	0.326	0.119	0.155	0.098	0.058	0.74	0.81	0.76	0.73	0.62	0.12
FIFO	Low	0.029	0.035	0.063	0.021	0.057	0.079	0.064	0.070	0.162	0.035	0.239	0.158	0.55	0.50	0.61	0.40	0.76	0.50
EDD	Low	0.027	0.815	0.095	0.022	0.121	0.091	0.087	4.373	0.359	0.078	0.276	0.197	0.69	0.81	0.73	0.71	0.56	0.54
EDD	Low	0.027	0.038	0.047	0.027	0.094	0.178	0.104	0.073	0.118	0.058	0.260	0.471	0.74	0.48	0.60	0.53	0.64	0.62
EDD	Low	0.030	0.042	0.038	0.021	0.087	0.165	0.085	0.047	0.118	0.025	0.255	0.228	0.65	0.10	0.68	0.15	0.66	0.28
SPT	Low	0.028	0.085	0.090	0.011	0.165	0.260	0.089	0.382	0.130	0.027	0.195	0.662	0.69	0.78	0.31	0.60	0.15	0.61
SPT	Low	0.049	0.026	0.089	0.012	0.068	0.068	0.095	0.144	0.578	0.016	0.092	0.116	0.48	0.82	0.85	0.26	0.26	0.41
SPT	Low	0.024	0.036	0.034	0.017	0.083	0.159	0.082	0.098	0.075	0.018	0.133	0.283	0.71	0.64	0.55	0.07	0.38	0.44
FIFO	Medium	0.129	0.137	0.182	0.050	0.334	0.382	0.280	0.370	0.854	0.156	0.945	1.312	0.54	0.63	0.79	0.68	0.65	0.71
FIFO	Medium	0.191	0.151	0.243	0.063	0.447	0.503	0.255	0.277	0.619	0.095	0.623	1.360	0.25	0.45	0.61	0.33	0.28	0.63
FIFO	Medium	0.162	0.208	0.197	0.038	0.299	0.529	0.172	0.359	0.217	0.056	0.424	0.667	0.06	0.42	0.09	0.32	0.29	0.21
EDD	Medium	0.159	0.167	0.202	0.070	0.344	0.392	0.231	0.212	0.360	0.186	0.509	0.470	0.31	0.21	0.44	0.63	0.32	0.17
EDD	Medium	0.159	0.167	0.202	0.070	0.344	0.392	0.488	0.292	0.311	0.076	0.657	0.697	0.67	0.43	0.35	0.08	0.48	0.44
EDD	Medium	0.167	0.135	0.168	0.140	0.322	0.505	0.261	0.196	1.056	0.393	0.463	1.414	0.36	0.31	0.84	0.64	0.30	0.64
SPT	Medium	0.196	0.183	0.171	0.046	0.396	0.423	0.273	0.549	0.487	0.057	1.044	0.505	0.28	0.67	0.65	0.19	0.62	0.16
SPT	Medium	0.181	0.121	0.233	0.043	0.447	0.503	0.333	0.188	0.820	0.045	0.515	0.920	0.46	0.36	0.72	0.04	0.13	0.45
SPT	Medium	0.107	0.075	0.128	0.100	0.282	0.445	0.157	0.156	0.378	0.157	0.531	0.615	0.32	0.52	0.66	0.36	0.47	0.28
FIFO	High	0.590	35.663	7.995	37.049	0.883	1.083	1.630	69.543	18.916	42.943	1.150	1.867	0.64	0.49	0.58	0.14	0.23	0.42
FIFO	High	0.536	48.730	3.926	28.073	2.083	1.511	1.102	68.665	6.450	45.619	3.096	1.805	0.51	0.29	0.39	0.38	0.33	0.16
FIFO	High	0.516	48.710	3.916	28.123	2.053	1.481	1.391	119.561	5.933	59.460	2.464	2.296	0.63	0.59	0.34	0.53	0.17	0.35
EDD	High	0.590	35.663	7.995	37.049	0.883	1.083	0.670	64.639	12.720	56.416	1.200	1.894	0.12	0.45	0.37	0.34	0.26	0.43
EDD	High	0.600	35.683	8.025	37.079	0.893	1.083	0.817	85.010	11.236	58.267	1.122	2.134	0.27	0.58	0.29	0.36	0.20	0.49
EDD	High	0.630	35.663	8.055	37.069	0.883	1.103	0.945	76.081	13.963	104.032	1.193	1.719	0.33	0.53	0.42	0.64	0.26	0.36
SPT	High	0.620	35.673	8.015	37.049	0.893	1.083	1.105	54.882	50.383	105.447	3.142	3.193	0.44	0.35	0.84	0.65	0.72	0.66
SPT	High	0.620	35.693	8.045	37.109	0.913	1.083	1.653	38.938	22.604	46.066	0.950	1.694	0.63	0.08	0.64	0.19	0.04	0.36
SPT	High	0.526	48.740	3.926	28.143	2.053	1.481	0.631	86.649	10.993	33.615	3.754	2.047	0.17	0.44	0.64	0.16	0.45	0.28
MA = Machin	ne A MI	B = Machine	B MO	C = Machine	C M	D = Machin	eD N	ME = Machi	ne E M	E = Machine l	F			-					

 Table 5.14
 Comparison of Average Job Q Length for the Machine.

# 5.4 Discussion

Samples of the results are compared graphically between the results from ARENA simulation and the ANN scheduling model as shown in Figures 5.2 to 5.5. Overall, ANN model resulted in moderately reliable prediction for the following:

- (i) Prediction for the number completed jobs for EDD with high job arrival (Figure 5.2 (h), SPT with medium and high job arrival (Fig. 5.2(f and i)
- (ii) Prediction for maximum flowtime for SPT with low, and SPT with medium job arrival (Fig. 5.3 (c) and (f))
- (iii) Prediction for average machine utilization for SPT with medium job arrival (Figure 5.4 f)
- (iv) Prediction on average length of queue. The graphs in Figure 5.5 suggest that both techniques gave almost similar patterns.

In general, the above results suggest that the ANN schedule model needs further improvement to provide more consistent results for other scheduling scenarios. High variability in the dynamic job shop environment may have contributed to the difficulty in getting better results. The proposed theoretical framework as shown in Figure 3-2 can be used as a basis for further investigation.



Figure 5.2 Comparison of Number Completed Jobs.



Figure 5.3 Comparison of Maximum Flowtime Job.



Figure 5.4 Comparison of Average Machine Utilization.



Figure 5.5 Comparison of Average Job Q Length for the Machine.
### **CHAPTER 6**

#### CONCLUSSIONS

In the first phase of this research, a simulation study for various job shop scheduling scenarios were evaluated using ARENA simulation software package. In the second phase, an ANN scheduling model was developed using Multilayer Perceptron model. The ANN model was trained and tested using various scheduling scenarios generated from Arena simulation.

This study has provided better understanding on the complexity of dynamic scheduling. An ANN model to predict various scheduling scenario has been developed. The experimental results suggest that the model can provided moderately reliable prediction results for selected job shop scenario when predicting the number completed jobs, maximum flowtime, average machine utilization, and average length of queue. There were also some scheduling scenarios where the model did not provide good prediction results. The finding suggests that high variability in the dynamic job shop environment and insufficient representative scenarios may have contributed to the difficulty in getting better results. Thus, the present ANN scheduling model needs further improvement to provide more consistent results.

The following are suggestions for further investigation:

(i) Fine tune the ANN scheduling model to give more consistent results (ii) Consider more variety of job shop sizes (iii) Incorporate an expert system in realizing an intelligent dynamic scheduling system.

The theoretical framework as proposed in Figure 3-2 can be used as a basis for further investigation.

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## APPENDIX A Most Common Scheduling Rules

# 1. Job Scheduling Rules

EDD	Earliest Due Dates
EDF	Earliest Deadline First
FASFO	First At Shop First Out
FCFS	First Come First Served
FIFO	First In First Out
FRO	Fewest number of Remaining Opertion
LDT	Longest SIO/TP ratio
LIO	Longest Imminent Operation time
LLF	Least Laxity First (Laxity =kelemahan)
LMT	Longest SIO.TP Multiplication Time
LPT	Longest Processing Time
LRPT	Longest Remaining Processing Time
MRO	Largest number of Remaining Opertion
SDT	Shortest SIO/TP ratio
SIO	Shortest Imminent Operation time (Imminent = hampir sampai
	gilirannya)
SMT	Shortes SIO.TP Multiplication Time
SPT	Shortest Processing Time
SRPT	Shortest Remaining Processing Time

# 2. Machine Scheduling Rules

FAFS	First Arrived First Served
FCFS	First Come First Served
FOPNR	Fewest number of operation remaining
LPT. TOT	Largest value of operation time multiplied by total operation time
LPT/TOT	Largest value of operation time divided by total operation time
LWKR	Least work remaining
MOPNR	Most number of operation remaining
MWKR	Most work remaining
RANDOM	Job priority is random
SPT	Shortest Processing Time
SPT. TOT	Smallest value of operation time multiplied by total operation
	time
SPT/TOT	Smallest value of operation time divided by total operation time

### APPENDIX B FIFO, SPT and EDD Algorithm



**FIFO** Algorithm



SPT Algorithm



# **EDD** Algorithm

# Appendix C Most Common Performance Measure

## 1. Time-based measure

Mean and variance of flow time per job
Mean and variance of flow time per operation
Mean waiting time
Mean idle time

# 2. WIP Measure

Average number of job in queue
Average number of operation in queue
Value of work-in-process

# 3. Due-date related measure

Mean tardiness
Conditional mean tardiness
Proportional of job tardy
Mean lateness
Number of job tardy
Maximum lateness

# 4. *Cost-based Measure*

Cost of idle	machines
Cost of long	g promises
Cost of carr	ying work-in-process
Total cost p	er job
Average va	lue added in queue

#### Summary for Replication 1 of 20

Part 1: TotalTime         49:543         (Insur)         41:000         61:594         112           Part 2: TotalTime         51:784         (Insur)         40:544         80:378         19           Part 4: TotalTime         51:786         (Insur)         35:000         74:725         17           Part 5: TotalTime         54:466         (Insur)         35:000         74:725         17           Part 5: TotalTime         54:466         (Insur)         38:020         67:312         20           DISCRETE: CHANGE VARIABLES         Job Control         00000         10:000         00000         00000           Machine 1: Utilization         :31102         (Insur)         00000         10:000         00000           Machine 1: Utilization         :31102         (Insur)         00000         10:000         00000           Machine 4: Utilization         :31102         (Insur)         00000         10:000         00000           Machine 4: Utilization         :31102         (Insur)         00000         2:0000         00000           Werk Station 1: Outure NumberFriducate         :0424         (Insur)         00000         2:0000         00000           Werk Station 1: Outure NumberFriducate         :04205         <	Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
Part 2. TotalTime       53. 974       (nsuf)       41.833       70.725       15         Part 3. TotalTime       51. 425       (nsuf)       40.544       60.578       19         Part 3. TotalTime       51. 425       (nsuf)       40.544       60.578       19         Part 5. TotalTime       54. 466       (nsuf)       40.442       77.545       18         DISCRETE-CHANGE VARIABLES       Jacobia       40.442       77.545       18         Jacobia       .39000       (Insuf)       00000       1.0000       00000         Machine 1. Utilization       .31100       (Insuf)       00000       1.0000       00000         Machine 4. Utilization       .31400       (Insuf)       00000       1.0000       00000         Machine 6. Utilization       .4174.4       (Insuf)       00000       1.0000       00000         Work Station 7.0ueue Number/InOueue       .0422       (Insuf)       00000       2.0000       00000         Work Station 7.0ueue Number/InOueue       .0424       (Insuf)       00000       2.0000       00000         Work Station 7.0ueue Number/InOueue       .0424       (Insuf)       00000       2.0000       00000         Part 1.NumberOut       15.000	Part 1.TotalTime	48.543	(Insuf)	41.000	61.594	12		
Part 3. TotalTime       51.708       Cinsupf       40.544       60.378       19         Part 4. TotalTime       51.425       (insupf       40.422       77.545       18         Part 5. TotalTime       55.074       (insupf       40.422       77.545       18         Part 5. TotalTime       55.074       (insupf       40.422       77.545       18         Machine 1. Utilization       .39000       (insuff       0.0000       0.0000       0.0000         Machine 3. Utilization       .31129       (insuff       0.0000       1.0000       0.0000         Machine 3. Utilization       .43746       (insuff       0.0000       1.0000       0.0000         Machine 4. Utilization       .43746       (insuff       0.0000       1.0000       0.0000         More 5. Statistics       Souree NumberInClause       .09417       (insuff       0.0000       2.0000       .00000         Work Station 3. Gueue NumberInClause       .09437       (insuff       0.0000       2.0000       .00000         Work Station 3. Gueue NumberInClause       .09376       (insuff       0.0000       2.0000       .00000         Work Station 3. Gueue NumberInClause       .09376       (insuff       0.0000       2.0000       .	Part 2.TotalTime	53.974	(Insuf)	41.833	70.725	15		
Part 4. TotalTime 51.425 (nsup 35.000 4.725 17 Part 5. TotalTime 54.466 (nsup 40.442 7.7545 18 Part 5. TotalTime 55.074 (nsup 40.442 7.7545 18 Part 5. TotalTime 55.074 (nsup 40.442 7.7545 18 Part 5. TotalTime 55.074 (nsup 40.442 7.7545 18 Machine 1. Utilization 31420 (nsup 0.0000 1.0000 0.0000 Machine 3. Utilization 31420 (nsup 0.0000 1.0000 0.0000 Machine 3. Utilization 33119 (nsup 0.0000 1.0000 0.0000 Machine 4. Utilization 34746 (nsup 0.0000 1.0000 0.0000 Machine 5. Utilization 4.7474 (nsup 0.0000 1.0000 0.0000 0.0000 Machine 6. Utilization 4.7474 (nsup 0.0000 1.0000 0.0000 0.0000 Machine 6. Utilization 4.7474 (nsup 0.0000 0.0000 0.0000 0.0000 Wark Station 6. Outure. Number InCueue 0.02417 (nsup 0.0000 2.0000 0.0000 0.0000 Wark Station 6. Uture. Number InCueue 0.02417 (nsup 0.0000 2.0000 0.0000 0.0000 Wark Station 6. Uture. Number InCueue 0.0247 (nsup 0.0000 2.0000 0.0000 0.0000 Wark Station 7. Usuee. Number InCueue 0.0247 (nsup 0.0000 2.0000 0.0000 0.0000 Wark Station 7. Usuee. Number InCueue 0.0247 (nsup 0.0000 2.0000 0.0000 0.0000 Wark Station 7. Usuee. Number InCueue 0.0247 (nsup 0.0000 2.0000 0.0000 0.0000 Wark Station 7. Usuee. Number InCueue 0.0247 (nsup 0.0000 2.0000 0.0000 0.0000 Wark Station 7. Usuee. Number InCueue 0.0247 (nsup 0.0000 2.0000 0.0000 Part 3. NumberOut 12.000 Part 3. NumberOut 12.000 Part 3. NumberOut 18.000 Part 4. NumberOut 2.0000 Number 2.000 0.0000 0.0000 Number 2.000 0.00000 Number 2.000 0.0000 0.0000 Number 2.000 0.00000 0.0000 Nu	Part 3.TotalTime	51.708	(Insuf)	40.544	80.378	19		
Part 5. TotalTime       54 466       (Insur)       38.020       67.312       20         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Minimum       Final Value         Machine 1. Utilization       .30000       (Insur)       .00000       .00000         Machine 1. Utilization       .3119       (Insur)       .00000       .00000         Machine 3. Utilization       .3119       (Insur)       .00000       .00000         Machine 3. Utilization       .43744       (Insur)       .00000       .00000         Work Station 5. Oueue Number InOueue       .02233       (Insur)       .00000       .00000         Work Station 5. Oueue Number InOueue       .02233       (Insur)       .00000       .00000       .00000         Work Station 5. Oueue Number InOueue       .02234       (Insur)       .00000       .00000       .00000         Work Station 5. Oueue Number InOueue       .02644       (Insur)       .00000       .00000       .00000         OUTPUTS       Identifier       Value       .02444       (Insur)       .00000       .00000         Station 5. Oueue Number InOueue       .02644       (Insur)       .00000       .00000       .00000         OUTPUTS       Ident	Part 4.TotalTime	51.425	(Insuf)	35.000	74.725	17		
Part 6. TotalTime         55.074         (insuf)         38.020         67.312         20           DISCRETE-CHARGE VARIABLES         Average Half Width Minimum         Maximum         Final Value           Machine 1.Utilization         .31420         (insuf)         .00000         1.0000         .00000           Machine 3.Utilization         .31420         (insuf)         .00000         1.0000         .00000           Machine 4.Utilization         .34746         (insuf)         .00000         .00000         .00000           Machine 6.Utilization         .47474         (insuf)         .00000         .00000         .00000         .00000           Work Station 6.Queue NumberInQueue         .07417         (insuf)         .00000         .00000         .00000         .00000           Work Station 6.Queue NumberInQueue         .03799         (insuf)         .00000         .00000         .00000         .00000           Work Station 6.Queue NumberInQueue         .08376         (insuf)         .00000         .00000         .00000         .00000           Part 1.NumberOut         12.0000         Part 3.NumberOut         12.0000         Part 3.NumberOut         .0000         .00001         .00001         .00001         .00001         .00001         .00001 <td>Part 5.TotalTime</td> <td>54.466</td> <td>(Insuf)</td> <td>40.442</td> <td>77.545</td> <td>18</td> <td></td> <td></td>	Part 5.TotalTime	54.466	(Insuf)	40.442	77.545	18		
Discrett-CHANGE VARIABLES Identifier         Average         Half Width         Maximum         Final Value           Machine 1. Utilization         .39000         (Insuf)         0.0000         1.0000         0.0000           Machine 1. Utilization         .31119         (Insuf)         0.0000         1.0000         0.0000           Machine 3. Utilization         .31119         (Insuf)         0.0000         1.0000         0.0000           Machine 4. Utilization         .41744         (Insuf)         0.0000         1.0000         0.0000           Work Station 5. Queue NumberinQueue         .02233         (Insuf)         0.0000         2.0000         0.0000           Work Station 5. Queue NumberinQueue         .02234         (Insuf)         0.0000         2.0000         0.0000           Work Station 5. Queue NumberinQueue         .02376         (Insuf)         0.0000         2.0000         0.0000           OUTPUTS         Value	Part 6.TotalTime	55.074	(Insuf)	38.020	67.312	20		
Machine 1.Utilization         39000         (Insul)         00000         1.0000         00000           Machine 2.Utilization         31420         (Insul)         00000         1.0000         00000           Machine 3.Utilization         24600         (Insul)         00000         1.0000         00000           Machine 3.Utilization         47474         (Insul)         00000         1.0000         00000           Work Station 5. Oucue Number InQueue         04402         (Insul)         00000         00000         00000           Work Station 5. Oucue Number InQueue         04402         (Insul)         00000         00000         00000           Work Station 5. Oucue Number InQueue         04402         (Insul)         00000         00000         00000           Work Station 5. Oucue Number InQueue         04426         (Insul)         00000         00000         00000           Work Station 3. Oucue Number InQueue         08376         (Insul)         00000         2.0000         00000           Work Station 3. Oucue Number InQueue         08376         (Insul)         00000         2.0000         00000           Station S. NumberOut         12.000         Fart NumberOut         12.000         Fart NumberOut         12.000         Far	DISCRETE-CHANGE VARIABLES Identifier	Average H	alf Width	Minimum	Maximun	n Final Va	alue	
Machine 3,Utilization 3,1420 (Insuf) 0,0000 1,0000 ,00000 Machine 4,Utilization 2,4460 (Insuf) 0,0000 1,0000 1,0000 1,0000 Machine 5,Utilization 4,4744 (Insuf) 0,0000 1,0000 1,0000 0,0000 Work Station 4,0ueue NumberInQueue 0,0233 (Insuf) 0,0000 2,0000 ,00000 Work Station 5,Queue NumberInQueue 0,0417 (Insuf) 0,0000 2,0000 ,00000 Work Station 5,Queue NumberInQueue 1,13799 (Insuf) 0,0000 2,0000 ,00000 Work Station 5,Queue NumberInQueue 1,13799 (Insuf) 0,0000 2,0000 ,00000 Work Station 5,Queue NumberInQueue 1,0264 (Insuf) 0,0000 2,0000 ,00000 Work Station 5,Queue NumberInQueue 0,08376 (Insuf) 0,0000 2,0000 ,00000 Work Station 5,Queue NumberInQueue 0,08376 (Insuf) 0,0000 2,0000 ,00000 Work Station 2,Queue NumberInQueue 0,08376 (Insuf) 0,0000 2,0000 ,00000 Work Station 3,Queue NumberInQueue 0,08376 (Insuf) 0,0000 2,0000 ,00000 Summary for Replication 2 of 20 TatLY VARIABLES Identifier AumberOut 10,000 Fart 3,NumberOut 10,000 Fart 3,NumberOut 10,000 Fart 4,NumberOut 10,000 Fart 4,NumberOut 10,000 Summary for Replication 2 of 20 TatLY VARIABLES Identifier Aureage Half Width Minimum Maximum Observations Fart 1,TotaTime 51,833 (Insuf) 39,000 6,107 23 Part 4,TotaTime 52,602 (Insuf) 39,000 1,000 0,0000 Machine 3,Utilization 3,7827 (Insuf) 30,000 1,0000 0,0000 Machine 3,Utilization 3,7827 (Insuf) 0,0000 1,0000 0,0000 Machine 3,Utilization 3,7827 (Insuf) 0,0000 1,0000 0,0000 Machine 3,Utilization 3,7827 (Insuf) 0,0000 1,0000 0,0000 Machine 3,Utilization 3,7837 (Insuf) 0,0000 1,0000 0,0000 Machine 4,Utilization 3,7837 (Insuf) 0,0000 1,00	Machine 1.Utilization	.39000	(Insuf)	.00000	1.0000	.00000		
Machine 3.Utilization 3.5119 (Insuf) 0.0000 1.0000 0.0000 Machine 5.Utilization 4.3744 (Insuf) 0.0000 1.0000 0.0000 Work Station 4.Queue NumberInQueue 0.2233 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue NumberInQueue 0.4747 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue NumberInQueue 0.4747 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue NumberInQueue 0.4747 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue NumberInQueue 0.464 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue NumberInQueue 0.8876 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue NumberInQueue 0.8876 (Insuf) 0.0000 2.0000 0.00000 QUIPUTS Identifier Value Part 1.NumberOut 12.000 Part 6.NumberOut 13.000 Part 6.NumberOut 13.000 Part 6.NumberOut 13.000 Part 1.TotalTime 53.782 (Insuf) 40.000 69.708 16 Part 1.TotalTime 53.620 (Insuf) 43.117 63.467 11 Part 3.IotalTime 53.633 (Insuf) 39.000 6.107 23 Part 1.TotalTime 53.633 (Insuf) 39.000 1.0000 0.0000 Machine 3.Utilization 3.24429 (Insuf) 43.117 63.467 11 Part 3.IotalTime 53.6438 (Insuf) 42.795 63.453 13 DISCRETE-CHANGE VARIABLES Identifier Average Half Width Minimum Maximum Final Value 	Machine 2. Utilization	.31420	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization 24600 (Insul) 00000 1.0000 00000 Machine 6. Utilization 4.1747 (Insul) 0.0000 1.0000 00000 Work Station 5. Queue, NumberInQueue 0.9417 (Insul) 0.0000 2.0000 00000 Work Station 5. Queue, NumberInQueue 0.9417 (Insul) 0.0000 2.0000 00000 Work Station 5. Queue, NumberInQueue 0.9417 (Insul) 0.0000 2.0000 00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 1.0000 0.00000 Part 3. NumberOut 12.000 Part 3. NumberOut 18.000 Part 4. NumberOut 18.000 Part 4. NumberOut 18.000 Part 5. TotalTime 43.471 (Insul) 34.205 53.678 13 Part 1. TotalTime 53.582 (Insul) 42.759 65.375 23 Part 1. TotalTime 53.782 (Insul) 42.759 65.375 23 Part 4. TotalTime 52.600 (Insul) 39.807 6.3483 13 DISCRETE-CHANGE VARIABLES Identifier Average Half Width Minimum Maximum Final Value Machine 1.Utilization 3.7827 (Insul) 0.0000 1.0000 0.00000 Machine 5.Utilization 3.4000 (Insul) 0.0000 1.0000 0.00000 Machine 5.Utilization 3.4007 (Insul) 0.0000 1.0000 0.00000 Mach	Machine 3. Utilization	.35119	(Insuf)	.00000	1.0000	1.0000		
Machine 5.Uillization 47474 (Insuf) 0.0000 1.0000 00000 Work Station 4.Queue.NumberInQueue 0.2233 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue.NumberInQueue 0.2233 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue.NumberInQueue 0.4026 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue.NumberInQueue 0.4026 (Insuf) 0.0000 2.0000 0.00000 Work Station 5.Queue.NumberInQueue 0.8376 (Insuf) 0.0000 2.0000 0.00000 Part 5.NumberOut 12.000 Part 5.NumberOut 15.000 Part 5.NumberOut 17.000 Part 5.NumberOut 20.000 Summary for Replication 2 of 20 TALLY VARIABLES Identifier Average Half Width Minimum Maximum Observations Part 1.TotalTime 43.471 (Insuf) 34.205 53.678 13 Part 2.TotalTime 53.782 (Insuf) 40.000 69.708 16 Part 1.TotalTime 53.633 (Insuf) 43.117 63.467 11 Part 3.CotalTime 53.633 (Insuf) 43.900 66.107 23 Part 4.TotalTime 53.633 (Insuf) 43.900 66.107 23 Part 5.TotalTime 53.633 (Insuf) 39.857 63.483 13 DISCRETE-CHANGE VARIABLES Identifier Average Half Width Minimum Maximum Final Value Machine 3.Uillization 37827 (Insuf) 0.0000 1.0000 0.00000 Machine 4.Uillization 37827 (Insuf) 0.0000 1.0000 0.00000 Machine 3.Uillization 37827 (Insuf) 0.0000 1.0000 0.00000 Machine 3.Uillization 34000 (Insuf) 0.0000 1.0000 0.00000 Machine 3.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 3.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 3.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 5.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 3.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 4.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 5.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 5.Uillization 34315 (Insuf) 0.0000 1.0000 0.00000 Machine 5.Uillization 34315	Machine 4. Utilization	.24600	(Insuf)	.00000	1.0000	.00000		
Machine 6.Utilization 4.47474 (Insul) 0.0000 1.0000 0.0000 Work Station 5. Queue, NumberInQueue 0.9417 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.9417 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 Work Station 5. Queue, NumberInQueue 0.8376 (Insul) 0.0000 2.0000 0.00000 OUTPUTS Identifier Value Part 1. NumberOut 12.000 Part 3. NumberOut 19.000 Part 3. NumberOut 19.000 Part 4. NumberOut 19.000 Part 6. NumberOut 18.000 Part 6. NumberOut 19.000 Part 6. NumberOut 19.000 Part 6. NumberOut 19.000 Part 6. NumberOut 19.000 Part 6. NumberOut 10.000 Machine 3.2117 Part 6. TotalTime 52.602 Machine 4.01112ation 3.2723 Part 6. TotalTime 52.602 Machine 3.01112ation 3.2733 Machine 4.01112ation 3.2733 Machine 4.01112ation 3.2733 Machine 4.01112ation 3.2733 Machine 3.01112ation 3.2733 Machine 4.01112ation 3.2733 Machine 4.01112ation 3.2733 Machine 5.01112ation 3.2733 Machine 5.01112ation 3.2733 Machine 4.01112ation 3.2733 Machine 5.01112ation 3.2733 Machine 5.01112ation 3.2733 Machine 5.01112ation 3.2733 Machine 5.01112ation 3.2733 Machine 5.01112ation 3.2733 Machine 5.0111000 Machine 6.01112atio	Machine 5. Utilization	.43746	(Insuf)	.00000	1.0000	1.0000		
Work Station 4. Queue, NumberInQueue         .02233         (Insul)         .00000         .00000           Work Station 5. Queue, NumberInQueue         .0447         (Insul)         .00000         .00000           Work Station 5. Queue, NumberInQueue         .04476         (Insul)         .00000         .00000           Work Station 5. Queue, NumberInQueue         .08376         (Insul)         .00000         .00000           Work Station 5. Queue, NumberInQueue         .08376         (Insul)         .00000         .00000           OUTPUTS         Identifier         Value         .         .         .           Part 1 NumberOut         12.000         Part 3. NumberOut         17.000         Part 3. NumberOut         .         .           Part 1 NumberOut         17.000         Part 3. NumberOut         .         .         .           Summary for Replication 2 of 20         .         .         .         .         .           Sumtary 1 TotalTime         43.471         (Insul)         .4.67         11         .           Part 1. TotalTime         54.566         (Insul)         .4.67         12         .           Part 3. TotalTime         52.602         (Insul)         .4.67         11         .      <	Machine 6. Utilization	.47474	(Insuf)	.00000	1.0000	.00000		
Work Station 5. Queue. Number InQueue         .09417         (Insulf)         00000         2.0000         .00000           Work Station 6. Queue. Number InQueue         .13799         (Insulf)         .00000         2.0000         .00000           Work Station 5. Queue. Number InQueue         .08376         (Insulf)         .00000         2.0000         .00000           Work Station 5. Queue. Number InQueue         .08376         (Insulf)         .00000         2.0000         .00000           Work Station 5. Queue. Number InQueue         .08376         (Insulf)         .00000         2.0000         .00000           OUTPUTS         Identifier         Value         .0000         2.0000         .00000         .00000           Part 1. NumberOut         12.000         Part 4. NumberOut         18.000         Part 4. NumberOut         18.000           Part 4. NumberOut         18.000         Part 4. NumberOut         20.000         Summary for Replication 2 of 20           Summary for Replication 2 of 20         Cinsulf         43.471         (Insulf)         42.759         53.575         23           Part 1. TotalTime         53.782         (Insulf)         43.117         63.467         11           Part 5. TotalTime         52.602         (Insulf)         0000	Work Station 4.Queue.NumberIr	Queue	.02233	(Insuf)	.00000	2.0000	.00000	
Work Station 6. Queue NumberInQueue         .04026         (Insuf)         .00000         2.0000         .00000           Work Station 6. Queue NumberInQueue         .02444         (Insuf)         .00000         2.0000         .00000           Work Station 3. Queuee. NumberInQueue         .08376         (Insuf)         .00000         2.0000         .00000           Work Station 3. Queuee. NumberInQueue         .08376         (Insuf)         .00000         2.0000         .00000           Part 1. NumberOut         12.000         Part 3. NumberOut         15.000         Part 3. NumberOut         17.000           Part 4. NumberOut         18.000         Part 5. NumberOut         20.000         Summary for Replication 2 of 20           Summary for Replication 2 of 20         TALLY VARIABLES         Its NumberOut         20.000         53.678         13           Part 1. TotalTime         53.762         (Insuf)         39.000         66.107         23           Part 2. TotalTime         52.602         (Insuf)         39.000         1.000         .00000           Part 4. TotalTime         52.602         (Insuf)         .00000         1.0000         .00000           Machine 2.Utilization         .37827         (Insuf)         .00000         1.0000         .00000 <td>Work Station 5.Queue.NumberIr</td> <td>Queue</td> <td>.09417</td> <td>(Insuf)</td> <td>.00000</td> <td>2.0000</td> <td>.00000</td> <td></td>	Work Station 5.Queue.NumberIr	Queue	.09417	(Insuf)	.00000	2.0000	.00000	
Work Station 6, Queue, NumberInQueue         .1379         (Insulf)         .00000         3.0000         .00000           Work Station 3, Queue, NumberInQueue         .08376         (Insulf)         .00000         2.0000         .00000           Work Station 3, Queue, NumberInQueue         .08376         (Insulf)         .00000         2.0000         .00000           OUTPUTS         Identifier         Value	Work Station 1.Queue.NumberIr	Queue	.04026	(Insuf)	.00000	2.0000	.00000	
Work Station 2. Queue. NumberInQueue         .02244         (Insul)         .00000         2.0000         .00000           Work Station 3. Queue. NumberInQueue         .08376         (Insul)         .00000         2.0000         .00000           OUTPUTS         Identifier         Value         .02444         (Insul)         .00000         2.0000         .00000           Part 1. NumberOut         12.000         Part 3. NumberOut         19.000         Part 3. NumberOut         19.000           Part 5. NumberOut         10.000         Part 4. NumberOut         20.000         Summary for Replication 2 of 20           Summary for Replication 2 of 20         TALLY VARIABLES         Identifier         Average         Half Width Minimum         Maximum         Observations           Part 1. TotalTime         53.762         13         Part 3. TotalTime         53.678         13           Part 2. TotalTime         52.750         (Insul)         43.275         65.375         23           Part 4. TotalTime         52.602         (Insul)         39.000         66.107         23           Part 4. TotalTime         52.602         (Insul)         0.0000         1.0000         0.0000           DISCRETE-CHANGE VARIABLES         Identifier         Average         Ha	Work Station 6.Queue.NumberIr	Queue	.13799	(Insuf)	.00000	3.0000	.00000	
Work Station 3.Queue.NumberInQueue         .08376         (Insul)         .00000         2.0000         .00000           OUTPUTS         Identifier         Value	Work Station 2.Queue.NumberIr	Queue	.02644	(Insuf)	.00000	2.0000	.00000	
OUTPUTS Identifier         Value           Part 1.NumberOut         12.000 Part 3.NumberOut         15.000 Part 3.NumberOut           Part 1.NumberOut         19.000 Part 3.NumberOut         19.000 Part 4.NumberOut         19.000 Part 5.NumberOut           Summary for Replication 2 of 20         Summary for Replication 2 of 20         Summary for Replication 2 of 20           TALLY VARIABLES Identifier         Average         Half Width         Maximum         Observations           Part 1.TotalTime         43.471         (Insul)         34.205         53.678         13           Part 1.TotalTime         53.782         (Insul)         42.059         65.375         23           Part 1.TotalTime         52.760         (Insul)         39.000         66.107         23           Part 5.TotalTime         52.602         (Insul)         39.000         10000         .00000           Machine 1.Utilization         .37827         (Insul)         .00000         1.0000         .00000           Machine 2.Utilization         .32133         (Insul)         .00000         1.0000         .00000           Machine 3.Utilization         .3429         (Insul)         .00000         1.0000         .00000           Machine 3.Utilization         .42439         (Insul)	Work Station 3.Queue.NumberIr	Queue	.08376	(Insuf)	.00000	2.0000	.00000	
Part 1. NumberOut       12.000         Part 3. NumberOut       15.000         Part 3. NumberOut       17.000         Part 3. NumberOut       17.000         Part 4. NumberOut       18.000         Part 6. NumberOut       20.000         Summary for Replication 2 of 20         TALLY VARIABLES         Identifier       Average         Part 1. TotalTime       43.471         Sampar 2. TotalTime       53.678       13         Part 2. TotalTime       53.782       10suft 42.759       65.375       23         Part 3. TotalTime       54.586       (Insur)       42.759       65.467       11         Part 4. TotalTime       51.633       (Insur)       39.000       66.107       23         Part 4. TotalTime       51.633       (Insur)       9.857       63.483       13         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Minimum       Maximum       Final Value         Machine 2. Utilization       .37827       (Insur)       .00000       1.0000       .00000         Machine 3. Utilization       .4439       (Insur)       .00000       1.0000       .00000         Machine 4. Utilization	OUTPUTS Identifier	Value						
Part 2. NumberOut       15.000         Part 3. NumberOut       19.000         Part 4. NumberOut       17.000         Part 5. NumberOut       18.000         Summary for Replication 2 of 20         Summary for Replication 2 of 20         Summary for Replication 2 of 20         Part 1. TotalTime       43.471         Part 2. TotalTime       53.678       13         Part 1. TotalTime       54.586       (Insur)       42.759       65.375       23         Part 3. TotalTime       52.760       (Insur)       39.000       66.107       23         Part 4. TotalTime       52.602       (Insur)       39.857       63.483       13         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Minimum       Maximum       Final Value         Machine 1. Utilization       37827       (Insur)       00000       1.0000       00000         Machine 1. Utilization       3413       (Insur)       00000       1.0000       00000         Machine 1. Utilization       34139       (Insur)       00000       1.0000       00000         Machine 4. Utilization       34139       (Insur)       00000       1.0000       00000         Machine 4.	Part 1.NumberOut	12.000	)					
Part 3.NumberOut       19.000         Part 4.NumberOut       17.000         Part 5.NumberOut       18.000         Part 5.NumberOut       20.000         Summary for Replication 2 of 20         TALLY VARIABLES Identifier       Average       Half Width       Minimum       Maximum       Observations         Part 1.TotalTime       43.471       (Insuf)       34.205       53.678       13         Part 1.TotalTime       53.782       (Insuf)       40.000       69.708       16         Part 1.TotalTime       54.586       (Insuf)       42.759       65.375       23         Part 4.TotalTime       51.633       (Insuf)       99.000       6.070       16         Part 5.TotalTime       52.602       (Insuf)       99.857       63.483       13         DISCRETE-CHANGE VARIABLES Identifier       Average       Half Width       Minimum       Maximum       Final Value         Machine 1.Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 3.Utilization       .378249       (Insuf)       .00000       1.0000       .00000         Machine 4.Utilization       .34000       (Insuf)       .00000       1.0000       .00000       Maximum<	Part 2.NumberOut	15.000	)					
Part 4.NumberOut       17.000         Part 5.NumberOut       18.000         Part 6.NumberOut       20.000         Summary for Replication 2 of 20         TALLY VARIABLES         Identifier       Average         Part 1.TotalTime       43.471         (Insur)       34.205       53.678       13         Part 1.TotalTime       53.782       (Insur)       40.000       69.708       16         Part 3.TotalTime       54.586       (Insur)       43.477       1         Part 3.TotalTime       51.633       (Insur)       43.177       63.467       11         Part 4.TotalTime       52.602       (Insur)       39.857       63.483       13         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Minimum       Maximum       Final Value         Machine 1.Utilization       .37827       (Insur)       .00000       1.0000       .00000         Machine 2.Utilization       .34100       (Insur)       .00000       1.0000       .00000         Machine 3.Utilization       .4317       (Insur)       .00000       1.0000       .00000         Machine 4.Utilization       .43175       (Insur)       .00000       1.0000	Part 3.NumberOut	19.000	)					
Part 5.NumberOut         18.000           Part 6.NumberOut         20.000           Summary for Replication 2 of 20           TALLY VARIABLES Identifier         Average Half Width         Minimum         Maximum         Observations           Part 1.TotalTime         43.471         (Insuf)         34.205         53.678         13           Part 2.TotalTime         53.782         (Insuf)         40.000         69.708         16           Part 3.TotalTime         54.586         (Insuf)         42.759         65.375         23           Part 4.TotalTime         52.760         (Insuf)         39.857         63.487         11           Part 5.TotalTime         52.602         (Insuf)         39.857         63.483         13           DISCRETE-CHANGE VARIABLES Identifier         Average Half Width         Minimum         Maximum         Final Value           Machine 1.Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 2.Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 3.Utilization         .3413         .00000         1.0000         .00000         Machine 5.Utilization         .4409         (Insuf)         .0000	Part 4.NumberOut	17.000	1					
Part 6.NumberOut         20.000           Summary for Replication 2 of 20           TALLY VARIABLES Identifier         Average         Half Width         Minimum         Maximum         Observations           Part 1.TotalTime         43.471         (Insuf)         34.205         53.678         13           Part 2.TotalTime         53.782         (Insuf)         40.000         69.708         16           Part 3.TotalTime         54.586         (Insuf)         42.759         65.375         23           Part 4.TotalTime         52.602         (Insuf)         39.000         66.107         23           Part 6.TotalTime         52.602         (Insuf)         .99.857         63.483         13           DISCRETE-CHANGE VARIABLES         Identifier         Average         Half Width         Minimum         Maximum         Final Value           Machine 1.Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 3.Utilization         .34439         (Insuf)         .00000         1.0000         .00000           Machine 4.Utilization         .4439         (Insuf)         .00000         1.0000         .00000           Machine 5.Utilization         .4094         (Insuf) <td>Part 5.NumberOut</td> <td>18.000</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Part 5.NumberOut	18.000	1					
Summary for Replication 2 of 20           TALLY VARIABLES Identifier         Average         Half Width         Mainmun         Observations           Part 1. TotalTime         43.471         (Insuf)         34.205         53.678         13           Part 2. TotalTime         53.782         (Insuf)         42.055         53.678         13           Part 2. TotalTime         54.586         (Insuf)         42.759         65.375         23           Part 4. TotalTime         52.602         (Insuf)         39.857         63.483         13           DISCRETE-CHANGE VARIABLES Identifier         Average         Half Width         Minimum         Maximum         Final Value           Machine 1. Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 2. Utilization         .34815         (Insuf)         .00000         1.0000         .00000           Machine 3. Utilization         .48439         (Insuf)         .00000         1.0000         .00000           Machine 4. Utilization         .4815         (Insuf)         .00000         1.0000         .00000           Machine 5. Utilization         .48094         (Insuf)         .00000	Part 6.NumberOut	20.000	)					
Summary for Replication 2 of 20           TALLY VARIABLES Identifier         Average         Half Width         Minimum         Maximum         Observations           Part 1. TotalTime         43.471         (Insuf)         34.205         53.678         13           Part 2. TotalTime         53.782         (Insuf)         40.000         69.708         16           Part 3. TotalTime         54.586         (Insuf)         42.759         65.375         23           Part 4. TotalTime         52.760         (Insuf)         43.117         63.467         11           Part 5. TotalTime         52.602         (Insuf)         39.00         66.107         23           Part 6. TotalTime         52.602         (Insuf)         39.857         63.483         13           DISCRETE-CHANGE VARIABLES         Identifier         Average         Half Width         Minimum         Maximum         Final Value           Machine 1. Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 3. Utilization         .4315         (Insuf)         .00000         1.0000         .00000           Machine 4. Utilization         .4315         (Insuf)         .00000         1.0000         .00000     <	Cummun fan Dauliaatien 2 e	6.00						
TALLY VARIABLES Identifier         Average         Half Width         Minimum         Maximum         Observations           Part 1. TotalTime         43.471         (Insuf)         34.205         53.678         13           Part 2. TotalTime         53.782         (Insuf)         40.000         69.708         16           Part 3. TotalTime         54.586         (Insuf)         42.759         65.375         23           Part 4. TotalTime         51.633         (Insuf)         39.000         66.107         23           Part 6. TotalTime         51.633         (Insuf)         39.857         63.483         13           DISCRETE-CHANGE VARIABLES Identifier         Average         Half Width         Minimum         Maximum         Final Value           Machine 1. Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 2. Utilization         .34000         (Insuf)         .00000         1.0000         .00000           Machine 4. Utilization         .44694         (Insuf)         .00000         1.0000         .00000           Machine 4. Utilization         .44694         (Insuf)         .00000         1.0000         .00000           Machine 4. Utilization         .46094<	Nummary for Replication 7.0	T 20						
Identifier         Average         Half Width         Minimum         Maximum         Observations           Part 1.TotalTime         43.471         (Insuf)         34.205         53.678         13           Part 2.TotalTime         53.782         (Insuf)         40.000         69.708         16           Part 3.TotalTime         54.586         (Insuf)         42.759         65.375         23           Part 4.TotalTime         52.760         (Insuf)         39.000         66.107         23           Part 5.TotalTime         51.633         (Insuf)         39.000         66.107         23           Part 6.TotalTime         52.602         (Insuf)         .00000         1.0000         .00000           Machine 1.Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 2.Utilization         .34000         (Insuf)         .00000         1.0000         .00000           Machine 4.Utilization         .4439         (Insuf)         .00000         1.0000         .00000           Machine 5.Utilization         .46094         (Insuf)         .00000         1.0000         .00000           Work Station 5.Queue.NumberInQueue         .017897         (Insuf)         .0	Summary for Replication 2.0							
Part 1. TotalTime       43.471       (Insuf)       34.205       53.678       13         Part 2. TotalTime       53.782       (Insuf)       40.000       69.708       16         Part 3. TotalTime       54.586       (Insuf)       42.759       65.375       23         Part 4. TotalTime       52.760       (Insuf)       43.117       63.467       11         Part 5. TotalTime       51.633       (Insuf)       39.000       66.107       23         Part 6. TotalTime       52.602       (Insuf)       39.857       63.483       13         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Minimum       Maximum       Final Value         Machine 1.Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 3.Utilization       .34200       (Insuf)       .0000       1.0000       .00000         Machine 4.Utilization       .4439       (Insuf)       .00000       1.0000       .00000         Machine 5.Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Wachine 5.Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Work Station 5.Queue	TALLY VARIABLES							
Part 2. TotalTime       53.782       (Insuf)       40.000       69.708       16         Part 3. TotalTime       54.586       (Insuf)       42.759       65.375       23         Part 4. TotalTime       52.760       (Insuf)       43.117       63.467       11         Part 5. TotalTime       51.633       (Insuf)       39.000       66.107       23         Part 6. TotalTime       52.602       (Insuf)       39.857       63.483       13         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Maximum       Final Value         Machine 1.Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 2.Utilization       .32133       (Insuf)       .00000       1.0000       .00000         Machine 3.Utilization       .43815       (Insuf)       .00000       1.0000       .00000         Machine 6.Utilization       .43815       (Insuf)       .00000       1.0000       .00000         Machine 5.Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Work Station 5.Queue.NumberInQueue       .01785       (Insuf)       .00000       2.0000       .00000         Work Station 5.Queue	TALLY VARIABLES Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
Part 3. TotalTime       54.586       (Insuf)       42.759       65.375       23         Part 4. TotalTime       52.760       (Insuf)       43.117       63.467       11         Part 5. TotalTime       51.633       (Insuf)       39.000       66.107       23         Part 6. TotalTime       52.602       (Insuf)       39.857       63.483       13         DISCRETE-CHANGE VARIABLES       Average       Half Width       Minimum       Maximum       Final Value         Machine 1. Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 2. Utilization       .32133       (Insuf)       .00000       1.0000       .00000         Machine 3. Utilization       .34000       (Insuf)       .00000       1.0000       .00000         Machine 5. Utilization       .4439       (Insuf)       .00000       1.0000       .00000         Machine 6. Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Work Station 1. Queue. NumberInQueue       .07785       (Insuf)       .00000       2.0000       .00000         Work Station 1. Queue. NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000	TALLY VARIABLES Identifier Part 1.TotalTime	Average H	alf Width	Minimum 34.205	Maximun 53.678	n Observ 13	ations	
Part 4. TotalTime       52.760       (Insuf)       43.117       63.467       11         Part 5. TotalTime       51.633       (Insuf)       39.000       66.107       23         Part 6. TotalTime       52.602       (Insuf)       39.857       63.483       13         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Minimum       Maximum       Final Value         Machine 1. Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 3. Utilization       .32133       (Insuf)       .00000       1.0000       .00000         Machine 4. Utilization       .24439       (Insuf)       .00000       1.0000       .00000         Machine 5. Utilization       .43815       (Insuf)       .00000       1.0000       .00000         Machine 5. Utilization       .43815       (Insuf)       .00000       1.0000       .00000         Machine 6. Utilization       .43815       (Insuf)       .00000       1.0000       .00000         Work Station 5. Queue. NumberInQueue       .01909       (Insuf)       .00000       2.0000       .00000         Work Station 1. Queue. NumberInQueue       .05406       (Insuf)       .00000       2.0000 <td< td=""><td>TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime</td><td>Average H 43.471 53.782</td><td>alf Width (Insuf) (Insuf)</td><td>Minimum 34.205 40.000</td><td>Maximun 53.678 69.708</td><td>n Observ 13 16</td><td>ations</td><td></td></td<>	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 43.471 53.782	alf Width (Insuf) (Insuf)	Minimum 34.205 40.000	Maximun 53.678 69.708	n Observ 13 16	ations	
Part 5. TotalTime       51.633       (Insuf)       39.000       66.107       23         Part 6. TotalTime       52.602       (Insuf)       39.857       63.483       13         DISCRETE-CHANGE VARIABLES       Identifier       Average       Half Width       Minimum       Maximum       Final Value         Machine 1. Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 2. Utilization       .32133       (Insuf)       .00000       1.0000       .00000         Machine 3. Utilization       .34000       (Insuf)       .00000       1.0000       .00000         Machine 4. Utilization       .4439       (Insuf)       .00000       1.0000       .00000         Machine 5. Utilization       .44315       (Insuf)       .00000       1.0000       .00000         Machine 5. Utilization       .44315       (Insuf)       .00000       1.0000       .00000         Work Station 4. Queue.NumberInQueue       .01909       (Insuf)       .00000       2.0000       .00000         Work Station 5. Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 3. Queue.NumberInQueue       .05406       (Insuf)       .00000       2.	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 43.471 53.782 54.586	lalf Width (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759	Maximun 53.678 69.708 65.375	n Observ 13 16 23	ations	
Part 6. TotalTime         52.602         (Insuf)         39.857         63.483         13           DISCRETE-CHANGE VARIABLES Identifier         Average         Half Width         Minimum         Maximum         Final Value           Machine 1. Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 2. Utilization         .32133         (Insuf)         .00000         1.0000         .00000           Machine 3. Utilization         .34000         (Insuf)         .00000         1.0000         .00000           Machine 4. Utilization         .4439         (Insuf)         .00000         1.0000         1.0000           Machine 5. Utilization         .4815         (Insuf)         .00000         1.0000         1.0000           Machine 6. Utilization         .4694         (Insuf)         .00000         1.0000         .00000           Work Station 1.Queue.NumberInQueue         .01909         (Insuf)         .00000         2.0000         .00000           Work Station 6.Queue.NumberInQueue         .03907         (Insuf)         .00000         2.0000         .00000           Work Station 3.Queue.NumberInQueue         .05406         (Insuf)         .00000         2.0000         .00000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 43.471 53.782 54.586 52.760	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117	Maximun 53.678 69.708 65.375 63.467	n Observ 13 16 23 11	ations	
DISCRETE-CHANGE VARIABLES           Identifier         Average         Half Width         Minimum         Maximum         Final Value           Machine 1. Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 2. Utilization         .32133         (Insuf)         .00000         1.0000         .00000           Machine 3. Utilization         .34000         (Insuf)         .00000         1.0000         .00000           Machine 4. Utilization         .24439         (Insuf)         .00000         1.0000         .00000           Machine 5. Utilization         .46094         (Insuf)         .00000         1.0000         .00000           Work Station 4. Queue. Number InQueue         .01909         (Insuf)         .00000         1.0000         .00000           Work Station 5. Queue. Number InQueue         .03907         (Insuf)         .00000         2.0000         .00000           Work Station 2. Queue. Number InQueue         .03437         (Insuf)         .00000         2.0000         .00000           Work Station 3. Queue. Number InQueue         .04337         (Insuf)         .00000         2.0000         .00000           Work Station 3. Queue. Number InQueue         .04337         (Insuf) <t< td=""><td>TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime</td><td>Average H 43.471 53.782 54.586 52.760 51.633</td><td>(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)</td><td>Minimum 34.205 40.000 42.759 43.117 39.000</td><td>Maximun 53.678 69.708 65.375 63.467 66.107</td><td>n Observ 13 16 23 11 23</td><td>ations</td><td></td></t<>	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 43.471 53.782 54.586 52.760 51.633	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000	Maximun 53.678 69.708 65.375 63.467 66.107	n Observ 13 16 23 11 23	ations	
Identifier         Average         Half Width         Minimum         Maximum         Final Value           Machine 1.Utilization         .37827         (Insuf)         .00000         1.0000         .00000           Machine 2.Utilization         .32133         (Insuf)         .00000         1.0000         .00000           Machine 3.Utilization         .34000         (Insuf)         .00000         1.0000         .00000           Machine 5.Utilization         .24439         (Insuf)         .00000         1.0000         1.0000           Machine 5.Utilization         .43815         (Insuf)         .00000         1.0000         .00000           Machine 6.Utilization         .44394         (Insuf)         .00000         1.0000         .00000           Machine 5.Utilization         .44394         (Insuf)         .00000         1.0000         .00000           Work Station 4.Queue.NumberInQueue         .01909         (Insuf)         .00000         1.0000         .00000           Work Station 1.Queue.NumberInQueue         .03907         (Insuf)         .00000         2.0000         .00000           Work Station 2.Queue.NumberInQueue         .05406         (Insuf)         .00000         .00000         .000000           Work Station 3	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 43.471 53.782 54.586 52.760 51.633 52.602	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857	Maximun 53.678 69.708 65.375 63.467 66.107 63.483	n Observ 13 16 23 11 23 13	ations	
Machine 1. Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 2. Utilization       .32133       (Insuf)       .00000       1.0000       .00000         Machine 3. Utilization       .34000       (Insuf)       .00000       1.0000       .00000         Machine 4. Utilization       .24439       (Insuf)       .00000       1.0000       1.0000         Machine 5. Utilization       .43815       (Insuf)       .00000       1.0000       1.0000         Machine 6. Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Work Station 4.Queue.NumberInQueue       .07785       (Insuf)       .00000       2.0000       .00000         Work Station 1.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average H 43.471 53.782 54.586 52.760 51.633 52.602	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857	Maximun 53.678 69.708 65.375 63.467 66.107 63.483	n Observ 13 16 23 11 23 13	ations	
Machine 1.Utilization       .37827       (Insuf)       .00000       1.0000       .00000         Machine 2.Utilization       .32133       (Insuf)       .00000       1.0000       .00000         Machine 3.Utilization       .34000       (Insuf)       .00000       1.0000       .00000         Machine 3.Utilization       .24439       (Insuf)       .00000       1.0000       1.0000         Machine 5.Utilization       .43815       (Insuf)       .00000       1.0000       1.0000         Machine 6.Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Work Station 5.Queue.NumberInQueue       .01909       (Insuf)       .00000       2.0000       .00000         Work Station 1.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun	n Observ. 13 16 23 11 23 13 n Final Va	ations	
Machine 2. Utilization       .32133       (Insur)       .00000       1.0000       .00000         Machine 2. Utilization       .34000       (Insur)       .00000       1.0000       .00000         Machine 3. Utilization       .24439       (Insur)       .00000       1.0000       1.0000         Machine 4. Utilization       .43815       (Insur)       .00000       1.0000       1.0000         Machine 5. Utilization       .43815       (Insur)       .00000       1.0000       .00000         Machine 5. Utilization       .46094       (Insur)       .00000       1.0000       .00000         Work Station 4. Queue.NumberInQueue       .01909       (Insur)       .00000       2.0000       .00000         Work Station 1.Queue.NumberInQueue       .03907       (Insur)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .03907       (Insur)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insur)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insur)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value       11.000       .0000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun	n Observ. 13 16 23 11 23 13 n Final Va	ations	
Machine 1.0100       1.0100       1.0000       1.0000       1.0000         Machine 3. Utilization       .24439       (Insuf)       .00000       1.0000       1.0000         Machine 4. Utilization       .43815       (Insuf)       .00000       1.0000       1.0000         Machine 5. Utilization       .43815       (Insuf)       .00000       1.0000       1.0000         Machine 6. Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Work Station 4.Queue.NumberInQueue       .01909       (Insuf)       .00000       2.0000       1.0000         Work Station 1.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 6.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1. Utilization	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H 37827	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun	n Observ. 13 16 23 11 23 13 n Final Va 00000	ations	
Machine 4. Utilization       .24439       (Insuf)       .00000       1.0000         Machine 5. Utilization       .43815       (Insuf)       .00000       1.0000         Machine 6. Utilization       .46094       (Insuf)       .00000       1.0000         Work Station 4. Queue.NumberInQueue       .01909       (Insuf)       .00000       1.0000         Work Station 5. Queue.NumberInQueue       .07785       (Insuf)       .00000       2.0000       1.0000         Work Station 1. Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 6. Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 2. Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3. Queue.NumberInQueue       .04337       (Insuf)       .00000       2.0000       .00000         Work Station 3. Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value       Value       .0000       1.0000       .00000         Part 1.NumberOut       13.000       Part 3.NumberOut       23.000       Part 4.NumberOut       11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2. Itilization	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 32133	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000	n Observ. 13 16 23 11 23 13 n Final Va .00000 00000	ations	
Machine S. Utilization	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3. Utilization	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 34000	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 .00000	ations	
Machine 6.Utilization       .46094       (Insuf)       .00000       1.0000       .00000         Work Station 4.Queue.NumberInQueue       .01909       (Insuf)       .00000       1.0000       .00000         Work Station 5.Queue.NumberInQueue       .07785       (Insuf)       .00000       2.0000       1.0000         Work Station 1.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 6.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value       Value       .00000       .00000       .00000         Part 1.NumberOut       13.000       Part 3.NumberOut       13.000       Part 4.NumberOut       11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4. Utilization	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 24439	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 .00000 10000	ations	
Work Station 4.Queue.NumberInQueue       .01909       (Insuf)       .00000       1.0000       .00000         Work Station 5.Queue.NumberInQueue       .07785       (Insuf)       .00000       2.0000       1.0000         Work Station 1.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 6.Queue.NumberInQueue       .0183       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value       Value       .04337       (Insuf)       .00000       .00000         Part 1.NumberOut       13.000       Part 3.NumberOut       13.000       Part 4.NumberOut       11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5. Utilization Machine 5. Utilization	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 43815	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000	ations	
Work Station 5.Queue.NumberInQueue       .07785       (Insuf)       .00000       2.0000       1.0000         Work Station 1.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 6.Queue.NumberInQueue       .10183       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value       Value       .04337       (Insuf)       .00000       .00000         Part 1.NumberOut       13.000       Part 3.NumberOut       16.000       Part 3.NumberOut       23.000         Part 4.NumberOut       11.000       11.000       .0000       .00000       .00000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 46094	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 00000	ations	
Work Station 1.Queue.NumberInQueue       .03907       (Insuf)       .00000       2.0000       .00000         Work Station 6.Queue.NumberInQueue       .10183       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value       Value       .04337       (Insuf)       .00000       .00000         Part 1.NumberOut       13.000       Part 3.NumberOut       13.000       Part 4.NumberOut       11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 Oueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 1.0000	ations	
Work Station 6.Queue.NumberInQueue       .10183       (Insuf)       .00000       2.0000       .00000         Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 MQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01909 .07785	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 2.0000	ations alue .00000 1.0000	
Work Station 2.Queue.NumberInQueue       .05406       (Insuf)       .00000       2.0000       .00000         Work Station 3.Queue.NumberInQueue       .04337       (Insuf)       .00000       1.0000       .00000         OUTPUTS       Identifier       Value	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01909 .07785 .03907	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000	ations alue .00000 1.0000 .00000	
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OUTPUTS IdentifierValuePart 1.NumberOut13.000Part 2.NumberOut16.000Part 3.NumberOut23.000Part 4.NumberOut11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.01909 .03907 .03907 .10183 .05406	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations	
IdentifierValuePart 1.NumberOut13.000Part 2.NumberOut16.000Part 3.NumberOut23.000Part 4.NumberOut11.000	TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Machine 5.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 aQueue aQueue aQueue aQueue	lalf Width (Insuf) (Insa)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 2.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
Part 1.NumberOut       13.000         Part 2.NumberOut       16.000         Part 3.NumberOut       23.000         Part 4.NumberOut       11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue nQueue nQueue nQueue	lalf Width (Insuf) (Insa3) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
Part 2.NumberOut16.000Part 3.NumberOut23.000Part 4.NumberOut11.000	TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 0Queue 0Queue 0Queue 0Queue 0Queue 0Queue 0Queue 0Queue 0Queue 0Queue 0Queue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01909 .07785 .03907 .10183 .05406 .04337	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
Part 3.NumberOut23.000Part 4.NumberOut11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQUE NQUE NQ	lalf Width (Insuf) (Insaf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 2.0000 1.0000 1.0000 2.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
Part 4.NumberOut 11.000	TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUE NQUE NQ	lalf Width (Insuf) (Insaf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 2.0000 1.0000 1.0000 2.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
	TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 2.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQUE NQUE NQ	lalf Width (Insuf) (Insaf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 2.0000 1.0000 1.0000 2.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
Part 5 NumberOut 23 000	TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 4.Utilization         Machine 5.Utilization         Machine 6.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier         Part 1.NumberOut         Part 3.NumberOut         Part 4.NumberOut	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQUE NQUE	lalf Width (Insuf) (Insaf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 2.0000 1.0000 1.0000	ations	
Part 6.NumberOut 13.000	TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier	Average H 43.471 53.782 54.586 52.760 51.633 52.602 Average H .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUE NQUE	lalf Width (Insuf) (Insaf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000	n Observ. 13 16 23 11 23 13 n Final Va .00000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 2.0000 1.0000 1.0000	ations	

#### Summary for Replication 3 of 20

TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Observ	ations	
Part 1.TotalTime	42.292	(Insuf)	35.602	51.704	13		
Part 2.TotalTime	54.754	(Insuf)	41.869	73.876	19		
Part 3.TotalTime	54.178	(Insuf)	42.000	70.109	12		
Part 4.TotalTime	55.466	(Insuf)	38.000	71.103	15		
Part 5.TotalTime	54.972	(Insuf)	41.724	76.140	23		
Part 6.TotalTime	56.155	(Insuf)	45.179	70.805	18		
DISCRETE-CHANGE VARIABLE	S Averade H	alf Width	Minimum	Maximun	n Final V	aluo	
Identinei	Average 1		wiiniiniuni	IVIAAIITTUTT		aiue	
Machine 1.Utilization	.40533	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.34263	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.35032	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization	.22667	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.43733	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.49555	(Insuf)	.00000	1.0000	.00000		
Work Station 4.Queue.Number	InQueue	.01163	(Insuf)	.00000	1.0000	.00000	
Work Station 5.Queue.Number	InQueue	.08179	(Insuf)	.00000	2.0000	.00000	
Work Station 1.Queue.Number	InQueue	.03500	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.Number	InQueue	.14589	(Insuf)	.00000	3.0000	.00000	
Work Station 2.Queue.Number	InQueue	.03024	(Insuf)	.00000	1.0000	.00000	
Work Station 3.Queue.Number	InQueue	.08460	(Insuf)	.00000	2.0000	.00000	
			(				
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	13.000	)					
Part 2.NumberOut	19.000	)					
Part 3 NumberOut	12 000	)					
Part 4 NumberOut	15.000	)					
Part 5 NumberOut	23 000	) )					
Part 6.NumberOut	18.000	)					
Summary for Replication 4	of 20						
TALLY VARIABLES							
Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
Part 1 TotalTime	42 149	(Insuf)	35 721	59 240	12		
Part 2 TotalTime	56 313	(Insuf)	44 000	69 257	17		
Part 2 TotalTime	54 428	(Insuf)	44.000	78 107	11		
	40.000	(Insul)	29,000	70.107	21		
Part & TotalTime	47.707	(Insul)	42,000	42.000	21		
Part 6 TotalTime	52.022 47 344	(Insuf)	43.000 43.574	62.000 52 399	51		
	77.577	(msur)	43.374	52.577	0		
DISCRETE-CHANGE VARIABLES	S						
Identifier	Average H	alf Width	Minimum	Maximun	n Final V	alue	
Machine 1. Utilization	.34354	(Insuf)	.00000	1.0000	1.0000		
Machine 2. Utilization	.33200	(Insuf)	.00000	1,0000	.00000		
Machine 3. Utilization	.38828	(Insuf)	.00000	1,0000	.00000		
Machine 4. Utilization	.21989	(Insuf)	.00000	1.0000	1.0000		
Machine 5. Utilization	45486	(Insuf)	.00000	1.0000	.00000		
Machine 6 Utilization	,73400 12767	(Incuf)	00000	1 0000	00000		
Work Station 1 Ougun Number	.43∠07 InΩuouo	(11301)	(lncuf)	00000	2 00000	00000	
Work Station 2 Oucus Number		.03072	(Insuf)	00000	2.0000	.00000	
Work Station 2 Queue Number		04200	(Insur)	00000	2.0000	.00000	
Work Station 4 Oucus Number		.04200	(IIISUI)	.00000	1.0000	1 0000	
Work Station 4.Queue.Number		.01646	(Insur)	.00000	1.0000	1.0000	
Work Station 5.Queue.Number	InQueue	.08696	(Insuf)	.00000	2.0000	.00000	
work Station 6.Queue.Number	mQueue	.06/18	(Insuf)	.00000	2.0000	.00000	
OUTPUTS							
Identifier	Value						
Dort 1 NumberOut	10.000						
Part 1.NumberOut	12.000	,					
Part 2 NumberOut	17 000	1					
HOUT & NUIPODOR NUT	17.000	)					
Part 4 NumberOut	17.000 11.000	) )					
Part 5.NumberOut	17.000 11.000 21.000	) ) )					
Part 5.NumberOut Part 5.NumberOut	17.000 11.000 21.000 31.000	) ) )					

### Summary for Replication 5 of 20

Identifier	Average H	Half Width	Minimum	Maximun	n Observ	ations	
Part 1 TotalTime	46 736	(Insuf)	40,000	55 203	13		 
Part 2.TotalTime	59.746	(Insuf)	44.000	83.202	23		
Part 3.TotalTime	56.577	(Insuf)	42.190	95.372	19		
Part 4.TotalTime	51.882	(Insuf)	39.000	58.404	20		
Part 5.TotalTime	59.083	(Insuf)	43.000	89.884	15		
Part 6.TotalTime	51.844	(Insuf)	42.291	70.961	13		
DISCRETE-CHANGE VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Final V	alue	
Machine 1. Utilization	.39717	(Insuf)	.00000	1.0000	1.0000		 
Machine 2.Utilization	.36467	(Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.33800	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization	.25681	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.47933	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.51439	(Insuf)	.00000	1.0000	1.0000		
Work Station 1.Queue.NumberIn	nQueue	.03829	(Insuf)	.00000	1.0000	.00000	
Work Station 2.Queue.NumberIn	nQueue	.06138	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.NumberIn	nQueue	.05142	(Insuf)	.00000	1.0000	.00000	
Work Station 4.Queue.NumberIn	nQueue	.02824	(Insuf)	.00000	1.0000	.00000	
Work Station 5.Queue.NumberIn	nQueue	.11319	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.NumberIr	nQueue	.14575	(Insuf)	.00000	3.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	13.000	)					
Part 2.NumberOut	23.000	)					
Part 3.NumberOut	19.000	)					
Part 4.NumberOut	20.000	)					
Part 5.NumberOut	15.000	)					
Part 6.NumberOut	13.000	)					
Summary for Replication 6 o	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H 46.840	Half Width	Minimum 36.000	Maximun 61.090	n Observ 16	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 46.840 52.912	Half Width (Insuf) (Insuf)	Minimum 36.000 44.000	Maximun 61.090 74.149	n Observ 16 18	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 46.840 52.912 51.905	Half Width (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081	Maximun 61.090 74.149 78.443	n Observ 16 18 13	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 46.840 52.912 51.905 50.142	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000	Maximun 61.090 74.149 78.443 58.000	n Observ 16 18 13 20	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 46.840 52.912 51.905 50.142 52.103	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000	Maximun 61.090 74.149 78.443 58.000 67.537	n Observ 16 18 13 20 21	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 46.840 52.912 51.905 50.142 52.103 51.736	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443	n Observ 16 18 13 20 21 13	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average 46.840 52.912 51.905 50.142 52.103 51.736	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443	n Observ 16 18 13 20 21 13	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 Minimum	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun	n Observ 16 18 13 20 21 13 n Final V	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 Minimum .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000	n Observ 16 18 13 20 21 13 n Final V .00000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 Minimum .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V .00000 .00000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000 1.0000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45809 .45831	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000 (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000 1.0000 2.0000	ations alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 1.0000 .00000 1.0000	ations alue .00000 .00000	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 1.0000 2.0000	ations alue .00000 .00000 .00000	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 6.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Wack Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02841 .08647 .03155 .08414 .03741 .05022	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUE	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.NumberOut	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 5.NumberOut Pa	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 6.NumberOut Part 6.NumberOu	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue nQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUE	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	

#### Summary for Replication 7 of 20

Part 5.NumberOut

Part 6.NumberOut

17.000

20.000

TALLY VARIABLES Identifier	Average F	lalf Width	Minimum	Maximur	n Observ	ations
Part 1.TotalTime	43.443	(Insuf)	35.887	52.523	14	
Part 2.TotalTime	57.134	(Insuf)	42.000	68.931	16	
Part 3.TotalTime	55.495	(Insuf)	44.653	70.907	17	
Part 4.TotalTime	48.484	(Insuf)	39.000	64.679	19	
Part 5.TotalTime	52.439	(Insuf)	39.000	69.104	20	
Part 6.TotalTime	52.414	(Insuf)	43.177	74.032	16	
DISCRETE-CHANGE VARIABLES	S					
Identifier	Average H	alf Width	Minimum	Maximur	n Final V	alue
Machine 1.Utilization	.38000	(Insuf)	.00000	1.0000	.00000	
Machine 2. Utilization	.30924	(Insuf)	.00000	1.0000	1.0000	
Machine 3. Utilization	.34103	(Insuf)	.00000	1.0000	.00000	
Machine 4. Utilization	.25267	(Insuf)	.00000	1.0000	.00000	
Machine 5. Utilization	.44504	(Insuf)	.00000	1.0000	.00000	
Machine 6. Utilization	.46467	(Insuf)	.00000	1.0000	.00000	
Work Station 4.Queue.Number	InQueue	.02548	(Insuf)	.00000	1.0000	.00000
Work Station 5.Queue.Number	InQueue	.06961	(Insuf)	.00000	2.0000	.00000
vvork Station 1.Queue.Number	InQueue	.04185	(Insuf)	.00000	2.0000	.00000
work Station 6.Queue.Number	InQueue	.09441	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number	InQueue	.02537	(Insuf)	.00000	1.0000	1.0000
Work Station 3.Queue.Number	InQueue	.04820	(Insuf)	.00000	1.0000	.00000
OUTPUTS						
Identifier	Value					
Part 1.NumberOut	14.000	)				
Part 2.NumberOut	16.000	)				
Part 3.NumberOut	17.000	)				
Part 4.NumberOut	19.000	)				
Part 5.NumberOut	20.000	)				
Part 6.NumberOut	16.000	)				
Summary for Replication 8	of 20					
TALLY VARIABLES						
Identifier	Average H	lalf Width	Minimum	Maximur	n Observ	ations
Part 1 TotalTimo	11 045	(Incuf)	20 771	50 000	1/	
Part 2 Total Time	44.005	(Insul)	30.724	00.990 71.040	14	
Fait 2. IUtal IIIIte	50.U05	(Insul)	40.000	/ I.003	15	
Part 4 Total Time	52.623	(INSUI)	42.323	00.143	1/	
Part 5 Total Time	51.093	(Insur)	41.000	01.853 41 770	19	
rait 5.10tal1Ime	51.6/6	(Insur)	39.000	04.//3	1/	
Part 6.10tal1ime	52.471	(Insuf)	38.000	/1.564	20	
DISCRETE-CHANGE VARIABLES	S					
Identifier	Average H	lalf Width	Minimum	Maximur	m Final V	alue
Machine 1.Utilization	.37600	(Insuf)	.00000	1.0000	.00000	
Machine 2. Utilization	.30728	(Insuf)	.00000	1.0000	.00000	
Machine 3. Utilization	.30369	(Insuf)	.00000	1.0000	1.0000	
Machine 4. Utilization	.25891	(Insuf)	.00000	1.0000	.00000	
Machine 5. Utilization	.41887	(Insuf)	.00000	1.0000	1.0000	
Machine 6. Utilization	50851	(Insuf)	.00000	1.0000	1.0000	
Work Station 4 Oueue Number	InOueue	.02703	(Insuf)	.00000	2,0000	.00000
Work Station 5 Oueue Number	InQueue	05953	(Insuf)	.00000	1.0000	00000
Work Station 1 Oueue Number	InQueue	03808	(Insuf)	00000	2 0000	00000
Work Station 6 Ougue Number	InOueue	12600	(Insuf)	00000	2.0000	00000
WORK STATION O. QUEUE. NUMBER	LIN /UCUE	.12007	(Insuf)	00000	2.0000 1.0000	
Mark Station 2 Quara Number	InQueue	11 11 1 1 4	L I I N I I I	.00000	1.0000	.00000
Work Station 2.Queue.Number Work Station 3.Queue.Number	InQueue InQueue	.02076 .05978	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number Work Station 3.Queue.Number	InQueue InQueue	.02076 .05978	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number Work Station 3.Queue.Number OUTPUTS	InQueue	.02076 .05978	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number Work Station 3.Queue.Number OUTPUTS Identifier	InQueue InQueue Value	.02076 .05978	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number Work Station 3.Queue.Number OUTPUTS Identifier Part 1.NumberOut	InQueue InQueue Value 14.000	.02076 .05978	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number Work Station 3.Queue.Number OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut	Value 14.000 13.000	.02076 .05978	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number Work Station 3.Queue.Number OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut	InQueue InQueue Value 14.000 13.000 17.000	.02076 .05978	(Insuf)	.00000	2.0000	.00000

### Summary for Replication 9 of 20

TALLY VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Observ	ations	
Part 1.TotalTime	44.743	(Insuf)	34.000	57.046	16		_
Part 2.TotalTime	55.378	(Insuf)	44.720	65.000	17		
Part 3.TotalTime	58.213	(Insuf)	48.889	70.535	14		
Part 4.TotalTime	51.248	(Insuf)	43.000	67.124	20		
Part 5.TotalTime	52.046	(Insuf)	40.011	83.620	14		
Part 6.TotalTime	57.227	(Insuf)	41.485	79.162	17		
	071227	(			••		
DISCRETE-CHANGE VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Final V	alue	
Machine 1.Utilization	.38133	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.34068	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.32195	(Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.25133	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.41269	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.49040	(Insuf)	.00000	1.0000	1.0000		
Work Station 4.Queue.NumberIn	nQueue	.01311	(Insuf)	.00000	1.0000	.00000	
Work Station 5.Queue.NumberIr	nQueue	.07497	(Insuf)	.00000	2.0000	.00000	
Work Station 1.Queue.NumberIr	nQueue	.03333	(Insuf)	.00000	1.0000	.00000	
Work Station 6.Queue.NumberIn	nQueue	.14270	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.NumberIr	nQueue	.05729	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.NumberIr	nQueue	.05181	(Insuf)	.00000	2.0000	.00000	
Identifier	Value						
Part 1 NumberOut	16.00	0					
Part 2 NumberOut	17.00	0					
Part 2 NumberOut	17.00	0					
Part 4 NumberOut	14.00	0					
Part 4.NumberOut	20.00	0					
Part 5.NumberOut	14.00	0					
Part 6.NumberOut	17.00	0					
Summary for Replication 10	of 20						
Summary for Replication 10	of 20						
TALLY VARIABLES	of 20 Average	Half Width	Minimum	Maximur	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average 44.609	Half Width (Insuf)	Minimum 34.864	Maximur 51.930	n Observ	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average 44.609 55.302	Half Width (Insuf) (Insuf)	Minimum 34.864 40.000	Maximur 51.930 78.835	n Observ 	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average 44.609 55.302 51.385	Half Width (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804	Maximur 51.930 78.835 68.259	n Observ 19 19 20	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average 44.609 55.302 51.385 50.883	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000	Maximur 51.930 78.835 68.259 61.283	n Observ 19 19 20 14	ations	 _
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average 44.609 55.302 51.385 50.883 59.707	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000	Maximur 51.930 78.835 68.259 61.283 79.342	n Observ 19 19 20 14 16	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 44.609 55.302 51.385 50.883 59.707 48.874	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551	Maximur 51.930 78.835 68.259 61.283 79.342 57.930	n Observ 19 19 20 14 16 12	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime	Average 44.609 55.302 51.385 50.883 59.707 48.874	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551	Maximur 51.930 78.835 68.259 61.283 79.342 57.930	n Observ 19 19 20 14 16 12	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur	n Observ 19 19 20 14 16 12 n Final V	ations	 
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur	n Observ 19 20 14 16 12 n Final V	ations	 _
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 5.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000	n Observ 19 19 20 14 16 12 n Final V. 1.0000	ations	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 2.Utilization	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000	ations	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000	alue	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 4.Utilization	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000	ations	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 4.Utilization         Machine 5.Utilization	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000	alue	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 4.Utilization         Machine 5.Utilization         Machine 6.Utilization	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 1.0000 1.0000	alue	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 4.Utilization         Machine 5.Utilization         Machine 6.Utilization         Wachine 4.Utilization	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .000000 .000000 .000000 .00000 .00000 .000000 .000000 .000000 .000000 .000000 .000000 .0000000 .00000000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 19 20 14 16 12 n Final V. 1.0000 .00000 .00000 .00000 1.0000 2.0000	alue .00000	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 5.Utilization         Machine 6.Utilization         Work Station 4.Queue.NumberIr         Work Station 5.Queue.NumberIr	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue	Half Width (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	n Observ 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 1.0000 2.0000 2.0000	ations alue .00000 .00000	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Machine 6.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue	Half Width (Insuf) (In	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 1.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 6.Utilization         Machine 6.Utilization         Work Station 5.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 6.Queue.NumberIr	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (22246 .07250 .03327 .12171	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 1.0000	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 6.Queue.NumberIr         Work Station 2.Queue.NumberIr	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 1.0000 .00000	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 4.Utilization         Machine 5.Utilization         Machine 6.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	_
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .43867 .48600 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 19 19 20 14 16 12 m Final V. 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.00000 1.00000 1.00000 1.000000 1.00000 1.000000 1.00000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	_
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Machine 5.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	m Observ 19 20 14 16 12 m Final V. 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000 .00000	_
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V. 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	_
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut Part 3.NumberOut	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUE	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (02246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 1.00000 1.0000 1.00000 1.0000 1.00000 1.00000000 1.00000 1.00000	alue .00000 .00000 .00000 1.0000 .00000 .00000	_
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Machine 5.Utilization         Work Station 4.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier         Part 1.NumberOut         Part 3.NumberOut         Part 4.NumberOut	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (02246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 4.NumberOut Part 5.NumberOut Part	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Machine 1.Utilization         Machine 5.Utilization         Machine 6.Utilization         Machine 5.Utilization         Machine 5.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         OUTPUTS         Identifier         Part 1.NumberOut         Part 3.NumberOut         Part 3.NumberOut         Part 4.NumberOut	Average 44.609 55.302 51.385 50.883 59.707 48.874 Average .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUE NQ	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (0 (1nsuf) (0 (1nsuf) (0 (1nsuf) (0 (1nsuf) (0 (2246) (0 (2246) (0 (22542) (0 (200)) (0 (20	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V. 1.0000 1.0000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 2.0000 2.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	_

### Summary for Replication 11 of 20

Identifier	Average H	Half Width	Minimum	Maximum	n Observ	ations	
Part 1.TotalTime	45.870	(Insuf)	40.000	52.495	16		
Part 2.TotalTime	55.255	(Insuf)	41.869	65.972	17		
Part 3.TotalTime	53.547	(Insuf)	38.000	75.815	18		
Part 4.TotalTime	52.500	(Insuf)	37.000	66.410	21		
Part 5.TotalTime	51.124	(Insuf)	42.808	57.106	13		
Part 6.TotalTime	53.724	(Insuf)	37.201	72.349	17		
DISCRETE-CHANGE VARIABLES Identifier	Average H	Half Width	Minimum	Maximum	n Final V	alue	
Machine 1.Utilization	.35933	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.32660	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.31281	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization	.25/33	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.43614	(Insuf)	.00000	1.0000	.00000		
Work Station / Queue Numberly	.40743 NUQUQ	02103	(Insuf)	00000	1 0000	00000	
Work Station 5 Queue Numberli	noueue	07837	(Insuf)	00000	2 0000	00000	
Work Station 1 Oueue Numberli	noueue	.04542	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.NumberIn	nQueue	.13448	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.NumberIn	nQueue	.03194	(Insuf)	.00000	1.0000	.00000	
Work Station 3.Queue.NumberIn	nQueue	.03726	(Insuf)	.00000	1.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	16.000	)					
Part 2.NumberOut	17.000	)					
Part 3.NumberOut	18.000	)					
Part 4.NumberOut	21.000	)					
Part 5.NumberOut Part 6.NumberOut	13.000 17.000	) )					
Summary for Replication 12	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	Half Width	Minimum	Maximum	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H 45.093	lalf Width (Insuf)	Minimum 34.000	Maximum 54.176	n Observ  11	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 45.093 55.347	Half Width (Insuf) (Insuf)	Minimum 34.000 44.000	Maximum 54.176 66.726	1 Observ 11 19	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 45.093 55.347 53.394	Half Width (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819	Maximum 54.176 66.726 69.420	11 19 19	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 45.093 55.347 53.394 51.236	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000	Maximum 54.176 66.726 69.420 63.858	10 Observ 11 19 19 14	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime	Average H 45.093 55.347 53.394 51.236 52.649	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 41.722	Maximum 54.176 66.726 69.420 63.858 64.106	11 19 19 14 21	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 45.093 55.347 53.394 51.236 52.649 55.998	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729	Maximum 54.176 66.726 69.420 63.858 64.106 63.776	11 19 19 14 21 18	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average H 45.093 55.347 53.394 51.236 52.649 55.998	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729	Maximum 54.176 66.726 69.420 63.858 64.106 63.776	11 19 19 14 21 18		
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum	11 19 19 14 21 18 18	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000	11 19 19 14 21 18 Final V 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000	11 19 19 14 21 18 Final V. 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final V. 1.0000 .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final V. 1.0000 .00000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final V. 1.0000 .00000 1.0000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final V. 1.0000 .00000 1.0000 1.0000 1.0000 1.0000	alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 DQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 00000	11 19 19 14 21 18 Final V. 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000	ations alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 Dueue Dueue Dueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (02638	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .000000 .000000 .00000 .00000 .00000 .000000 .000000 .000000 .000000 .000000 .000000 .00000 .00000 .000000 .00000 .00000 .000000 .000000 .0000000 .000000 .000000 .000000 .000000 .00000000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	11 19 19 14 21 18 Final V. 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000	ations alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 Dueue Dueue Dueue	Half Width (Insuf) (2638 .12074	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01801 .08041 .02638 .12074 .03427	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01801 .08041 .02638 .12074 .03427 .06846	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01801 .08041 .02638 .12074 .03427 .06846	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01801 .08041 .02638 .12074 .03427 .06846	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier Part 1.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUEUE	Half Width (Insuf) (08041 .02638 .12074 .06846	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn NumberIn Numbe	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQUEUE	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Port 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUEUE NQUEUE NQUEUE	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn NumberIn Numbe	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 6.NumberOut Part 6.NumberOut Part 6.NumberOut Part 6.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue n nQueue n nQueue n nQueue n nQueue n nQueue n n nQueue n n nQue n n n n n n n n n n n n n n n n n n n	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	

### Summary for Replication 13 of 20

Identifier	Average H	lalf Width	Minimum	Maximun	n Observ	ations	
Dort 1 TotolTimo	45.014	(Incust)	24.000	E7 400	14		
Part 2 TotalTime	43.810	(Insul)	34.000	57.480 76.677	14		
Part 3 TotalTime	54 848	(Insuf)	40.000	72 402	17		
Part 4.TotalTime	52.772	(Insuf)	46.000	66.438	17		
Part 5.TotalTime	53.018	(Insuf)	43.000	72.502	16		
Part 6.TotalTime	56.647	(Insuf)	45.809	73.649	13		
DISCRETE-CHANGE VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Final V	alue	
Machine 1. Utilization	.38480	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.34340	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.32/15	(Insuf)	.00000	1.0000	1.0000		
Machine 4.0tilization	.2040/	(Insul)	.00000	1.0000	.00000		
Machine 5.0tilization	.44133	(Insuf)	00000	1.0000	1 0000		
Work Station 4 Queue Numberly	.47770 nOueue	(115ul) 02/17	(Insuf)	00000	2 0000	00000	
Work Station 5 Oueue Numberly	nQueue	02417	(Insuf)	00000	2.0000	00000	
Work Station 1 Queue Numberli	nQueue	07270	(Insuf)	00000	2.0000	00000	
Work Station 6 Queue Numberli	nQueue	11763	(Insuf)	00000	2.0000	00000	
Work Station 2. Oueue Numberli	nQueue	.02511	(Insuf)	.00000	1.0000	.00000	
Work Station 3.Queue.Numberli	nQueue	.08304	(Insuf)	.00000	3.0000	.00000	
			(				
OUTPUTS							
Identifier	Value						
Part 1 NumberOut	14 000	)					
Part 2 NumberOut	24 000	)					
Part 3 NumberOut	17 000	, )					
Part 4 NumberOut	17.000	, )					
Part 5 NumberOut	16.000	, )					
Part 6.NumberOut	13.000	, )					
Summary for Replication 14	of 20						
TALLY VARIABLES							
	Avorago H	lalf Width	Minimum	Maximun	n Observ	ations	
Identifier	Ачегауе п						
Identifier	Average п	(Insuf)	25 21/	50 325	10		
Identifier Part 1.TotalTime Part 2 TotalTime	43.020 56.413	(Insuf)	35.214	50.325 71 468	10		
Identifier Part 1.TotalTime Part 2.TotalTime Part 3 TotalTime	43.020 56.413 55.854	(Insuf) (Insuf) (Insuf)	35.214 40.000 43.021	50.325 71.468 78.827	10 19 22		
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4 TotalTime	43.020 56.413 55.854 52 771	(Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000	50.325 71.468 78.827 66 191	10 19 22 17		
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	43.020 56.413 55.854 52.771 53.366	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000	50.325 71.468 78.827 66.191 66.988	10 19 22 17 21		
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	43.020 56.413 55.854 52.771 53.366 52.771	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159	50.325 71.468 78.827 66.191 66.988 63.565	10 19 22 17 21 13		
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	43.020 56.413 55.854 52.771 53.366 52.771	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159	50.325 71.468 78.827 66.191 66.988 63.565	10 19 22 17 21 13		
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	43.020 56.413 55.854 52.771 53.366 52.771	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159	50.325 71.468 78.827 66.191 66.988 63.565	10 19 22 17 21 13	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	43.020 56.413 55.854 52.771 53.366 52.771 Average H	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum	50.325 71.468 78.827 66.191 66.988 63.565 Maximun	10 19 22 17 21 13 n Final V	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	43.020 56.413 55.854 52.771 53.366 52.771 Average H	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000	10 19 22 17 21 13 m Final V .00000	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000	10 19 22 17 21 13 n Final V .00000 .00000	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000	10 19 22 17 21 13 n Final V .00000 .00000 1.0000	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000	10 19 22 17 21 13 m Final V .00000 .00000 1.0000 .00000	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	10 19 22 17 21 13 m Final V .00000 .00000 1.0000 .00000	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000	alue	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000	alue .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue	(Insuf) (Insuf	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000	alue .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (3259 .03889 .06971	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 4.Queue.NumberIn Work Station 4.Queue.NumberIn	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue	(Insuf) (Insuf	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn	43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue nQueue	(Insuf) (Insuf	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000	
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Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue nQueue nQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn	43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn OUTPUTS Identifier	43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn OUTPUTS Identifier Part 1.NumberOut Part 1.NumberOut Part 1.NumberOut	43.020           56.413           55.854           52.771           53.366           52.771           Average           .37467           .33000           .37261           .23200           .45184           .51333           nQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 2.Num	43.020           56.413           55.854           52.771           53.366           52.771           Average           .37467           .33000           .37261           .23200           .45184           .51333           nQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 7.Queue.NumberIn OUTPUTS Identifier	43.020           56.413           55.854           52.771           53.366           52.771           Average           .37467           .33000           .37261           .23200           .45184           .51333           nQueue           10.000           12.000           22.000	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 7.Queue.NumberIn NumberIn Numb	43.020           56.413           55.854           52.771           53.366           52.771           Average           .37467           .33000           .37261           .23200           .45184           .51333           nQueue           nQueue           nQueue           nQueue           nQueue           nQueue           nQueue           10.000           19.000           22.000           17.000	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 7.Queue.NumberIn NumberIn Numb	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue nQueue NQUeue NQUE	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000	
Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 7.Queue.NumberIn Work Station 7.Queue.NumberIn Part 1.NumberOut Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 6.NumberOut Part 6.	43.020           56.413           55.854           52.771           53.366           52.771           Average           .37467           .33000           .37261           .23200           .45184           .51333           nQueue           nQueue           nQueue           nQueue           nQueue           nQueue           nQueue           nQueue           10.000           19.000           17.000           21.000           13.000	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	50.325 71.468 78.827 66.191 66.988 63.565 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	10 19 22 17 21 13 m Final V .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	.00000 .00000 .00000 .00000 .00000	

### Summary for Replication 15 of 20

Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
Part 1.TotalTime	44.941	(Insuf)	36.000	51.215	12		
Part 2.TotalTime	57.493	(Insuf)	42.000	74.713	27		
Part 3.TotalTime	54.500	(Insuf)	44.059	62.346	9		
Part 4.TotalTime	51.165	(Insuf)	39.000	64.912	18		
Part 5.TotalTime	58.901	(Insuf)	42.000	75.720	15		
Part 6.TotalTime	57.448	(Insuf)	41.367	70.292	19		
DISCRETE-CHANGE VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Final Va	alue	
Machine 1.Utilization	.39930	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.33772	(Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.31467	(Insuf)	.00000	1.0000	.00000		
Machine 4.Utilization	.25733	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.46263	(Insuf)	.00000	1.0000	.00000		
Wark Station 4 Queue Numberly	.50702	(Insul)	.00000	1.0000	1.0000	00000	
Work Station 5 Queue Number		.02292	(Insul) (Insuf)	.00000	2 0000	.00000	
Work Station 1 Oueue Number		03578	(Insuf)	00000	2.0000	00000	
Work Station 6 Queue Number	nQueue	15658	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.NumberIr	Queue	.01613	(Insuf)	.00000	1.0000	.00000	
Work Station 3.Queue.NumberIn	nQueue	.06775	(Insuf)	.00000	2.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	12.000	)					
Part 2.NumberOut	27.000	)					
Part 3.NumberOut	9.000	)					
Part 4.NumberOut	18.000	)					
Part 5.NumberOut	15.000	)					
Part 6.NumberOut	19.000	)					
Summary for Replication 16	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H	lalf Width	Minimum 34.000	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 41.992 55.347	lalf Width (Insuf) (Insuf)	Minimum 34.000 44.557	Maximun 52.852 78.018	n Observ 16 14	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 41.992 55.347 51.950	lalf Width (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181	Maximun 52.852 78.018 76.276	n Observ 16 14 15	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 41.992 55.347 51.950 52.089	lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861	Maximun 52.852 78.018 76.276 66.479	n Observ 16 14 15 16	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 41.992 55.347 51.950 52.089 53.664	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000	Maximun 52.852 78.018 76.276 66.479 75.000	n Observ 16 14 15 16 19	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average + 41.992 55.347 51.950 52.089 53.664 53.779	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313	Maximun 52.852 78.018 76.276 66.479 75.000 67.051	n Observ 16 14 15 16 19 20	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average H 41.992 55.347 51.950 52.089 53.664 53.779	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313	Maximun 52.852 78.018 76.276 66.479 75.000 67.051	n Observ 16 14 15 16 19 20	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average + 41.992 55.347 51.950 52.089 53.664 53.779 Average +	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun	n Observ 16 14 15 16 19 20 n Final Va	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average + 41.992 55.347 51.950 52.089 53.664 53.779 Average + .36038 .31867	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	Average + 41.992 55.347 51.950 52.089 53.664 53.779 Average + .36038 .31867 .32117	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	Average + 41.992 55.347 51.950 52.089 53.664 53.779 Average + .36038 .31867 .32117 .23800	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 .00000 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	Average + 41.992 55.347 51.950 52.089 53.664 53.779 Average + .36038 .31867 .32117 .23800 .42657	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 .00000 1.0000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 4.Utilization Machine 4.	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .4713	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 .00000 1.0000 .00000 1.0000 1.0000	alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station F.Oucue NumberIr Work Station F.Oucue NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .00000 .00000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 Dueue Dueue Dueue	lalf Width (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000	ations alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 Dueue Dueue Dueue	lalf Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000	ations alue .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 Dueue Dueue Dueue Dueue Dueue	lalf Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .0000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.01166 .06206 .04238 .15366 .04427 .06129	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average + 41.992 55.347 51.950 52.089 53.664 53.779 Average + .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue	lalf Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 Queue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (1n	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .01166 .06206 .04238 .15366 .04427 .06129	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue	Ialf Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 3.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUEUE NQUEUE	Ialf Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.NumberOut Part 4.NumberOut Part 4.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue	Half Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Part 1.NumberOut Part 2.NumberOut Part 4.NumberOut Part 5.NumberOut Part	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue n n n n n n n n n n n n n n n n n n	Half Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 5.NumberOut Part 6.NumberOut Par	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue n n n n n n n n n n n n n n n n n n	Half Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations	

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Identifier	Average H	lalf Width	Minimum	Maximum	n Observ	ations
Part 1.TotalTime	47.011	(Insuf)	34.234	63.573	9	
Part 2. Total Time	53.503	(Insuf)	39.562	65.965	14	
Part 3. Iotal I ime	50.816	(Insuf)	39.000	/1.3//	18	
Part 4. I otal I ime	51.2/3	(Insuf)	39.296	61.607	22	
Part 6 TotalTime	54.700	(Insul)	43.120 42.561	04.214 69.607	21 17	
Fait 0. I otal line	55.550	(IIISUI)	42.301	00.097	17	
DISCRETE-CHANGE VARIABLES						
Identifier	Average H	lalf Width	Minimum	Maximum	n Final Va	alue
Machine 1. Utilization	.39917	(Insuf)	.00000	1.0000	1.0000	
Machine 2. Utilization	.31915	(Insuf)	.00000	1.0000	.00000	
Machine 3. Utilization	.35318	(Insuf)	.00000	1.0000	1.0000	
Machine 4. Utilization	.22867	(Insuf)	.00000	1.0000	.00000	
Machine 5. Utilization	.43954	(Insuf)	.00000	1.0000	1.0000	
Machine 6. Utilization	.50724	(Insur)	.00000	1.0000	1.0000	00000
Work Station E. Queue Numberli		.01429	(Insul) (Insul)	.00000	2,0000	.00000
Work Station 1 Queue Numberli		.07393	(Insul) (Insuf)	.00000	2.0000	.00000
Work Station 6 Queue Numberli		.02014	(Insul) (Insuf)	.00000	2.0000	00000
Work Station 2 Queue Numberli	nQueue	0/1381	(Insuf)	00000	2.0000	00000
Work Station 3 Queue Numberli	nQueue	09301	(Insuf)	00000	3 0000	00000
Work Station 3. Queue. Number n		.00170	(msur)	.00000	5.0000	
OUTPUTS						
Identifier	Value					
Part 1.NumberOut	9.0000	)				
Part 2.NumberIn	15.000					
Part 2.NumberOut	14.000	)				
Part 3.NumberOut	18.000	)				
Part 4.NumberOut	22.000	)				
Dort E NumberOut	21 000	<b>`</b>				
Part 5.NumberOut	21.000	)				
Part 5.NumberOut Part 6.NumberOut	21.000 17.000	)				
Part 5.NumberOut Part 6.NumberOut	21.000 17.000 of 20	)				
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18	21.000 17.000 of 20	)				
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES	21.000 17.000 of 20	)				
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier	21.000 17.000 of 20 Average	) ) lalf Width	Minimum	Maximum	n Observ	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier	21.000 17.000 of 20 Average	) ) lalf Width	Minimum	Maximum	n Observ	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime	21.000 17.000 of 20 Average H 46.351	) lalf Width (Insuf)	Minimum 34.000	Maximum 55.769	0 Observ	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154	) ) lalf Width (Insuf) (Insuf)	Minimum 34.000 44.000	Maximum 55.769 72.506	15 17	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.940	) lalf Width (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.202	Maximum 55.769 72.506 64.768 65.701	15 17 20	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042	) lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 40.292 39.000	Maximum 55.769 72.506 64.768 65.791 88.603	15 15 17 20 18 13	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 40.292 39.000 37.970	Maximum 55.769 72.506 64.768 65.791 88.603 67.863	15 17 20 18 13 19	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399	) lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970	Maximum 55.769 72.506 64.768 65.791 88.603 67.863	15 17 20 18 13 19	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399	) lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970	Maximum 55.769 72.506 64.768 65.791 88.603 67.863	15 17 20 18 13 19	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H	allf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum	15 17 20 18 13 19	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H	allf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum	15 17 20 18 13 19 19	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000	15 17 20 18 13 19 Final Va .00000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000	15 17 20 18 13 19 Final Va .00000 1.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 5. Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000	15 17 20 18 13 19 Final V .00000 1.0000 0.00000 1.0000 0.00000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 42778 E0222	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 .00000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 .00000 .00000	alue
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue	) lalf Width (Insuf) (Insuf	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 00000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 .00000 2.0000 2.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue	) lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (3439 .05171 03522	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 .00000 2.0000 2.0000 2.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue	) lalf Width (Insuf) (	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 .00000 2.0000 2.0000 2.0000 2.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue nQueue nQueue	allf Width (Insuf) (In	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue nQueue nQueue	allf Width (Insuf) (In	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue nQueue	allf Width (Insuf) (In	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	15 17 20 18 13 19 Final Va .00000 1.0000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue	allf Width (Insuf) (In	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	15 17 20 18 13 19 Final V3 .00000 1.0000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue	) lalf Width (Insuf) (Insuf	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	15 17 20 18 13 19 Final V3 .00000 1.0000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue 1.0000 .00000 .00000 .00000 .00000 .00000
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue NQueue NQueue	) lalf Width (Insuf) (	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 55.769 72.506 64.768 65.791 88.603 67.863 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	15 17 20 18 13 19 Final V3 .00000 1.0000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue 1.0000 .00000 .00000 .00000 .00000 .00000 .00000

Part 1 NumberOut	15 000
Dart 2 Number Out	17,000
Part 2.NumberOut	17.000
Part 3.NumberOut	20.000
Part 4.NumberOut	18.000
Part 5.NumberOut	13.000
Part 6.NumberOut	19.000

### Summary for Replication 19 of 20

TALLY VARIABLES Identifier	Average H	alf Width	Minimum	Maximur	n Observ	ations	
Part 1.TotalTime	46.220	(Insuf)	39.843	56.734	14		
Part 2.TotalTime	54.942	(Insuf)	41.808	68.841	17		
Part 3.TotalTime	55.836	(Insuf)	44.000	81.003	19		
Part 4.TotalTime	48.950	(Insuf)	41.000	65.000	18		
Part 5.TotalTime	53.582	(Insuf)	41.328	85.879	17		
Part 6.TotalTime	57.288	(Insuf)	40.542	69.656	14		
DISCRETE-CHANGE VARIABLES	S Average H	alf Width	Minimum	Maximur	n Final V	alue	
Machine 1 Utilization	36133	(Insuf)	00000	1,0000	00000		
Machine 2 Utilization	.33733	(Insuf)	.00000	1.0000	.00000		
Machine 3.Utilization	.32708	(Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.24267	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.44643	(Insuf)	.00000	1.0000	1.0000		
Machine 6.Utilization	.48400	(Insuf)	.00000	1.0000	.00000		
Work Station 4. Oueue. Number	InOueue	.02639	(Insuf)	.00000	2.0000	.00000	
Work Station 5. Oueue. Number	InOueue	.08527	(Insuf)	.00000	2.0000	.00000	
Work Station 1. Oueue Number	InQueue	.02836	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.Number	InQueue	.10419	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.Number	InQueue	.04778	(Insuf)	.00000	1.0000	.00000	
Work Station 3.Queue.Number	InQueue	.08249	(Insuf)	.00000	2.0000	.00000	
ΟΠΤΡΠΤΖ							
Identifier	Value						
Part 1.NumberOut	14.000	I					
Part 2.NumberOut	17.000	1					
Part 3.NumberOut	19.000	1					
Part 4.NumberOut	18.000	1					
Part 5.NumberOut	17.000	1					
Part 6.NumberOut	14.000	1					
Summary for Replication 20	0 of 20						
TALLY VARIABLES							
Identifier	Average H	alf Width	Minimum	Maximur	n Observ	ations	
Part 1.TotalTime	43.856	(Insuf)	33.349	54.384	15		
Part 2.TotalTime	54.351	(Insuf)	45.000	60.594	15		
Part 3.TotalTime	51.816	(Insuf)	43.000	72.026	13		
Part 4.TotalTime	50.888	(Insuf)	39.000	77.076	22		
Part 5.TotalTime	53.095	(Insuf)	44.800	68.046	21		
Part 6.TotalTime	54.813	(Insuf)	43.829	74.311	14		
	0.010	(					
DISCRETE-CHANGE VARIABLES	S Averane H	alf Width	Minimum	Maximur	n Final V	alue	
Machine 1. Utilization	.33594	(Insuf)	.00000	1.0000	1.0000		
Machine 2. Utilization	.33400	(Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.33800	(Insuf)	.00000	1.0000	.00000		
Machine 4.Utilization	.24867	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.44803	(Insuf)	.00000	1.0000	1.0000		
Machine 6.Utilization	.45667	(Insuf)	.00000	1.0000	.00000		
Work Station 4.Queue.Number	InQueue	.02776	(Insuf)	.00000	1.0000	.00000	
Work Station 5.Queue.Number	InQueue	.06092	(Insuf)	.00000	1.0000	1.0000	
Work Station 1.Queue.Number	InQueue	.02392	(Insuf)	.00000	1.0000	.00000	
Work Station 6.Queue.Number	InQueue	.10219	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.Number	InQueue	.04409	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.Number	InQueue	.07656	(Insuf)	.00000	2.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut							
	15.000						
Part 2.NumberOut	15.000						
Part 2.NumberOut Part 3.NumberOut	15.000 15.000 13.000						

Part 5.NumberOut22.000Part 5.NumberOut21.000Part 6.NumberOut14.000

#### Summary for Replication 1 of 20

TALLY VARIABLES	Average H	Half Width	Minimum	Maximum	n Observ	ations
	Average		wiiniiniuni			
Part 1.TotalTime	48.081	(Insuf)	32.636	64.711	21	
Part 2.TotalTime	61.781	(Insuf)	49.000	81.247	24	
Part 3. I otal l ime	56.961	(Insuf)	41.538	80.614	23	
Part 4. I otal I ime	56.643	(Insuf)	37.558	84.507	30	
Part 6 TotalTime	01.908 54.660	(Insul) (Insuf)	47.000	80.000	20 27	
Fait 0.10tailline	54.007	(Insur)	44.307	03.000	27	
DISCRETE-CHANGE VARIABLES						
Identifier	Average I	Half Width	Minimum	Maximum	n Final Va	alue
Machine 1. Utilization	.57577	(Insuf)	.00000	1.0000	.00000	
Machine 2. Utilization	.47333	(Insuf)	.00000	1.0000	.00000	
Machine 3. Utilization	.43444	(Insuf)	.00000	1.0000	.00000	
Machine 4. Utilization	.37068	(Insuf)	.00000	1.0000	1.0000	
Machine 5. Utilization	.64377	(Insuf)	.00000	1.0000	1.0000	
Machine 6. Utilization	.67310	(Insuf)	.00000	1.0000	.00000	
Work Station 4.Queue.NumberIr	nQueue	.08105	(Insuf)	.00000	3.0000	.00000
Work Station 5.Queue.NumberIn	Queue	.21839	(Insuf)	.00000	3.0000	1.0000
Work Station 1.Queue.NumberIn	Queue	.09901	(Insul)	.00000	2.0000	.00000
Work Station 2 Queue Number		.44002	(Insul) (Insul)	.00000	4.0000	.00000
Work Station 2 Queue Number In		.13939	(Insul) (Insuf)	.00000	2,0000	.00000
work Station S.Queue.Numbern	IQueue	.11314	(IIISul)	.00000	3.0000	.00000
OUTPUTS						
Identifier	Value					
Part 1.NumberOut	21.00	C				
Part 2.NumberOut	24.00	C				
Part 3.NumberOut	23.00	C				
Part 4.NumberOut	30.00	C				
Part 5.NumberOut	26.00	C				
Part 6.NumberOut	27.00	C				
Summary for Replication 2 o	f 20					
Summary for Replication 2 o	f 20					
Summary for Replication 2 o TALLY VARIABLES	f 20 Average	Half Width	Minimum	Maximun	ο Observ	ations
Summary for Replication 2 o TALLY VARIABLES Identifier	f 20 Average	Half Width	Minimum	Maximun	ר Observ	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime	f 20 Average H 47.015	Half Width	Minimum 33.000	Maximum 58.313	n Observ	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	f 20 Average H 47.015 60.420	Half Width (Insuf) (Insuf)	Minimum 33.000 43.000	Maximun 58.313 86.195	n Observ 19 25	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	f 20 Average H 47.015 60.420 57.586	Half Width (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869	Maximun 58.313 86.195 79.787	1 Observ 19 25 32	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	f 20 Average H 47.015 60.420 57.586 59.309	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444	Maximun 58.313 86.195 79.787 75.420	19 25 32 20	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	f 20 Average H 47.015 60.420 57.586 59.309 58.200	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000	Maximun 58.313 86.195 79.787 75.420 83.603	19 25 32 20 30	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 47.015 60.420 57.586 59.309 58.200 60.720	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034	Maximun 58.313 86.195 79.787 75.420 83.603 82.638	19 25 32 20 30 22	ations
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034	Maximun 58.313 86.195 79.787 75.420 83.603 82.638	19 25 32 20 30 22	ations
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034	Maximun 58.313 86.195 79.787 75.420 83.603 82.638	19 25 32 20 30 22	ations
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum	19 25 32 20 30 22 n Final Va	ations
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000	Maximun 58.313 86.195 79.787 75.420 83.603 82.638 Maximun 1.0000	19 25 32 20 30 22 h Final Va	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000	19 25 32 20 30 22 h Final Va 1.0000 .00000	ations
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 4.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .44133 .48133	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000	19 25 32 20 30 22 h Final Va 1.0000 .00000	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000	19 25 32 20 30 22 5 5 1.0000 .00000 1.0000	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 .00000	ations
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 1.0000	ations
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .000000 .000000 .000000 .00000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 2.0000	ations alue
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nOueue nOueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .000000 .00000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	19 25 32 20 30 22 5 7 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 4.0000	ations alue .00000 .00000
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .000000 .000000 .000000 .0000000 .0000000 .00000000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 4.0000 2.0000	ations alue .00000 .00000 .00000
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .000000 .000000 .0000000 .0000000 .00000000	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 4.0000 2.0000 3.0000	ations
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 4.0000 2.0000 3.0000 2.0000	alue .00000 .00000 .00000 .00000 1.0000 .00000
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	Observ.           19           25           32           20           30           22           Final Va           1.0000           .00000           1.0000           .00000           1.0000           .00000           1.0000           .00000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000	alue .00000 .00000 .00000 .00000 1.0000 .00000 .00000 .00000
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	Observ.           19           25           32           20           30           22           Final Va           1.0000           .00000           1.0000           .00000           1.0000           .00000           1.0000           .00000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000           .0000	alue .00000 .00000 .00000 .00000 1.0000 .00000 .00000
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	Observ.           19           25           32           20           30           22           Final Va           1.0000           .00000           1.0000           .00000           1.0000           .0000           .0000           2.0000           3.0000           2.0000           3.0000           3.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue NQueue NQueue Value	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 4.0000 2.0000 3.0000 3.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000 .00000
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	f 20 Average 4 47.015 60.420 57.586 59.309 58.200 60.720 Average 4 .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue NQueue NQueue Value	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .06004 .13461 .18582	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 2.0000 4.0000 2.0000 3.0000 3.0000	alue .00000 .00000 .00000 1.0000 .0000 .00000 .00000 .0000 .0000 .0000 .0000 .0000 .0
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue NQueue Value Value	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 2.0000 4.0000 2.0000 3.0000 3.0000	alue
Summary for Replication 2 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIrr Work Station 5.Queue.NumberIrr Work Station 1.Queue.NumberIrr Work Station 3.Queue.NumberIrr Work Station 3.Queue.NumberIrr Work Station 3.Queue.NumberIrr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut Part 2.NumberOut	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue NQueue NQueue Value Value	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 2.0000 4.0000 2.0000 3.0000 3.0000	alue
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 3.NumberOut	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue NQueue NQueue Value 19.000 25.000 32.000	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000	alue
Summary for Replication 2 o TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIrr Work Station 5.Queue.NumberIrr Work Station 1.Queue.NumberIrr Work Station 3.Queue.NumberIrr Work Station 3.Queue.NumberIrr Work Station 3.Queue.NumberIrr OUTPUTS Identifier Part 1.NumberOut Part 1.NumberOut Part 5.NumberOut Part 4.NumberOut Part 5.NumberOut Part 5.NumberOut	f 20 Average H 47.015 60.420 57.586 59.309 58.200 60.720 Average H .55102 .46133 .48133 .34215 .65536 .67368 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue	Half Width (Insuf) (In	Minimum 33.000 43.000 41.869 43.444 42.000 36.034 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 58.313 86.195 79.787 75.420 83.603 82.638 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	19 25 32 20 30 22 Final Va 1.0000 .00000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000

22.000

Part 6.NumberOut

#### Summary for Replication 3 of 20

Part 6.NumberOut

9.0000

TALLY VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Observ	rations
Part 1 TotalTime	46 273	(Insuf)	37 770	64 472	26	
Part 2 TotalTime	61.972	(Insuf)	40.848	87.663	30	
Part 3 TotalTime	58.843	(Insuf)	45.396	77.673	17	
Part 4.TotalTime	55.614	(Insuf)	39.000	66.901	26	
Part 5.TotalTime	61.590	(Insuf)	46.000	89.018	29	
Part 6.TotalTime	59.407	(Insuf)	40.074	85.965	21	
DISCRETE-CHANGE VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Final V	alue
Machine 1 Utilization	53067	(Insuf)	00000	1.0000	00000	
Machine 2 Utilization	.49433	(Insuf)	.00000	1.0000	.00000	
Machine 3 Utilization	41638	(Insuf)	.00000	1.0000	1.0000	
Machine 4 Utilization	.37441	(Insuf)	.00000	1.0000	.00000	
Machine 5.Utilization	.63249	(Insuf)	.00000	1.0000	1.0000	
Machine 6. Utilization	.67358	(Insuf)	.00000	1.0000	1.0000	
Work Station 4. Oueue. Number Ir	nOueue	.07683	(Insuf)	.00000	2.0000	.00000
Work Station 5. Oueue. Number In	nOueue	.25612	(Insuf)	.00000	4.0000	.00000
Work Station 1. Queue. Number In	nOueue	.12783	(Insuf)	.00000	2.0000	.00000
Work Station 6 Queue Numberly	nOueue	50015	(Insuf)	00000	5.0000	2 0000
Work Station 2 Queue Numberly	Oueue	15461	(Insuf)	.00000	2,0000	.00000
Work Station 3.Queue.NumberIn	nQueue	.11150	(Insuf)	.00000	2.0000	.00000
Identifier	Value					
Part 1.NumberOut	26.00	0				
Part 2 Number Out	30.00	0				
Part 3.NumberOut	17.00	0				
Part 4.NumberOut	26.00	0				
Part 5.NumberOut	29.00	0				
Part 6.NumberOut	21.00	0				
Summary for Replication 4 of	of 20					
TALLY VARIABLES						
TALLY VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Observ	vations
TALLY VARIABLES Identifier Part 1.TotalTime	Average 48.539	Half Width	Minimum	Maximur	m Observ	vations
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average 48.539 59.479	Half Width (Insuf) (Insuf)	Minimum 31.000 44.004	Maximur 64.943 82.499	m Observ 18 32	vations
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average 48.539 59.479 58.802	Half Width (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963	Maximur 64.943 82.499 72.672	m Observ 18 32 16	vations
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average 48.539 59.479 58.802 59.553	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000	Maximur 64.943 82.499 72.672 83.752	m Observ 18 32 16 39	rations
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average 48.539 59.479 58.802 59.553 58.796	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000	Maximur 64.943 82.499 72.672 83.752 81.693	n Observ 18 32 16 39 38	rations
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 48.539 59.479 58.802 59.553 58.796 65.598	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552	Maximur 64.943 82.499 72.672 83.752 81.693 106.76	n Observ 18 32 16 39 38 9	vations
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average 48.539 59.479 58.802 59.553 58.796 65.598	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552	Maximur 64.943 82.499 72.672 83.752 81.693 106.76	n Observ 18 32 16 39 38 9	rations
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur	m Observ 18 32 16 39 38 9 m Final V	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000	m Observ 18 32 16 39 38 9 m Final V .00000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 1.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 1.0000 1.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Wachine 6.Utilization Wachine 6.Utilization	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 Dueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 1.0000 2.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 Dueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 1.0000 1.0000 2.0000 3.0000	rations alue .00000 2.0000
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 32042 .09318	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 1.0000 1.0000 2.0000 2.0000	rations alue .00000 2.0000 .00000
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (32042 .09318 .31661	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .000000 .000000 .000000 .000000 .000000 .000000 .0000000 .00000000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 1.0000 2.0000 3.0000 3.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 2.0000 3.0000 2.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Sta	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue NQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 2.0000 3.0000 2.0000 3.0000	alue .00000 2.0000 .00000 .00000 .00000 .00000 .00000
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Mort Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQUE NQUE NUE NQUE NUE NUE NUE NUE NUE NUE N	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 2.0000 3.0000 2.0000 3.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 1.NumberOut Part 2.NumberOut	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUE NQ	Half Width (Insuf) (2496 .32042 .09318 .31661 .16840 .24512	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 2.0000 3.0000 2.0000 3.0000	alue
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 2.0000 3.0000 2.0000 3.0000	alue .00000 2.0000 .00000 .00000 .00000 .00000
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work 3.Queue.NumberIn Work 3.Queue.NumberIn Work 3.Queue.NumberIn Machine 4.Queue.NumberIn Machine	Average 48.539 59.479 58.802 59.553 58.796 65.598 Average .50904 .52770 .52000 .33467 .71604 .66025 nQueue nQueue nQueue NQueue Value 18.00 32.00 16.00 39.00 20.	Half Width (Insuf) (In	Minimum 31.000 44.004 37.963 40.000 44.000 48.552 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.943 82.499 72.672 83.752 81.693 106.76 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 18 32 16 39 38 9 m Final V .00000 .00000 .00000 .00000 .00000 1.0000 2.0000 3.0000 2.0000 3.0000 3.0000	alue

### Summary for Replication 5 of 20

TALLY VARIABLES	Averade H	alf Width	Minimum	Maximun	n Observ	ations	
	Average		wiiniiniiuni				
Part 1.TotalTime	48.876	(Insuf)	33.967	73.941	23		
Part 2.TotalTime	63.090	(Insuf)	36.000	92.000	27		
Part 3.TotalTime	61.680	(Insuf)	41.165	87.191	26		
Part 4. I otal I ime	64.135	(Insuf)	40.000	95.028	29		
Part 6 TotalTime	61.552	(Insul)	47.458	81.227 96.242	20 10		
	05.025	(IIISUI)	41.030	00.342	10		
DISCRETE-CHANGE VARIABLES							
Identifier	Average H	lalf Width	Minimum	Maximun	n Final V	alue	
Machine 1 Utilization	59839	(Insuf)	00000	1,0000	1,0000		 
Machine 2.Utilization	.49760	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.47215	(Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.37784	(Insuf)	.00000	1.0000	1.0000		
Machine 5. Utilization	.68552	(Insuf)	.00000	1.0000	1.0000		
Machine 6.Utilization	.67572	(Insuf)	.00000	1.0000	1.0000		
Work Station 4.Queue.NumberIr	nQueue	.07811	(Insuf)	.00000	2.0000	.00000	
Work Station 5.Queue.NumberIn	nQueue	.39687	(Insuf)	.00000	4.0000	1.0000	
Work Station 1. Queue. Number In		.15077	(Insuf)	.00000	2.0000 E.0000	.00000	
Work Station 2 Queue Number		.40077	(Insul) (Insuf)	.00000	2 0000	1 00000	
Work Station 3 Queue Number		20203	(Insuf)	00000	3 0000	00000	
Work Station 5.20cdc. Numbern	loucuc	.20205	(msur)	.00000	5.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1 NumberOut	23.000						
Part 2.NumberOut	27.000	)					
Part 3.NumberOut	26.000	)					
Part 4.NumberOut	29.000	)					
Part 5.NumberOut	26.000	)					
Part 6.NumberOut	18.000	)					
Summary for Peolication 6 o	f 20						
Summary for Replication 0.0	1 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H	lalf Width	Minimum 36.198	Maximun	n Observ	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 49.244 61.740	lalf Width (Insuf) (Insuf)	Minimum 36.198 43.003	Maximun 63.332 75.773	n Observ 28 31	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 49.244 61.740 66.280	lalf Width (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119	Maximun 63.332 75.773 94.495	n Observ 28 31 16	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 49.244 61.740 66.280 56.122	lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000	Maximun 63.332 75.773 94.495 77.569	n Observ 28 31 16 31	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 49.244 61.740 66.280 56.122 58.001	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728	Maximun 63.332 75.773 94.495 77.569 89.376	n Observ 28 31 16 31 29	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 49.244 61.740 66.280 56.122 58.001 63.918	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152	Maximun 63.332 75.773 94.495 77.569 89.376 94.542	n Observ 28 31 16 31 29 20	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average H 49.244 61.740 66.280 56.122 58.001 63.918	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152	Maximun 63.332 75.773 94.495 77.569 89.376 94.542	n Observ 28 31 16 31 29 20	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun	n Observ 28 31 16 31 29 20 n Final V	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun	n Observ 28 31 16 31 29 20 n Final V	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000	n Observ 28 31 16 31 29 20 n Final V 1.0000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000	n Observ 28 31 16 31 29 20 n Final V 1.0000 1.0000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 0.00000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 0.00000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 0.00000 1.0000	ations	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 0.00000 1.0000 0.00000	alue	 
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 0.00000 1.0000 2.0000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .000000 .000000 .000000 .0000000 .000000 .000000 .00000000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 0.00000 1.0000 1.0000 2.0000 3.0000 2.0000	ations alue .00000 1.0000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Wach Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 Dueue Dueue Dueue	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 2.0000	ations alue .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 2.0000	ations alue .00000 1.0000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 Dueue Dueue Dueue Dueue	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .000000 .000000 .000000 .0000000 .0000000 .00000000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 Dueue Dueue Dueue Dueue	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000	ations .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQUeue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (13514 .17216 .18505 .08265 .34975 .42096	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 DQueue	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000 0.00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part Part 2.NumberOut Part Part 2.NumberOut Part Part Part Part Part Part Part Par	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUEUE NQUEUE	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000 0.00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.NumberOut Part 4.NumberOut Part 4.NumberOut	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQ	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000 0.00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Pa	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue nQueue nQueue nQueue NQUeue NQUEUE NQUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 6.NumberOut Pa	Average H 49.244 61.740 66.280 56.122 58.001 63.918 Average H .55643 .52156 .44733 .38748 .68067 .66602 nQueue nQueue nQueue nQueue nQueue NQUeue NQUE NQUE	Half Width (Insuf) (In	Minimum 36.198 43.003 49.119 40.000 42.728 37.152 Minimum .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000000	Maximun 63.332 75.773 94.495 77.569 89.376 94.542 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 28 31 16 31 29 20 n Final V. 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	

## Summary for Replication 7 of 20

Part 5.NumberOut

Part 6.NumberOut

36.000

27.000

TALLY VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Observ	ations	
Part 1 TotalTime	46 456	(Insuf)	37 370	59 237	21		
Part 2 TotalTime	60 560	(Insuf)	41 115	79 262	19		
Part 3 TotalTime	60.067	(Insuf)	42 677	84 010	24		
Part 4 TotalTime	56 044	(Insuf)	42 000	79 702	31		
Part 5 TotalTime	59 232	(Insuf)	39 000	81 903	30		
Part 6 TotalTime	59 831	(Insuf)	13 959	81 667	24		
	57.051	(mour)	43.737	01.007	27		
DISCRETE-CHANGE VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Final V	alue	
Machina 1 Utilization	E0479		00000	1 0000	1 0000		
Machine 2. Utilization	.30476	5 (Insui) 5 (Insuif)	.00000	1.0000	00000		
Machine 2. Utilization	.4/390	7 (Insui)	.00000	1.0000	1 0000		
Machine 5.0thzation	.4723	(Insui) 1 (Insuif)	.00000	1.0000	1.0000		
Machine 4.0thization	.33374	+ (Insui)	.00000	1.0000	00000		
Machine 5.0thzation	.00090	) (Insul) (Insul)	.00000	1.0000	1 0000		
Wark Station 4 Quana Numberly	.0004		.00000	00000	2 0000	00000	
Work Station 4. Queue. Number II		.05155	(Insul)	.00000	2.0000	.00000	
Work Station 5. Queue. Number In		.25/62	(Insul)	.00000	2.0000	.00000	
Work Station 1.Queue.Numbern	Queue	.10347	(Insul)	.00000	2.0000	.00000	
Work Station 6. Queue. Numberin		.40671	(Insul)	.00000	4.0000	.00000	
Work Station 2. Queue. Number If	nQueue	.14992	(Insur)	.00000	2.0000	.00000	
Work Station 3.Queue.Numberin	nQueue	.23215	(Insur)	.00000	3.0000	2.0000	
OUTPUTS Identifier	Value						
	04.04						
Part 1.NumberOut	21.00	00					
Part 2.NumberOut	19.00	00					
Part 3.NumberOut	24.00	00					
Part 4.NumberOut	31.00	00					
Part 5.NumberOut	30.00	00					
Part 6.NumberOut	24.00	00					
Summary for Replication 8 o	of 20						
Summary for Replication 8 of	of 20						
Summary for Replication 8 of TALLY VARIABLES	of 20 Average	Half Width	Minimum	Maximur	n Observ	ations	
Summary for Replication 8 of TALLY VARIABLES	o <b>f 20</b> Average	Half Width	Minimum	Maximur	n Observ	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime	of 20 Average 44.950	Half Width	Minimum 31.000	Maximur 	n Observ 	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	of 20 Average 44.950 59.821	Half Width (Insuf) (Insuf)	Minimum 31.000 47.106	Maximur 60.992 74.040	n Observ 	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average 44.950 59.821 58.642	Half Width (Insuf) (Insuf)	Minimum 31.000 47.106 40.860	Maximur 60.992 74.040 96.875	n Observ 20 18 21	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average 44.950 59.821 58.642 58.671	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 47.106 40.860 39.852	Maximur 60.992 74.040 96.875 77.214	n Observ 20 18 21 31	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average 44.950 59.821 58.642 58.671 56.871	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515	Maximur 60.992 74.040 96.875 77.214 92.443	n Observ 20 18 21 31 36	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 44.950 59.821 58.642 58.671 56.871 58.975	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539	Maximur 60.992 74.040 96.875 77.214 92.443 79.794	n Observ 20 18 21 31 36 27	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 44.950 59.821 58.642 58.671 56.871 58.975	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539	Maximur 60.992 74.040 96.875 77.214 92.443 79.794	n Observ 20 18 21 31 36 27	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	f 20 Average 44.950 59.821 58.642 58.671 56.871 58.975 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur	n Observ 20 18 21 31 36 27 n Final V	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	f 20 Average 44.950 59.821 58.642 58.671 56.871 58.975 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000	n Observ 20 18 21 31 36 27 n Final V 1.0000	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	f 20 Average 44.950 59.821 58.642 58.671 56.871 58.975 Average .53444 .46510	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization	f 20 Average 44.950 59.821 58.642 58.671 56.871 56.871 58.975 Average .53444 .46510 .5026	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 .00000	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	f 20 Average 44.950 59.821 58.642 58.671 56.871 56.871 58.975 Average .53444 .5026 .34342	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width 5 (Insuf) 5 (Insuf) 7 (Insuf) 2 (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 4.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization	f 20 Average 44.950 59.821 58.642 58.671 56.871 56.871 58.975 Average .53444 .4651 .5026 .34342 .6587!	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width 5 (Insuf) 5 (Insuf) 7 (Insuf) 2 (Insuf) 5 (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 4.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization	Average 44.950 59.821 58.642 58.671 56.871 56.871 58.975 Average .53440 .46510 .50261 .34342 .65875 .66875	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000	ations	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization	Average 44.950 59.821 58.642 58.671 56.871 56.871 58.975 Average .53440 .46510 .50260 .34342 .65875 .66913	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000	ations alue	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization	Average 44.950 59.821 58.642 58.671 58.975 Average .53444 .46510 .50261 .34342 .66913 .66913 .02491 .00491 .004	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) 5 (Insuf) 7 (Insuf) 2 (Insuf) 5 (Insuf) 3 (Insuf) 3 (Insuf) 3 (33752	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000	ations alue	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIn Work Station 1.Queue NumberIn	Average 44.950 59.821 58.642 58.671 58.975 Average .53444 .46511 .5026 .34342 .66913 nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) 5 (Insuf) 2 (Insuf) 5 (Insuf) 3 (Insuf) .05660 .33752 10389	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000	ations alue	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn	Average 44.950 59.821 58.642 58.671 56.871 58.975 Average .53444 .46514 .5026 .34342 .65875 .66913 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insaf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000	ations alue .00000 .00000 1.0000 00000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn	Average 44.950 59.821 58.642 58.671 58.975 Average 	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000	ations alue .00000 .00000 1.0000 .00000 1.0000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 44.950 59.821 58.642 58.671 58.671 58.975 Average 	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 44.950 59.821 58.642 58.671 58.975 Average 53444 46514 5026 34342 6587 66913 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000 .00000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 44.950 59.821 58.642 58.671 58.671 58.975 Average 	Half Width (Insuf) (In	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000 .00000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 44.950 59.821 58.642 58.6471 58.975 Average 53444 46514 50267 34342 65875 66912 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 3.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000 .00000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 44.950 59.821 58.642 58.642 58.671 58.975 Average .53444 .46514 .5026 .34342 .65875 .66912 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000 0.00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000 1.0000 .00000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 44.950 59.821 58.642 58.642 58.671 58.975 Average .53440 .46510 .5026 .34342 .65879 .66912 nQueue nQueue nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (In	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000 0.00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000 1.0000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Mort Station 3.Queue.NumberIn Mort Station 3.Queue.NumberIn Mort Station 3.Queue.NumberIn Mort Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Mort Station 3.Qu	Average 44.950 59.821 58.642 58.671 56.871 56.871 56.871 58.975 Average .53444 .46516 .34342 .6587 .66913 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUEUE	Half Width (Insuf) (05660 (33752 (10389 (45370 (09972 (18659 ) 00 00 00	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 00000 .00000 .00000 .00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000 .00000	
Summary for Replication 8 of TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut Part 3.NumberOut	Average 44.950 59.821 58.642 58.671 56.871 56.871 56.871 56.871 56.871 56.871 56.871 56.975 Average .53440 .46510 .50260 .34342 .65875 .66913 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue	Half Width (Insuf) (In	Minimum 31.000 47.106 40.860 39.852 42.515 42.539 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 60.992 74.040 96.875 77.214 92.443 79.794 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 20 18 21 31 36 27 n Final V 1.0000 1.0000 1.0000 1.0000 2.0000 3.0000 2.0000 3.0000 2.0000 3.0000	ations alue .00000 .00000 1.0000 1.0000 1.0000 .00000	

### Summary for Replication 9 of 20

TALLY VARIABLES Identifier	Average	Half Width	Minimum	Maximur	n Observ	vations	
Part 1.TotalTime	44.162	(Insuf)	32,715	71.365	16		
Part 2.TotalTime	57.942	(Insuf)	39.589	84.137	31		
Part 3.TotalTime	59.978	(Insuf)	40.920	71.917	24		
Part 4.TotalTime	60.862	(Insuf)	44.990	92.812	29		
Part 5.TotalTime	59.551	(Insuf)	42.000	79.968	29		
Part 6.TotalTime	56.387	(Insuf)	40.702	77.564	23		
DISCRETE-CHANGE VARIABLES							
Identifier	Average	Half Width	Minimum	Maximur	m Final V	alue	
Machine 1. Utilization	.56475	i (Insuf)	.00000	1.0000	1.0000		
Machine 2. Utilization	.47268	3 (Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.4/548	3 (Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.32267	(Insuf)	.00000	1.0000	.00000		
Machine 5.0002ation	.00083	(Insul)	.00000	1.0000	1 0000		
Work Station 4 Queue Numberly	.07741 ∩⊔∩⊔∩	03244	(Insuf)	00000	2 0000	00000	
Work Station 5 Queue Numberli		22514	(Insuf)	00000	3 0000	00000	
Work Station 1. Queue. Number In	nOueue	.11194	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.NumberIn	Queue	.42076	(Insuf)	.00000	4.0000	2.0000	
Work Station 2.Queue.NumberIn	nQueue	.13319	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.NumberIn	nQueue	.17693	(Insuf)	.00000	2.0000	.00000	
OUTPUTS	Valuo						
Identinei	value						
Part 1.NumberOut	16.00	00					
Part 2 NumberOut	31.00						
Part 4 NumberOut	24.00						
Part 5 NumberOut	29.00	0					
Part 6 NumberOut	23.00	0					
		-					
Summary for Replication 10	of 20						
Summary for Replication 10	of 20						
Summary for Replication 10 TALLY VARIABLES Identifier	of 20 Average	Half Width	Minimum	Maximur	n Observ	vations	
Summary for Replication 10 TALLY VARIABLES Identifier	of 20 Average	Half Width	Minimum	Maximur	n Observ	rations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Dat 2.TatalTime	of 20 Average 47.900	Half Width (Insuf)	Minimum 34.397	Maximur 63.000	n Observ 	rations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	of 20 Average 47.900 62.891	Half Width (Insuf) (Insuf)	Minimum 34.397 49.438	Maximur 63.000 78.749	n Observ 27 23 22	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	of 20 Average 47.900 62.891 58.220 55.295	Half Width (Insuf) (Insuf) (Insuf)	Minimum 34.397 49.438 45.377 38.178	Maximur 63.000 78.749 81.695 83.249	n Observ 27 23 23 29	rations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	of 20 Average 47.900 62.891 58.220 55.295 62.064	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.397 49.438 45.377 38.178 44.010	Maximur 63.000 78.749 81.695 83.249 87 170	n Observ 27 23 23 29 25	rations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.397 49.438 45.377 38.178 44.010 32.000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722	n Observ 27 23 23 29 25 24	rations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.397 49.438 45.377 38.178 44.010 32.000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722	m Observ 27 23 23 29 25 24	rations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur	n Observ 27 23 23 29 25 24 n Final V	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur	m Observ 27 23 23 29 25 24 m Final V	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000	m Observ 27 23 23 29 25 24 m Final V 1.0000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 2.Utilization	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 47565 47565	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .28402	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .00000 .00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 64967	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .00000 .00000 .00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64867	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .00000 .00000 .00000 .00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Machine 4.Queue Number II Work Station 4.Queue Number II	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64867 .64437	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2000)	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64867 .64867	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (26519	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .00000 .00000 .00000 .00000 .00000 3.0000 3.0000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64867 .64867 .04869	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (07976 .26519 .10782	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000 .00000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 27 23 23 29 25 24 n Final V 1.0000 .00000 .00000 .00000 .00000 .00000 .00000 3.0000 3.0000 2.0000	alue .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64867 .64867 .64867 .04869 .04869	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (07976 .26519 .10782 .44979	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64867 .64867 .04867 .04869 nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (07976 .26519 .10782 .44979 .17046	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 27 23 23 29 25 24 m Final V 1.0000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 3.0000 3.0000 3.0000	alue .00000 .00000 .00000 2.0000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 5.Utilization Machine 5.	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 5 (Insuf) 5 (Insuf) 5 (Insuf) 7 (Insuf) 9 (Insuf) 9 (Insuf) 7 (Insuf) 9 (Insuf)	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	m Observ 27 23 29 25 24 m Final V 1.0000 .000000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 27 23 29 25 24 n Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue NQueue NQueue Value	Half Width (Insuf) (Insa2 (Insuf) (Insa2 (I	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	m Observ 27 23 29 25 24 m Final V 1.0000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 2.0000 2.0000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47665 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	m Observ 27 23 29 25 24 m Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut Part 2.NumberOut	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000 .000000 .0000000 .000000 .000000 .00000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 27 23 29 25 24 n Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut Part 3.NumberOut Part 3.NumberOut	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	m Observ 27 23 29 25 24 m Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 3.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue NQUeue NQUEUE NQUEU	Half Width (Insuf) (In	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	m Observ 27 23 29 25 24 m Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 5.	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue NQUeue NQUEUE NQUEU	Half Width (Insuf) (In	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .000000 .000000 .00000000	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	m Observ 27 23 29 25 24 m Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 5.NumberOut Part 6.NumberOut Part 6.	of 20 Average 47.900 62.891 58.220 55.295 62.064 54.896 Average .54225 .47565 .42867 .38400 .64867 .64437 nQueue nQueue nQueue nQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUEUE NQUEU	Half Width (Insuf)	Minimum 34.397 49.438 45.377 38.178 44.010 32.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 63.000 78.749 81.695 83.249 87.170 75.722 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	m Observ 27 23 29 25 24 m Final V 1.0000 .000000 .000000 .00000000	alue .00000 .00000 .00000 2.0000 .00000 .00000	

#### Summary for Replication 11 of 20

TALLY VARIABLES							
Identifier	Average	Half Width	Minimum	Maximun	n Observ	ations	
Part 1 TotalTimo	10 021	(Incuf)	20 160	60 707	22		
Part 2 TotalTime	62 / 8/	(Insuf)	139.109 13.109	02.737 QA 230	22		
Part 3 TotalTime	55 907	(Insuf)	43.121	73 934	25		
Part 4 TotalTime	57 895	(Insuf)	41 412	78 354	23		
Part 5 TotalTime	60 134	(Insuf)	44 972	75.836	19		
Part 6. TotalTime	58.279	(Insuf)	43.309	78.332	28		
		( )					
DISCRETE-CHANGE VARIABLES							
Identifier	Average	Half Width	Minimum	Maximun	n Final V	alue	
				4 0000	4 0000		
Machine 1. Utilization	.5/190	) (Insuf)	.00000	1.0000	1.0000		
Machine 2. Utilization	.4688.	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.40005	o (Insuf)	.00000	1.0000	1.0000		
Machine 4.0tilization	.3720	(IIISUI) (Incuf)	.00000	1.0000	1 0000		
Machine 5.0tilization	.00370	1 (Insuf)	00000	1.0000	00000		
Work Station 4 Queue NumberIr	.7101- Ωμεμε	08785	(Insuf)	00000	2 0000	00000	
Work Station 5 Queue NumberIn		23852	(Insuf)	00000	3 0000	00000	
Work Station 1.Queue.NumberIr	Queue	.08398	(Insuf)	.00000	2.0000	1.0000	
Work Station 6.Queue.NumberIr	nQueue	.49973	(Insuf)	.00000	4.0000	.00000	
Work Station 2.Queue.NumberIr	nQueue	.09449	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.NumberIr	nQueue	.10657	(Insuf)	.00000	2.0000	.00000	
			. ,				
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	22.00	00					
Part 2.NumberOut	26.00	00					
Part 3.NumberOut	25.00	00					
Part 4.NumberOut	28.00	00					
Part 6 NumberOut	19.00	0					
Part 6.NumberOut	28.00	0					
Summary for Replication 12	of 20						
Summary for Replication 12	of 20						
Summary for Replication 12 TALLY VARIABLES	of 20						
Summary for Replication 12 TALLY VARIABLES Identifier	of 20 Average	Half Width	Minimum	Maximun	n Observ	vations	
Summary for Replication 12 TALLY VARIABLES Identifier	of 20 Average	Half Width	Minimum	Maximun	n Observ	ations	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime	of 20 Average 48.790	Half Width	Minimum 31.092	Maximun 66.681	n Observ 22	ations	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime	of 20 Average 48.790 62.785	Half Width (Insuf) (Insuf)	Minimum 31.092 41.703	Maximun 66.681 91.318	n Observ 	rations	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	of 20 Average 48.790 62.785 63.983	Half Width (Insuf) (Insuf) (Insuf)	Minimum 31.092 41.703 42.241	Maximun 66.681 91.318 90.523 87.000	n Observ 22 25 28 22	rations	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	of 20 Average 48.790 62.785 63.983 59.990 64.343	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.092 41.703 42.241 40.000 40.720	Maximun 66.681 91.318 90.523 87.000 93.998	n Observ 22 25 28 23 34		
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.092 41.703 42.241 40.000 40.720 38.802	Maximun 66.681 91.318 90.523 87.000 93.998 98.259	22 25 28 23 34 25	rations	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.092 41.703 42.241 40.000 40.720 38.802	Maximun 66.681 91.318 90.523 87.000 93.998 98.259	22 25 28 23 34 25		
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 31.092 41.703 42.241 40.000 40.720 38.802	Maximun 66.681 91.318 90.523 87.000 93.998 98.259	22 25 28 23 34 25	rations	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun	22 25 28 23 34 25 n Final V	alue	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun	22 25 28 23 34 25 n Final V	alue	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971 Average .58540	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum .00000	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun 1.0000	22 25 28 23 34 25 n Final V 1.0000	alue	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971 Average .58540 .48455	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum .00000 .00000	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun 1.0000 1.0000	22 25 28 23 34 25 n Final V 1.0000 1.0000	alue	
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Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.Numb	Average 48.790 62.785 63.983 59.990 64.343 67.971 Average .58540 .48459 .49252 .36200 .65933 .70273 nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum .000000 .000000 .000000 .0000000 .000000 .000000 .00000000	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	22 25 28 23 34 25 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 3.0000 2.0000	alue 1.0000 .00000 .00000	
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Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971 Average .58540 .48455 .49252 .36200 .65933 .70273 nQueue nQueue nQueue NQueue Value Value 22.00 25.00 28.00 20.	Half Width (Insuf) (In	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	22 25 28 23 34 25 n Final V 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 3.0000 2.0000 5.0000	alue	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Pa	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971 Average .58540 .48455 .49252 .36200 .65933 .70273 nQueue nQueue nQueue NQueue Value Value 22.00 25.00 23.00 23.00 24.02	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	22 25 28 23 34 25 n Final V 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 3.0000 2.0000 5.0000	alue	
Summary for Replication 12 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 5.NumberOut Part 5.NumberOut Part 6.NumberOut Part	of 20 Average 48.790 62.785 63.983 59.990 64.343 67.971 Average .58540 .48455 .49252 .36200 .65933 .70273 nQueue nQueue nQueue NQueue Queue Value Value 22.00 25.00 23.00 34.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 23.00 25.00 23.00 23.00 25.00 23.00 23.00 25.00 23.00 23.00 25.00 23.00 23.00 25.00 23.00 23.00 25.00 23.00 23.00 25.00 23.00 25.00 23.00 25.00 23.00 23.00 25.00 23.00 25.	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf	Minimum 31.092 41.703 42.241 40.000 40.720 38.802 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 66.681 91.318 90.523 87.000 93.998 98.259 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	22 25 28 23 34 25 n Final V 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 5.0000	alue	
## Summary for Replication 13 of 20

TALLY VARIABLES Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
Part 1.TotalTime	52.148	(Insuf)	35.932	74.732	22		
Part 2.TotalTime	64.294	(Insuf)	43.000	83.555	32		
Part 3.TotalTime	59.678	(Insuf)	49.000	76.836	25		
Part 4.TotalTime	60.717	(Insuf)	44.694	95.470	21		
Part 5.TotalTime	60.661	(Insuf)	39.713	88.502	29		
Part 6.TotalTime	57.842	(Insuf)	39.648	85.688	23		
DISCRETE-CHANGE VARIABLE	S						
Identifier	Average H	alf Width	Minimum	Maximum	n Final V	alue	
Machine 1.Utilization	.57385	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.48592	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.46752	(Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.35000	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.66294	(Insuf)	.00000	1.0000	1.0000		
Machine 6. Utilization	.68227	(Insuf)	.00000	1.0000	1.0000		
Work Station 4.Queue.Numbe	rInQueue	.05971	(Insuf)	.00000	2.0000	.00000	
Work Station 5.Queue.Numbe	rInQueue	.37982	(Insuf)	.00000	3.0000	1.0000	
Work Station 1.Queue.Numbe	rInQueue	.10847	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.Numbe	rInQueue	.56955	(Insuf)	.00000	4.0000	.00000	
Work Station 2.Queue.Numbe	rInQueue	.12925	(Insuf)	.00000	3.0000	.00000	
Work Station 3.Queue.Numbe	rInQueue	.16238	(Insuf)	.00000	3.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	22.000						
Part 2.NumberOut	32.000						
Part 3.NumberOut	25.000						

Part 5.NumberOut25.000Part 4.NumberOut21.000Part 5.NumberOut29.000Part 6.NumberOut23.000

#### Summary for Replication 14 of 20

TALLY VARIABLES Identifier	Average H	Half Width	Minimum	Maximum	n Observ	vations	
Part 1.TotalTime	47.209	(Insuf)	34.159	69.653	18		
Part 2.TotalTime	61.895	(Insuf)	40.000	76.433	25		
Part 3.TotalTime	60.220	(Insuf)	42.331	101.90	34		
Part 4.TotalTime	56.243	(Insuf)	36.994	70.541	26		
Part 5.TotalTime	58.855	(Insuf)	42.865	83.601	31		
Part 6.TotalTime	60.543	(Insuf)	45.540	79.327	20		
Work Station 3.Queue.WaitingT	ime	1.6890	(Insuf) .(	00000 11	.668	149	
DISCRETE-CHANGE VARIABLES	5						
Identifier	Average H	Half Width	Minimum	Maximum	n Final V	alue	
Machine 1.Utilization	.55455	(Insuf)	.00000	1.0000	1.0000		
Machine 2. Utilization	.44333	(Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.49182	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization	.35835	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.66061	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.64527	(Insuf)	.00000	1.0000	.00000		
Work Station 4.Queue.NumberI	nQueue	.06124	(Insuf)	.00000	2.0000	.00000	
Work Station 5.Queue.NumberI	nQueue	.34646	(Insuf)	.00000	3.0000	.00000	
Work Station 1.Queue.NumberI	nQueue	.12455	(Insuf)	.00000	3.0000	.00000	
Work Station 6.Queue.NumberI	nQueue	.38138	(Insuf)	.00000	3.0000	.00000	
Work Station 2.Queue.NumberI	nQueue	.15130	(Insuf)	.00000	3.0000	.00000	
Work Station 3.Queue.NumberI	nQueue	.16778	(Insuf)	.00000	3.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	18.000	0					
Part 2.NumberOut	25.000	0					
Part 3.NumberOut	34.000	0					

	23.000
Part 3.NumberOut	34.000
Part 4.NumberOut	26.000
Part 5.NumberOut	31.000
Part 6.NumberOut	20.000

## Summary for Replication 15 of 20

Identifier	Average H	alf Width	Minimum	Maximur	n Observ	ations	
Dent 4 TetelTime	40.101	(16)	00.170	(( 077			
Part 1.10tal11me	49.101	(Insuf)	39.172	00.0// 01 707	16		
Part 3 TotalTime	64 468	(Insuf)	49.000	01.797 88.486	4Z 18		
Part 4 TotalTime	62,193	(Insuf)	38,995	88.538	21		
Part 5.TotalTime	65.019	(Insuf)	45.370	95.045	25		
Part 6.TotalTime	63.048	(Insuf)	47.212	85.422	23		
DISCRETE-CHANGE VARIABLES							
Identifier	Average H	alf Width	Minimum	Maximur	m Final V	alue	
Machine 1.Utilization	.58055	(Insuf)	.00000	1.0000	1.0000		
Machine 2. Utilization	.53793	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.46046	(Insul)	.00000	1.0000	00000		
Machine 5 Utilization	.34200	(Insuf)	00000	1.0000	1 0000		
Machine 6 Utilization	.69153	(Insuf)	.00000	1.0000	1.0000		
Work Station 1.Queue.NumberIr	nQueue	.15589	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.NumberIn	nQueue	.20445	(Insuf)	.00000	2.0000	1.0000	
Work Station 3.Queue.NumberIn	nQueue	.21664	(Insuf)	.00000	4.0000	.00000	
Work Station 4.Queue.NumberIn	nQueue	.06792	(Insuf)	.00000	2.0000	.00000	
Work Station 5.Queue.NumberIn	nQueue	.37305	(Insuf)	.00000	4.0000	1.0000	
Work Station 6.Queue.NumberIn	nQueue	.45793	(Insuf)	.00000	4.0000	.00000	
Identifier	Value						
Part 1.NumberOut	16.000						
Part 2.NumberOut	42.000	1					
Part 3.NumberOut	18.000	)					
Part 4.NumberOut	21.000	)					
Part 5.NumberOut	25.000	)					
Part 6.NumberOut	23.000						
Summary for Replication 16	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	alf Width	Minimum	Maximur	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H 46.579	alf Width (Insuf)	Minimum 33.964	Maximur 66.096	n Observ 21	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 46.579 58.533	lalf Width (Insuf) (Insuf)	Minimum 33.964 42.000	Maximur 66.096 74.423	m Observ 	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 46.579 58.533 60.049	alf Width (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670	Maximur 66.096 74.423 77.689	m Observ 21 15 29	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 46.579 58.533 60.049 58.540	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695	Maximur 66.096 74.423 77.689 84.159	m Observ 21 15 29 32	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 46.579 58.533 60.049 58.540 57.578	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 20.521	Maximur 66.096 74.423 77.689 84.159 88.710 82.59(	n Observ 21 15 29 32 26	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 46.579 58.533 60.049 58.540 57.578 56.166	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531	Maximur 66.096 74.423 77.689 84.159 88.710 82.596	n Observ 21 15 29 32 26 29	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average H 46.579 58.533 60.049 58.540 57.578 56.166	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531	Maximur 66.096 74.423 77.689 84.159 88.710 82.596	n Observ 21 15 29 32 26 29	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur	n Observ 21 15 29 32 26 29 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000	m Observ 21 15 29 32 26 29 m Final V. 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 4.Utilization Machine 6.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 4.Utilization Machine 4.	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 21 15 29 32 26 29 n Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .0000000 .00000000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 3.0000 2.0000	ations alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 20457 12425	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 21 15 29 32 26 29 n Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 2.0000	ations alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue	lalf Width (Insuf) (In	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 4.Queue.NumberIn Machine 4.Queue	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue	lalf Width (Insuf) (In	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 3.0000 3.0000 3.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .07397 .20457 .13635 .49765 .10533 .20500	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue	lalf Width (Insuf) (In	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue	lalf Width (Insuf) (In	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	lalf Width (Insuf) (1000) (100) (1000)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier Part 1.NumberOut Part 1.NumberOut	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .07397 .20457 .13635 .49765 .10533 .20500	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .07397 .20457 .13635 .49765 .10533 .20500	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUEUE NQUE N N N N N N N N N N N N N N N N N N N	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .07397 .20457 .13635 .49765 .10533 .20500	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.NumberOut Part 5.NumberOut Part 5.N	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUEUE NQUE N N N N N N N N N N N N N N N N N N N	alf Width (Insuf) (1000)	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 2.NumberOut Part 4.NumberOut Part 6.NumberOut Part 6.Numbe	Average H 46.579 58.533 60.049 58.540 57.578 56.166 Average H .56391 .43064 .44600 .33801 .62114 .67650 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUEUE NQUE N N N N N N N N N N N N N N N N N N N	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .07397 .20457 .13635 .49765 .10533 .20500	Minimum 33.964 42.000 43.670 43.695 41.914 38.531 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 66.096 74.423 77.689 84.159 88.710 82.596 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	m Observ 21 15 29 32 26 29 m Final V. 1.0000 1.0000 1.0000 1.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 1.0000 .00000	

## Summary for Replication 17 of 20

Identifier	Averade H	lalf Width	Minimum	Maximur	n Observ	ations	
	Average		wiiniiniuni	IVIAAIITTUI	II Observ	ations	
Part 1.TotalTime	48.920	(Insuf)	33.000	61.307	15		
Part 2.TotalTime	57.545	(Insuf)	37.000	77.856	22		
Part 3.TotalTime	59.689	(Insuf)	42.000	76.166	30		
Part 4.TotalTime	55.812	(Insuf)	41.000	76.597	31		
Part 5.TotalTime	60.723	(Insuf)	42.586	79.806	31		
Part 6. rotai lime	59.850	(Insul)	38.147	88.150	26		
DISCRETE-CHANGE VARIABLES							
Identifier	Average H	lalf Width	Minimum	Maximur	n Final V	alue	
Machina 1 Utilization	E0027	(Incuf)	00000	1 0000	00000		
Machine 2 Utilization	.09827	(Insuf)	00000	1.0000	00000		
Machine 3 Utilization	49098	(Insuf)	00000	1.0000	1 0000		
Machine 4.Utilization	.34267	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.64787	(Insuf)	.00000	1.0000	1.0000		
Machine 6. Utilization	.70027	(Insuf)	.00000	1.0000	.00000		
Work Station 4.Queue.NumberIn	nQueue	.04890	(Insuf)	.00000	2.0000	.00000	
Work Station 5.Queue.NumberIn	nQueue	.25299	(Insuf)	.00000	3.0000	1.0000	
Work Station 1.Queue.NumberIr	nQueue	.09715	(Insuf)	.00000	1.0000	.00000	
Work Station 6.Queue.Numberli	nQueue	.4/189	(Insuf)	.00000	4.0000	.00000	
Work Station 2 Queue Numberli		.17042	(Insul) (Insuf)	.00000	3.0000	1 0000	
Work Station S.Queue.Numbern	IQueue	.10050	(Insur)	.00000	2.0000	1.0000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	15.000	)					
Part 2 Number Out	22.000	)					
Part 4 NumberOut	30.000	)					
Part 5 Number Out	31.000	, )					
Part 6.NumberOut	26.000	)					
Summary for Replication 18	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximur	n Observ	ations	
TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximur	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H	lalf Width (Insuf)	Minimum 36.082	Maximur 64.323	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average F 51.183 60.239	lalf Width (Insuf) (Insuf)	Minimum 36.082 41.088	Maximur 64.323 88.864	n Observ 27 27	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 51.183 60.239 62.380	lalf Width (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709	Maximur 64.323 88.864 76.726	n Observ 27 27 29 22	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 51.183 60.239 62.380 59.870 60.004	lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.212	Maximur 64.323 88.864 76.726 89.059 04.620	n Observ 27 27 27 29 23 24	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 51.183 60.239 62.380 59.870 60.904 57.091	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428	n Observ 27 27 29 23 26 23	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 51.183 60.239 62.380 59.870 60.904 57.091	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428	n Observ 27 27 29 23 26 23	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average H 51.183 60.239 62.380 59.870 60.904 57.091	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428	n Observ 27 27 29 23 26 23	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur	n Observ 27 27 29 23 26 23 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur	n Observ 27 27 29 23 26 23 m Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 48672	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 00000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1 0000	n Observ 27 27 29 23 26 23 m Final V .00000 00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 42000	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000	n Observ 27 27 29 23 26 23 m Final V .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000	n Observ 27 27 29 23 26 23 m Final V .00000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 27 27 29 23 26 23 m Final V .00000 .00000 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 27 27 29 23 26 23 m Final V .00000 .00000 .00000 1.0000 .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .000000 .000000 .000000 .00000000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 27 29 23 26 23 m Final V .00000 .00000 .00000 1.0000 .00000 3.0000	ations alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue	lalf Width (Insuf) (In	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 27 29 23 26 23 n Final V .00000 .00000 1.0000 .00000 1.0000 3.0000 3.0000	ations alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 5.Queue.NumberIn	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue	lalf Width (Insuf) (In	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .000000 .000000 .00000000	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 27 27 29 23 26 23 m Final V .00000 .00000 .00000 1.0000 .00000 3.0000 3.0000 3.0000 2.0000	ations alue .00000 .00000 .00000 .00000	
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TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue nQueue nQueue nQueue nQueue nQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (12875 .28270 .13852 .46506 .17173 .11169	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 27 27 29 23 26 23 n Final V .00000 .00000 .00000 1.0000 .00000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 6.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (12875 .28270 .13852 .46506 .17173 .11169	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	m Observ 27 27 29 23 26 23 m Final V .00000 .00000 .00000 1.0000 .00000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
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TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 1.NumberOut Part 2.NumberOut	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue	lalf Width (Insuf) (In	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	n Observ 27 27 29 23 26 23 26 23 n Final V .00000 .00000 .00000 1.0000 .00000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Part 1.NumberOut Part 3.NumberOut Part 3.NumberOut	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue nQueue nQueue nQueue nQueue NQueue	lalf Width (Insuf) (In	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 27 27 29 23 26 23 26 23 n Final V .00000 .00000 .00000 1.0000 .00000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part Part Part Part Part Part Part Par	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue nQueue nQueue nQueue nQueue NQUeue NQUEUE NQUE NQUEUE NQ	lalf Width (Insuf) (In	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 27 27 29 23 26 23 n Final V .00000 .00000 .00000 1.0000 .00000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Part 1.NumberOut Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 5.Number	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUEUE NQUE NQUEUE NQUE	lalf Width (Insuf) (In	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 27 27 29 23 26 23 n Final V .00000 .00000 .00000 .00000 .00000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 5.NumberOut Part 5.NumberOut Part 6.NumberOut Pa	Average H 51.183 60.239 62.380 59.870 60.904 57.091 Average H .54759 .48672 .42000 .39914 .65292 .65292 nQueue nQueue nQueue nQueue nQueue NQUeue NQUeue NQUEUE NQUE NQUE NQUE	lalf Width (Insuf)	Minimum 36.082 41.088 42.709 43.780 44.313 44.000 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 64.323 88.864 76.726 89.059 94.629 75.428 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 27 27 29 23 26 23 n Final V .00000 .00000 .00000 .00000 .00000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000	ations alue .00000 .00000 .00000 .00000 .00000	

#### Summary for Replication 19 of 20

TALLY VARIABLES					
Identifier	Average H	alf Width	Minimum	Maximum	Observations
Part 1.TotalTime	49.805	(Insuf)	35.000	66.983	22
Part 2.TotalTime	62.542	(Insuf)	49.695	87.033	24
Part 3.TotalTime	58.537	(Insuf)	40.746	82.020	27
Part 4.TotalTime	59.211	(Insuf)	46.664	79.244	23
Part 5.TotalTime	58.775	(Insuf)	45.642	90.119	27
Part 6.TotalTime	56.520	(Insuf)	44.965	75.530	23
DISCRETE-CHANGE VARIABLES					
Identifier	Average H	alf Width	Minimum	Maximum	Final Value
Machine 1. Utilization	.55508	(Insuf)	.00000	1.0000 1	.0000
Machine 2. Utilization	.45187	(Insuf)	.00000	1.0000 1	.0000
Machine 3. Utilization	.45333	(Insuf)	.00000	1.0000 .0	00000
Machine 4. Utilization	.36299	(Insuf)	.00000	1.0000 .0	00000
Machine 5. Utilization	.62033	(Insuf)	.00000	1.0000 .0	00000
Machine 6. Utilization	.66975	(Insuf)	.00000	1.0000 1	.0000
Work Station 1.Queue.NumberIn	nQueue	.07553	(Insuf)	.00000 2.0	0000. 0000
Work Station 2.Queue.NumberIn	nQueue	.11795	(Insuf)	.00000 2.0	0000 1.0000
Work Station 3.Queue.NumberIr	nQueue	.14292	(Insuf)	.00000 2.0	0000. 0000
Work Station 4. Queue. Number In	nOueue	.06430	(Insuf)	.00000 2.0	0000.0000
Work Station 5 Queue Numberli	noueue	24735	(Insuf)	00000 2 (	0000 00000
Work Station 6.Queue.NumberIn	nQueue	.46833	(Insuf)	.00000 4.0	00000.00000
ΟΠΤΡΠΤΖ					
Identifier	Value				
Part 1.NumberOut	22.000				
Part 2.NumberOut	24.000				
Part 3.NumberOut	27.000				
Part 4.NumberOut	23.000				
Part 5.NumberOut	27.000				
Part 6.NumberOut	23.000				
Summary for Replication 20	of 20				
TALLY VARIABLES		16 14 11			
	Average H	air width	winimum	waximum	
Part 1.TotalTime	48.001	(Insuf)	35.000	70.650	23
Part 2.TotalTime	59.020	(Insuf)	42.657	78.378	22
Part 3.TotalTime	58.788	(Insuf)	38.000	90.260	17
Part 4.TotalTime	57.119	(Insuf)	43.461	82.543	33
Part 5.TotalTime	61.545	(Insuf)	43.130	88.159	33
Part 6.TotalTime	56.399	(Insuf)	33.924	73.982	26
DISCRETE-CHANGE VARIABLES					
Identifier	Average H	alf Width	Minimum	Maximum	Final Value
Machine 1.Utilization	.55129	(Insuf)	.00000	1.0000 .0	00000
Machine 2. Utilization	.48840	(Insuf)	.00000	1.0000 1	.0000
Machine 3. Utilization	.47710	(Insuf)	.00000	1.0000 1	.0000
Machine 4. Utilization	33662	(Insuf)	.00000	1.0000 .0	00000
Machine 5. Utilization	.00002	· · · · · · · · · · · · · · · · · · ·		4 0 0 0 0 4	
Machine 6. Utilization	.66530	(Insuf)	.00000	1.0000 1	.0000
Mark Chatlan 1 Ourse Nearly and	.66530	(Insuf) (Insuf)	.00000	1.0000 1	.0000
Work Station Louene Mumperi	.66530 .64126	(Insuf) (Insuf) 11737	.00000 .00000 (Insuf)	1.0000 1 1.0000 1 .00000 2.0	.0000 .0000 .0000 00000
Work Station 1.Queue.Numberli Work Station 2.Queue Numberli	.66530 .64126 nQueue	(Insuf) (Insuf) .11737 .12153	.00000 .00000 (Insuf) (Insuf)	1.0000 1 1.0000 1 .00000 2.0	0000 .0000 .0000 .00000 .0000 .0000
Work Station 1.Queue.Numberli Work Station 2.Queue.Numberli Work Station 3.Queue Numberli	.66530 .64126 1Queue 1Queue	(Insuf) (Insuf) .11737 .12153 20918	.00000 .00000 (Insuf) (Insuf)	1.0000 1 1.0000 1 .00000 2.0 .00000 3.0	.0000 .0000 .0000 .00000 .0000 .00000 .0000 1.0000
Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 4.Queue.NumberIn	.66530 .64126 nQueue nQueue	(Insuf) (Insuf) .11737 .12153 .20918 06487	.00000 .00000 (Insuf) (Insuf) (Insuf)	1.0000         1           1.0000         1           .00000         2.0           .00000         3.0           .00000         3.0           .00000         3.0	0000 0000 0000 .00000 0000 .00000 0000 1.0000
Work Station 1.Queue.Number In Work Station 2.Queue.Number In Work Station 3.Queue.Number In Work Station 4.Queue.Number In Work Station 5.Queue Number In	.66530 .64126 nQueue nQueue nQueue	(Insuf) (Insuf) .11737 .12153 .20918 .06487 .31029	.00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	1.0000         1           1.0000         1           .00000         2.0           .00000         3.0           .00000         3.0           .00000         3.0           .00000         2.0	0000 0000 0000 .00000 0000 .00000 0000 1.0000 0000 .00000
Work Station 1.Queue.Number In Work Station 2.Queue.Number In Work Station 3.Queue.Number In Work Station 4.Queue.Number In Work Station 5.Queue.Number In Work Station 6.Queue.Number In	.66530 .64126 1Queue 1Queue 1Queue 1Queue 1Queue 1Queue	(Insuf) (Insuf) .11737 .12153 .20918 .06487 .31928 37999	.00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000         1           1.0000         2.0           .00000         3.0           .00000         3.0           .00000         3.0           .00000         3.0           .00000         3.0           .00000         3.0           .00000         3.0	0000 0000 0000 .00000 0000 .00000 0000 1.0000 0000 .00000 0000 .00000

OUTPUTS Identifier	Value	
Part 1.NumberOut	23.000	
Part 2.NumberOut	22.000	
Part 3.NumberOut	17.000	
Part 4.NumberOut	33.000	
Part 5.NumberOut	33.000	
Part 6.NumberOut	26.000	

#### Summary for Replication 1 of 20

Identifier	Average	Half Width	Minimum	Maximun	n Observ	ations	
Part 1.TotalTime	48.543	(Insuf)	41.000	61.594	12		
Part 2.TotalTime	53.974	(Insuf)	41.833	70.725	15		
Part 3.TotalTime	51.708	(Insuf)	40.544	80.378	19		
Part 4.TotalTime	51.425	(Insuf)	35.000	74.725	17		
Part 5.TotalTime	54.466	(Insuf)	40.442	77.545	18		
Part 6.TotalTime	55.074	(Insuf)	38.020	67.312	20		
DISCRETE-CHANGE VARIABLES Identifier	Average	Half Width	Minimum	Maximun	n Final V	alue	
Machine 1.Utilization	.39000	) (Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.31420	) (Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.35119	(Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.24600	) (Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.43746	(Insuf)	.00000	1.0000	1.0000		
Machine 6. Utilization	.4/4/4	(Insuf)	.00000	1.0000	.00000	00000	
Work Station 5 Queue Number		.02233	(Insul) (Insulf)	.00000	2.0000	.00000	
Work Station 1 Oueue Number	noueue	.04026	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.NumberIr	nQueue	.13799	(Insuf)	.00000	3.0000	.00000	
Work Station 2.Queue.NumberIr	nQueue	.02644	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.NumberIn	nQueue	.08376	(Insuf)	.00000	2.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	12.00	0					
Part 2.NumberOut	15.00	0					
Part 3.NumberOut	19.00	0					
Part 4.NumberOut	17.00	0					
Part 5.NumberOut	18.00	0					
Part 6.NumberOut	20.00	0					
Summary for Replication 2 of	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average	Half Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average 43.471	Half Width (Insuf)	Minimum 34.205	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average 43.471 53.782	Half Width (Insuf) (Insuf)	Minimum 34.205 40.000	Maximun 53.678 69.708	n Observ 13 16	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average 43.471 53.782 54.586	Half Width (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759	Maximun 53.678 69.708 65.375	n Observ 13 16 23	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average 43.471 53.782 54.586 52.760	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117	Maximun 53.678 69.708 65.375 63.467	n Observ 13 16 23 11	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average 43.471 53.782 54.586 52.760 51.633	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000	Maximun 53.678 69.708 65.375 63.467 66.107	n Observ 13 16 23 11 23	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 43.471 53.782 54.586 52.760 51.633 52.602	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857	Maximun 53.678 69.708 65.375 63.467 66.107 63.483	n Observ 13 16 23 11 23 13	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun	n Observ 13 16 23 11 23 13 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun	n Observ 13 16 23 11 23 13 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2. Itilization	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000	n Observ 13 16 23 11 23 13 n Final V .00000 00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439 .43815	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 .00000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439 .43815 .46094	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439 .43815 .46094	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 1.0000 1.0000	ations alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 5.Queue.NumberIn	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439 .43815 .46094 hQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 1.0000 2.0000	ations alue .00000 1.0000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439 .43815 .46094 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 000000 000000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue NumberIr	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average 	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insa) (I	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 1.0000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439 .43815 .46094 hQueue hQueue hQueue hQueue hQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0(1	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .000000 .000000 .000000 .0000000 .0000000 .00000000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average 	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insa)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 0.00000 0.00000 0.00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average .37827 .32133 .34000 .24439 .46094 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue	Half Width (Insuf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 2.0000 1	ations alue .00000 1.0000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average 	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insa)	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 1.0000 1.0000 2.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average 	Half Width (Insuf) (Insa) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Par	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average 	Half Width (Insuf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.Num	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average 	Half Width (Insuf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Part 1.NumberOut Part 2.NumberOut Part 4.NumberOut Part 4.NumberOut Part 5.NumberOut Part 6.NumberOut Part	Average 43.471 53.782 54.586 52.760 51.633 52.602 Average 	Half Width (Insuf) (In	Minimum 34.205 40.000 42.759 43.117 39.000 39.857 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 53.678 69.708 65.375 63.467 66.107 63.483 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 13 16 23 11 23 13 n Final V .00000 .00000 1.0000 1.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000	ations alue .00000 1.0000 .00000 .00000 .00000	

#### Summary for Replication 3 of 20

TALLY VARIABLES	Average	Jalf Width	Minimum	Maximun	n Observ	ations	
ruentinei	Average		wiiniiniuni	IVIAXITTUT	UDSELV	ations	
Part 1.TotalTime	42.292	(Insuf)	35.602	51.704	13		
Part 2.TotalTime	54.754	(Insuf)	41.869	73.876	19		
Part 3.TotalTime	54.178	(Insuf)	42.000	70.109	12		
Part 5 Total Time	55.400	(Insul)	38.000	76 140	15		
Part 6 TotalTime	56 155	(Insuf)	41.724	70.140	23 18		
	50.155	(msur)	40.177	10.000	10		
DISCRETE-CHANGE VARIABLES							
Identifier	Average I	Half Width	Minimum	Maximun	n Final V	alue	
Machine 1 Litilization	40522	(Incust)	00000	1 0000	00000		
Machine 1.0thization	.40533	(Insul) (Insul)	.00000	1.0000	1 0000		
Machine 3 Utilization	.35032	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization	.22667	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.43733	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.49555	(Insuf)	.00000	1.0000	.00000		
Work Station 4.Queue.NumberIr	nQueue	.01163	(Insuf)	.00000	1.0000	.00000	
Work Station 5.Queue.NumberIr	nQueue	.08179	(Insuf)	.00000	2.0000	.00000	
Work Station 1.Queue.NumberIr	nQueue	.03500	(Insuf)	.00000	2.0000	.00000	
Work Station 2 Queue Number		.14589	(Insul) (Insuf)	.00000	3.0000	.00000	
Work Station 3 Queue Number	noueue	.08460	(Insuf)	.00000	2.0000	.00000	
	124040	.00100	(mour)	.00000	2.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1 NumberOut	12 00	0					
Part 2 NumberOut	13.00	0					
Part 3.NumberOut	12.00	0					
Part 4.NumberOut	15.00	0					
Part 5.NumberOut	23.00	0					
Part 6.NumberOut	18.00	0					
Summary for Danligation 4 a	£ 20						
Summary for Replication 4 0	1 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average I	Half Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier	Average I	Half Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2 TotalTime	Average I 42.149 56.313	Half Width (Insuf)	Minimum 35.721 44.000	Maximun 59.240 69.257	n Observ 12 17	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average 42.149 56.313 54.428	Half Width (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591	Maximun 59.240 69.257 78.107	n Observ 12 17 11	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average 42.149 56.313 54.428 49.989	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000	Maximun 59.240 69.257 78.107 79.014	n Observ 12 17 11 21	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average 42.149 56.313 54.428 49.989 52.022	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000	Maximun 59.240 69.257 78.107 79.014 62.000	n Observ 12 17 11 21 31	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 42.149 56.313 54.428 49.989 52.022 47.344	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574	Maximun 59.240 69.257 78.107 79.014 62.000 52.399	n Observ 12 17 11 21 31 6	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 42.149 56.313 54.428 49.989 52.022 47.344	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574	Maximun 59.240 69.257 78.107 79.014 62.000 52.399	n Observ 12 17 11 21 31 6	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 42.149 56.313 54.428 49.989 52.022 47.344	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574	Maximun 59.240 69.257 78.107 79.014 62.000 52.399	12 17 11 21 31 6	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 42.149 56.313 54.428 49.989 52.022 47.344 Average 1	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun	n Observ 12 17 11 21 31 6 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 42.149 56.313 54.428 49.989 52.022 47.344 Average 4	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun	n Observ 12 17 11 21 31 6 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000	n Observ 12 17 11 21 31 6 n Final V 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 42347	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 0.00000 1.0000 0.00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 1.Queue Number	Average I 42.149 56.313 54.428 49.989 52.022 47.344 Average I .34354 .33200 .38828 .21989 45486 .43267	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 1.0000 0.00000 2.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nOueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (20092 .03590	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 .00000 2.0000 2.0000	ations alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIn Work Station 3.Queue.NumberIn	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.3092 0.3590 .04288	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 1.0000 1.0000	ations alue .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.03092 0.04288 .01646	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 1.0000 1.0000 1.0000 1.0000	ations alue .00000 .00000 .00000 1.0000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (03092 .03590 .04288 .01646 .08696	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 1.0000 1.0000 2.0000 1.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 03092 .03590 .04288 .01646 .08696 .06718	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 1.0000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .45486 .43267 nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 1.0000 1.0000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .32200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue nQueue NQueue Value	Half Width (Insuf) (In	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue	Half Width (Insuf) (In	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr Part 1.NumberOut Part 2.NumberOut Part 2.N	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQUeue NQUeue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.03092 .03590 .04288 .01646 .08696 .06718	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.N	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 45486 .43267 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.03092 .03590 .04288 .01646 .08696 .06718	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 (lnsuf) (lnsuf) (lnsuf) (lnsuf) (lnsuf) (lnsuf) (lnsuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 3.NumberOut Part 5.NumberOut Part 5.NumberOut Part 5.NumberOut	Average 1 42.149 56.313 54.428 49.989 52.022 47.344 Average 1 .34354 .33200 .38828 .21989 .45486 .43267 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (03590 .04288 .01646 .08696 .06718	Minimum 35.721 44.000 44.591 38.000 43.000 43.574 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 59.240 69.257 78.107 79.014 62.000 52.399 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 12 17 11 21 31 6 n Final V 1.0000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000	

## Summary for Replication 5 of 20

Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
Part 1 TotalTime	46 736	(Insuf)	40,000	55 203	13		<u>.</u>
Part 2.TotalTime	59.746	(Insuf)	44.000	83.202	23		
Part 3.TotalTime	56.577	(Insuf)	42.190	95.372	19		
Part 4.TotalTime	51.882	(Insuf)	39.000	58.404	20		
Part 5.TotalTime	59.083	(Insuf)	43.000	89.884	15		
Part 6.TotalTime	51.844	(Insuf)	42.291	70.961	13		
DISCRETE-CHANGE VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Final V	alue	
Machine 1. Utilization	.39717	(Insuf)	.00000	1.0000	1.0000		
Machine 2.Utilization	.36467	(Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.33800	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization	.25681	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.47933	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.51439	(Insuf)	.00000	1.0000	1.0000		
Work Station 1.Queue.NumberIn	nQueue	.03829	(Insuf)	.00000	1.0000	.00000	
Work Station 2.Queue.NumberIn	nQueue	.06138	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.NumberIn	nQueue	.05142	(Insuf)	.00000	1.0000	.00000	
Work Station 4.Queue.NumberIn	nQueue	.02824	(Insuf)	.00000	1.0000	.00000	
Work Station 5.Queue.NumberIn	nQueue	.11319	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.NumberIn	nQueue	.14575	(Insuf)	.00000	3.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	13.000	)					
Part 2.NumberOut	23.000	)					
Part 3.NumberOut	19.000	)					
Part 4.NumberOut	20.000	)					
Part 5.NumberOut	15.000	)					
Part 6.NumberOut	13.000	)					
Summary for Replication 6 o	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H	lalf Width (Insuf)	Minimum 36.000	Maximun 61.090	n Observ 16	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 46.840 52.912	lalf Width (Insuf) (Insuf)	Minimum 36.000 44.000	Maximun 61.090 74.149	n Observ 16 18	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 46.840 52.912 51.905	lalf Width (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081	Maximun 61.090 74.149 78.443	n Observ 16 18 13	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 46.840 52.912 51.905 50.142	lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000	Maximun 61.090 74.149 78.443 58.000	n Observ 16 18 13 20	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 46.840 52.912 51.905 50.142 52.103	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000	Maximun 61.090 74.149 78.443 58.000 67.537	n Observ 16 18 13 20 21	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average H 46.840 52.912 51.905 50.142 52.103 51.736	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443	n Observ 16 18 13 20 21 13	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average 46.840 52.912 51.905 50.142 52.103 51.736	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443	n Observ 16 18 13 20 21 13	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 Minimum	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun	n Observ 16 18 13 20 21 13 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 Minimum .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 Minimum .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000 1.0000	alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45809 .45831	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 .00000 1.0000 2.0000	alue .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 1.0000 .00000 1.0000	ations alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 .00000 1.0000 2.0000 1.0000 2.0000	alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 4.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn NumberIn Num	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45809 .45831 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn Work Station 3.Queue.NumberIn	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUE	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 4.Queue.	Average H 46.840 52.912 51.905 50.142 52.103 51.736 Average H .33533 .32284 .34785 .25400 .45409 .45831 nQueue nQueue nQueue nQueue NQUeue NQUeue NQUeue NQUEUE NQUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQUEUE NQ	Half Width (Insuf) (In	Minimum 36.000 44.000 40.081 39.000 43.000 43.000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 61.090 74.149 78.443 58.000 67.537 66.443 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00000 .00000 .00000 .00000	n Observ 16 18 13 20 21 13 n Final V. .00000 .00000 1.0000 2.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations	

#### Summary for Replication 7 of 20

Part 5.NumberOut

Part 6.NumberOut

17.000 20.000

TALLY VARIABLES Identifier	Average H	alf Width	Minimum	Maximun	n Observ	rations
Part 1.TotalTime	43.443	(Insuf)	35.887	52.523	14	
Part 2.TotalTime	57.134	(Insuf)	42.000	68.931	16	
Part 3.TotalTime	55.495	(Insuf)	44.653	70.907	17	
Part 4.TotalTime	48.484	(Insuf)	39.000	64.679	19	
Part 5.TotalTime	52.439	(Insuf)	39.000	69.104	20	
Part 6.TotalTime	52.414	(Insuf)	43.177	74.032	16	
DISCRETE-CHANGE VARIABLES	S Average H	alf Width	Minimum	Maximun	n Final V	alue
Machine 1.Utilization	.38000	(Insuf)	.00000	1.0000	.00000	
Machine 2. Utilization	.30924	(Insuf)	.00000	1.0000	1.0000	
Machine 3. Utilization	.34103	(Insuf)	.00000	1.0000	.00000	
Machine 4. Utilization	.25267	(Insuf)	.00000	1.0000	.00000	
Machine 5. Utilization	.44504	(Insuf)	.00000	1.0000	.00000	
Machine 6. Utilization	.46467	(Insuf)	.00000	1.0000	.00000	
Work Station 4.Queue.Number	InQueue	.02548	(Insuf)	.00000	1.0000	.00000
Work Station 5.Queue.Number	InQueue	.06961	(Insuf)	.00000	2.0000	.00000
Work Station 1.Queue.Number	InQueue	.04185	(Insuf)	.00000	2.0000	.00000
Work Station 6.Queue.Number	InQueue	.09441	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number	InQueue	.02537	(Insuf)	.00000	1.0000	1.0000
Work Station 3.Queue.Number	InQueue	.04820	(Insuf)	.00000	1.0000	.00000
OUTPUTS						
Identifier	Value					
Part 1.NumberOut	14.000					
Part 2.NumberOut	16.000	)				
Part 3.NumberOut	17.000	)				
Part 4.NumberOut	19.000	)				
Part 5.NumberOut	20.000	)				
Part 6.NumberOut	16.000	)				
Summary for Replication 8	of 20					
TALLY VARIABLES						
Identifier	Average H	alf Width	Minimum	Maximun	n Observ	rations
Part 1 TotalTime	44.065	(Insuf)	38,724	50,990	14	
Part 2 TotalTime	56 065	(Insuf)	40,000	71 863	13	
Part 3 TotalTime	52 623	(Insuf)	42 323	65 143	17	
Part 4 TotalTime	51 093	(Insuf)	41 000	67 853	19	
Part 5 TotalTime	51.676	(Insuf)	39,000	64 773	17	
Part 6 TotalTime	52 471	(Insuf)	38,000	71 564	20	
	52.471	(msur)	30.000	71.504	20	
DISCRETE-CHANGE VARIABLES	S Average U		Minimum	Maximum	n Final V	alua
	Average H		winimum	waximur		
Machine 1. Utilization	.37600	(Insuf)	.00000	1.0000	.00000	
Machine 2. Utilization	.30728	(Insuf)	.00000	1.0000	.00000	
Machine 3.Utilization	.30369	(Insuf)	.00000	1.0000	1.0000	
Machine 4. Utilization	.25891	(Insuf)	.00000	1.0000	.00000	
Machine 5. Utilization	.41887	(Insuf)	.00000	1.0000	1.0000	
Machine 6.Utilization	.50851	(Insuf)	.00000	1.0000	1.0000	
Work Station 4.Queue.Number	InQueue	.02703	(Insuf)	.00000	2.0000	.00000
Work Station 5.Queue.Number	InQueue	.05953	(Insuf)	.00000	1.0000	.00000
Work Station 1.Queue.Number	InQueue	.03808	(Insuf)	.00000	2.0000	.00000
Work Station 6.Queue.Number	InQueue	.12609	(Insuf)	.00000	2.0000	.00000
Work Station 2.Queue.Number	InQueue	.02076	(Insuf)	.00000	1.0000	.00000
work Station 3.Queue.Number	InQueue	.05978	(Insuf)	.00000	2.0000	.00000
OUTPUTS						
Identifier	Value					
Identifier Part 1.NumberOut	Value 14.000					
Identifier Part 1.NumberOut Part 2.NumberOut	Value 14.000 13.000	)				
Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut	Value 14.000 13.000 17.000	)				

## Summary for Replication 9 of 20

TALLY VARIABLES Identifier	Average I	Half Width	Minimum	Maximur	n Observ	ations	
Part 1.TotalTime	44.743	(Insuf)	34.000	57.046	16		
Part 2.TotalTime	55.378	(Insuf)	44.720	65.000	17		
Part 3.TotalTime	58.213	(Insuf)	48.889	70.535	14		
Part 4.TotalTime	51.248	(Insuf)	43.000	67.124	20		
Part 5.TotalTime	52.046	(Insuf)	40.011	83.620	14		
Part 6.TotalTime	57.227	(Insuf)	41.485	79.162	17		
	07.1227	(11041)			••		
DISCRETE-CHANGE VARIABLES Identifier	Average I	Half Width	Minimum	Maximur	n Final V	alue	
Machine 1.Utilization	.38133	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.34068	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.32195	(Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.25133	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.41269	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.49040	(Insuf)	.00000	1.0000	1.0000		
Work Station 4.Queue.NumberIn	nQueue	.01311	(Insuf)	.00000	1.0000	.00000	
Work Station 5.Queue.NumberIn	nQueue	.07497	(Insuf)	.00000	2.0000	.00000	
Work Station 1.Queue.NumberIn	nQueue	.03333	(Insuf)	.00000	1.0000	.00000	
Work Station 6.Queue.NumberIn	nQueue	.14270	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.NumberIn	nQueue	.05729	(Insuf)	.00000	2.0000	.00000	
Work Station 3.Queue.NumberIn	nQueue	.05181	(Insuf)	.00000	2.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	16.00	0					
Part 2.NumberOut	17.00	0					
Part 3.NumberOut	14.00	0					
Part 4.NumberOut	20.00	0					
Part 5.NumberOut	14.00	0					
Part 6.NumberOut	17.00	0					
Summary for Replication 10	of 20						
Summary for Replication 10	of 20						
Summary for Replication 10 TALLY VARIABLES Identifier	of 20 Average	Half Width	Minimum	Maximur	n Observ	ations	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime	Average I 44.609	Half Width (Insuf)	Minimum 34.864	Maximur 51.930	n Observ  19	ations	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime	Average I 44.609 55.302	Half Width (Insuf) (Insuf)	Minimum 34.864 40.000	Maximur 51.930 78.835	n Observ 19 19	ations	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime	Average I 44.609 55.302 51.385	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804	Maximur 51.930 78.835 68.259	n Observ 19 19 20	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average I 44.609 55.302 51.385 50.883	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000	Maximur 51.930 78.835 68.259 61.283	n Observ 19 19 20 14	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average I 44.609 55.302 51.385 50.883 59.707	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000	Maximur 51.930 78.835 68.259 61.283 79.342	n Observ 19 19 20 14 16	ations	
Summary for Replication 10         TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime	Average 1 44.609 55.302 51.385 50.883 59.707 48.874	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551	Maximur 51.930 78.835 68.259 61.283 79.342 57.930	n Observ 19 19 20 14 16 12	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average 1 44.609 55.302 51.385 50.883 59.707 48.874	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551	Maximur 51.930 78.835 68.259 61.283 79.342 57.930	n Observ 19 20 14 16 12	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur	n Observ 19 20 14 16 12 n Final V	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur	n Observ 19 20 14 16 12 n Final V	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .000000 00002	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000	n Observ 19 20 14 16 12 n Final V 1.0000 1.0000	ations	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2. Utilization Machine 2. Utilization	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000	n Observ 19 20 14 16 12 n Final V 1.0000 1.0000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000	n Observ 19 20 14 16 12 n Final V 1.0000 1.0000 00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 4.Utilization	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000	m Observ 19 19 20 14 16 12 m Final V 1.0000 1.0000 .00000 .00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V 1.0000 1.0000 .00000 .00000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V 1.0000 1.0000 .00000 .00000 1.0000	alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 19 19 20 14 16 12 n Final V 1.0000 1.0000 .00000 .00000 1.0000 2.0000 2.0000	ations alue	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (22246 .07250	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 19 19 20 14 16 12 n Final V 1.0000 1.0000 .00000 .00000 1.0000 2.0000 2.0000	ations alue .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue	Half Width (Insuf) (In	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000	n Observ 19 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 6.Queue.NumberIr	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (22246 .07250 .03327 .12171	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V 1.0000 1.0000 .00000 .00000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 1.0000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V 1.0000 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	Average I 44.609 55.302 51.385 50.883 59.707 48.874 Average I .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	n Observ 19 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000	ations alue .00000 .00000 .00000 1.0000 .00000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut	Average I 44.609 55.302 51.385 50.883 59.707 48.874 Average I .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	n Observ 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 3.NumberOut	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue nQueue NQUeue NQUE NQUE NQUE NQUE NQUE NQUE NQUE NQUE	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	n Observ 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 4.NumberOut Part 4.NumberOut Part 4.NumberOut	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue nQueue NQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000	alue .00000 .00000 .00000 1.0000 .00000 .00000	
Summary for Replication 10 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 5.Num	Average 1 44.609 55.302 51.385 50.883 59.707 48.874 Average 1 .36241 .34647 .31200 .24533 .43867 .48600 nQueue nQueue nQueue nQueue nQueue nQueue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUeue NQUE NQUE NQUE NQUE NQUE NQUE NQUE NQUE	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (2246 .07250 .03327 .12171 .04849 .02542	Minimum 34.864 40.000 39.804 41.000 39.000 38.551 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximur 51.930 78.835 68.259 61.283 79.342 57.930 Maximur 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 19 20 14 16 12 n Final V 1.0000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 1.0000 1.0000 1.0000	alue	

## Summary for Replication 11 of 20

Identifier	Average H	Half Width	Minimum	Maximum	n Observ	ations	
Part 1.TotalTime	45.870	(Insuf)	40.000	52.495	16		
Part 2.TotalTime	55.255	(Insuf)	41.869	65.972	17		
Part 3.TotalTime	53.547	(Insuf)	38.000	75.815	18		
Part 4.TotalTime	52.500	(Insuf)	37.000	66.410	21		
Part 5.TotalTime	51.124	(Insuf)	42.808	57.106	13		
Part 6.TotalTime	53.724	(Insuf)	37.201	72.349	17		
DISCRETE-CHANGE VARIABLES Identifier	Average H	Half Width	Minimum	Maximum	n Final Va	alue	
Machine 1.Utilization	.35933	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.32660	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.31281	(Insuf)	.00000	1.0000	.00000		
Machine 4.Utilization	.25733	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.43614	(Insuf)	.00000	1.0000	.00000		
Work Station 4 Quoue Numberly	.40943	(IIISUI) 02102	.00000 (Incuf)	00000	1.0000	00000	
Work Station 5 Oueue Number	noueue	07837	(Insuf)	00000	2 0000	00000	
Work Station 1 Oueue Number	noueue	.04542	(Insuf)	.00000	2.0000	.00000	
Work Station 6.Queue.NumberIr	nQueue	.13448	(Insuf)	.00000	2.0000	.00000	
Work Station 2.Queue.NumberIr	nQueue	.03194	(Insuf)	.00000	1.0000	.00000	
Work Station 3.Queue.NumberIr	nQueue	.03726	(Insuf)	.00000	1.0000	.00000	
OUTPUTS							
Identifier	Value						
Part 1.NumberOut	16.000	 Э					
Part 2.NumberOut	17.000	C					
Part 3.NumberOut	18.00	C					
Part 4.NumberOut	21.00	C					
Part 5.NumberOut Part 6.NumberOut	13.000 17.000	) )					
Summary for Replication 12	of 20						
<b>J</b>							
TALLY VARIABLES	Avorago	Jalf Width	Minimum	Maximum	Obsory	ations	
TALLY VARIABLES Identifier	Average H	Half Width	Minimum	Maximum	ו Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H 45.093	Half Width	Minimum 34.000	Maximum 54.176	n Observ 11	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 45.093 55.347	Half Width (Insuf) (Insuf)	Minimum 34.000 44.000	Maximum 54.176 66.726	1 Observ 11 19	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 45.093 55.347 53.394	Half Width (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819	Maximum 54.176 66.726 69.420	11 19 19	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average 45.093 55.347 53.394 51.236	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 20.000	Maximum 54.176 66.726 69.420 63.858 (410)	11 19 19 14	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 45.093 55.347 53.394 51.236 52.649	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.730	Maximum 54.176 66.726 69.420 63.858 64.106 62.776	1 Observ 11 19 19 14 21	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 45.093 55.347 53.394 51.236 52.649 55.998	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729	Maximum 54.176 66.726 69.420 63.858 64.106 63.776	11 19 19 14 21 18	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES	Average 45.093 55.347 53.394 51.236 52.649 55.998	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729	Maximum 54.176 66.726 69.420 63.858 64.106 63.776	11 19 19 14 21 18	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 45.093 55.347 53.394 51.236 52.649 55.998 Average 4	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.000 41.819 43.000 39.000 46.729 Minimum	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum	11 19 19 14 21 18 18	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average + 45.093 55.347 53.394 51.236 52.649 55.998 Average + .41006	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000	11 19 19 14 21 18 Final Va 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 34.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000	11 19 19 14 21 18 Final Va 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	Average + 45.093 55.347 53.394 51.236 52.649 55.998 Average + .41006 .33133 .37200	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final Va 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization	Average + 45.093 55.347 53.394 51.236 52.649 55.998 Average + .41006 .33133 .37200 .23999	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization	Average + 45.093 55.347 53.394 51.236 52.649 55.998 Average + .41006 .33133 .37200 .23999 .45134	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .4887 .4887	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 5.Oueue NumberIr Work Station 5.Oueue NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 DQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 00000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000	ations alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 5.Queue.NumberIr Work Station 1.Queue NumberIr Work Station 1.Queue NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue	Half Width (Insuf) (0.0801 0.08041 0.02638	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .000000 .000000 .00000 .00000 .00000 .000000 .000000 .000000 .000000 .000000 .00000 .000000 .000000 .000000 .0000000 .0000000 .00000000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000	ations alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 6.Queue.NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .000000 .000000 .0000000 .0000000 .00000000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 Dueue Dueue Dueue Dueue	Half Width (Insuf) (2638 (12074) (03427)	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final V: 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average + 45.093 55.347 53.394 51.236 52.649 55.998 Average + .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 34.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	11 19 19 14 21 18 Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (1nsuf) (1nsuf) (1nsuf) (2638 .12074 .03427 .06846	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 Final Va 1.0000 .00000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 2.Utilization         Machine 3.Utilization         Machine 6.Utilization         Machine 6.Utilization         Work Station 1.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQUEUE NQUE N NQUEUE N NQUE N N N N N N N N N N N N N N N N N N N	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 • Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 2.Utilization         Machine 3.Utilization         Machine 5.Utilization         Machine 6.Utilization         Work Station 1.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier         Part 1.NumberOut         Part 2.NumberOut         Part 3.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE NU NU NU NU NU NU NU NU NU NU NU NU NU	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 • Final Va 1.0000 .00000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 2.Utilization         Machine 3.Utilization         Machine 6.Utilization         Machine 6.Utilization         Work Station 1.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier         Part 1.NumberOut         Part 2.NumberOut         Part 3.NumberOut         Part 4.NumberOut         Part 4.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQue nQ	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 • Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES         Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 2.Utilization         Machine 3.Utilization         Machine 6.Utilization         Machine 6.Utilization         Work Station 1.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier         Part 1.NumberOut         Part 2.NumberOut         Part 3.NumberOut         Part 4.NumberOut         Part 5.NumberOut         Part 5.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQue nQ	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	11 19 19 14 21 18 • Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier         Part 1.TotalTime         Part 2.TotalTime         Part 3.TotalTime         Part 4.TotalTime         Part 5.TotalTime         Part 6.TotalTime         Part 6.TotalTime         DISCRETE-CHANGE VARIABLES         Identifier         Machine 1.Utilization         Machine 2.Utilization         Machine 3.Utilization         Machine 6.Utilization         Machine 6.Utilization         Work Station 5.Queue.NumberIr         Work Station 1.Queue.NumberIr         Work Station 2.Queue.NumberIr         Work Station 3.Queue.NumberIr         Work Station 3.Queue.NumberIr         OUTPUTS         Identifier         Part 1.NumberOut         Part 2.NumberOut         Part 3.NumberOut         Part 4.NumberOut         Part 5.NumberOut         Part 5.NumberOut         Part 6.NumberOut	Average H 45.093 55.347 53.394 51.236 52.649 55.998 Average H .41006 .33133 .37200 .23999 .45134 .48873 nQueue nQue nQ	Half Width (Insuf) (In	Minimum 34.000 44.000 41.819 43.000 39.000 46.729 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum 54.176 66.726 69.420 63.858 64.106 63.776 Maximum 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	11 19 19 14 21 18 • Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	

## Summary for Replication 13 of 20

Identifier	Average I	Half Width	Minimum	Maximun	n Observ	ations	
Part 1.TotalTime	45.816	(Insuf)	34.000	57.480	14		
Part 2.TotalTime	56.326	(Insuf)	40.000	76.677	24		
Part 3.TotalTime	54.848	(Insuf)	42.234	72.402	17		
Part 4.TotalTime	52.772	(Insuf)	46.000	66.438	17		
Part 5.TotalTime	53.018	(Insuf)	43.000	72.502	16		
Part 6.TotalTime	56.647	(Insuf)	45.809	73.649	13		
DISCRETE-CHANGE VARIABLES Identifier	Average I	Half Width	Minimum	Maximun	n Final V	alue	
Machine 1.Utilization	.38480	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.34340	(Insuf)	.00000	1.0000	1.0000		
Machine 3. Utilization	.32715	(Insuf)	.00000	1.0000	1.0000		
Machine 4. Utilization	.26467	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.44133	(Insuf)	.00000	1.0000	.00000		
Machine 6.Utilization	.49978	(Insuf)	.00000	1.0000	1.0000		
Work Station 4.Queue.NumberIr	nQueue	.02417	(Insuf)	.00000	2.0000	.00000	
Work Station 5.Queue.NumberIn	nQueue	.09296	(Insuf)	.00000	2.0000	.00000	
Work Station 6 Queue Number		.03393	(Insul) (Insuf)	.00000	2.0000	.00000	
Work Station 2 Queue Number		02511	(Insuf)	00000	2.0000	.00000	
Work Station 3 Oueue Number	Oueue	.08304	(Insuf)	.00000	3.0000	.00000	
	- 20040		(		2.0000		
OUTPUTS Identifier	Value						
Part 1.NumberOut	14.00	0					
Part 2.NumberOut	24.00	0					
Part 3.NumberOut	17.00	0					
Part 4.NumberOut	17.00	0					
Part 5.NumberOut	16.00	0					
Part 6.NumberOut	13.00	0					
Summary for Replication 14	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average I	Half Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H 43.020	Half Width (Insuf)	Minimum 35.214	Maximun 50.325	n Observ 10	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average 43.020 56.413	Half Width (Insuf) (Insuf)	Minimum 35.214 40.000	Maximun 50.325 71.468	n Observ 	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average 43.020 56.413 55.854	Half Width (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021	Maximun 50.325 71.468 78.827	10 10 19 22	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average 4 43.020 56.413 55.854 52.771	Half Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000	Maximun 50.325 71.468 78.827 66.191	10 19 22 17	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average 43.020 56.413 55.854 52.771 53.366	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 22.152	Maximun 50.325 71.468 78.827 66.191 66.988 (2.545	10 19 22 17 21	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 43.020 56.413 55.854 52.771 53.366 52.771	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 38.159	Maximun 50.325 71.468 78.827 66.191 66.988 63.565	10 19 22 17 21 13	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun	n Observ 10 19 22 17 21 13	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun	n Observ 10 19 22 17 21 13 n Final V	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000	n Observ 10 19 22 17 21 13 n Final V .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5. Utilization	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261 .23200	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 1.0000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261 .23200 .45184 51222	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 1.0000 .00000 .00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 1.Queue Number	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261 .23200 .45184 .51333	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 1.0000 .00000 .00000 .00000 .00000	alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue NumberIr	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261 .23200 .45184 .51333	Half Width (Insuf) (In	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 1.0000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	ations alue .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue NumberIr	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (3259 .03889 .06971	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 1.0000 .00000 .00000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 Dueue Dueue Dueue	Half Width (Insuf) (In	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr	Average 4 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.3259 .03889 .06971 .02176 .09070	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 1.0000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 03259 .03889 .06971 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr	Average 43.020 56.413 55.854 52.771 53.366 52.771 Average 4 .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue Dueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) 0.3259 0.3889 0.69711 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberQut	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 2.NumberOut Part 2.NumberOut	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 3.NumberOut	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.NumberOut Part 4.NumberOut	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue n n n n n n n n n n n n n n n n n n	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 3.NumberOut Part 5.NumberOut Part 5.NumberOut Part 5.NumberOut	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue n n n n n n n n n n n n n n n n n n	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 6.Queue.NumberIr Work Station 6.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 6.NumberOut Part 6.	Average H 43.020 56.413 55.854 52.771 53.366 52.771 Average H .37467 .33000 .37261 .23200 .45184 .51333 nQueue n n n n n n n n n n n n n n n n n n	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03259 .03889 .06971 .02176 .09070 .12943	Minimum 35.214 40.000 43.021 43.000 39.000 38.159 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 50.325 71.468 78.827 66.191 66.988 63.565 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	n Observ 10 19 22 17 21 13 n Final V. .00000 .00000 .00000 .00000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	

## Summary for Replication 15 of 20

Identifier	Average H	alf Width	Minimum	Maximun	n Observ	ations	
Part 1.TotalTime	44.941	(Insuf)	36.000	51.215	12		
Part 2.TotalTime	57.493	(Insuf)	42.000	74.713	27		
Part 3.TotalTime	54.500	(Insuf)	44.059	62.346	9		
Part 4.TotalTime	51.165	(Insuf)	39.000	64.912	18		
Part 5.TotalTime	58.901	(Insuf)	42.000	75.720	15		
Part 6.TotalTime	57.448	(Insuf)	41.367	70.292	19		
DISCRETE-CHANGE VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Final Va	alue	
Machine 1.Utilization	.39930	(Insuf)	.00000	1.0000	.00000		
Machine 2. Utilization	.33772	(Insuf)	.00000	1.0000	.00000		
Machine 3. Utilization	.31467	(Insuf)	.00000	1.0000	.00000		
Machine 4. Utilization	.25733	(Insuf)	.00000	1.0000	.00000		
Machine 5. Utilization	.46263	(Insuf)	.00000	1.0000	.00000		
Machine 6. Utilization	.50702	(Insuf)	.00000	1.0000	1.0000	00000	
Work Station 4. Queue. Number In		.02292	(Insur)	.00000	1.0000	.00000	
Work Station 5. Queue Number In		.11213	(Insul)	.00000	2.0000	.00000	
Work Station 6 Queue Number		.03578	(Insul) (Insuf)	.00000	2.0000	.00000	
Work Station 2 Queue Number		01613	(Insuf)	00000	1 0000	00000	
Work Station 3 Queue Number		06775	(Insuf)	00000	2 0000	00000	
Work Station 3. 2000c. Numbern		.00775	(msur)	.00000	2.0000	.00000	
OUTPUTS Identifier	Value						
Part 1.NumberOut	12.000	)					
Part 2.NumberOut	27.000	)					
Part 3.NumberOut	9.000	)					
Part 4.NumberOut	18.000	)					
Part 5.NumberOut	15.000	)					
Part 6.NumberOut	19.000	)					
Summary for Replication 16	of 20						
TALLY VARIABLES							
TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximun	n Observ	ations	
TALLY VARIABLES Identifier Part 1.TotalTime	Average H	lalf Width (Insuf)	Minimum 34.000	Maximun 52.852	n Observ 16	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	Average H 41.992 55.347	lalf Width (Insuf) (Insuf)	Minimum 34.000 44.557	Maximun 52.852 78.018	n Observ 16 14	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime	Average H 41.992 55.347 51.950	lalf Width (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181	Maximun 52.852 78.018 76.276	n Observ 16 14 15	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	Average H 41.992 55.347 51.950 52.089	lalf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861	Maximun 52.852 78.018 76.276 66.479	n Observ 16 14 15 16	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime	Average H 41.992 55.347 51.950 52.089 53.664	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000	Maximun 52.852 78.018 76.276 66.479 75.000	n Observ 16 14 15 16 19	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	Average 41.992 55.347 51.950 52.089 53.664 53.779	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313	Maximun 52.852 78.018 76.276 66.479 75.000 67.051	n Observ 16 14 15 16 19 20	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) lalf Width	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun	n Observ 16 14 15 16 19 20 n Final Va	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun	n Observ 16 14 15 16 19 20 n Final Va	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2. Utilization	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) Half Width (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 .00000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 4.Utilization	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 .00000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5. Utilization	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 42457	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 1.0000 1.0000 1.0000 1.0000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 6.Utilization	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 47122	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 .00000 1.0000 0.00000 1.0000 0.00000	ations	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 4.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 .00000 1.0000 .00000 1.0000 1.0000	alue	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133	Half Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 00000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	ations alue .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 Queue DQueue	lalf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (04208 04238	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 00000	n Observ 16 14 15 16 19 20 n Final V: 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000	ations alue .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 Dueue Dueue Dueue	lalf Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .000000 .0000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 2.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 Dueue Dueue Dueue Dueue	lalf Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .0000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue	Half Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .0000000 .0000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue nQueue	lalf Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .000000 .0000000 .000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQUEUE NQUEUE	Half Width (Insuf) (In	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .000000 .000000 .0000000 .0000000 .00000000	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 5.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUEUE	Half Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE N N N N N N N N N N N N N N N N N N N	Half Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Port 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 4.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE N N N N N N N N N N N N N N N N N N N	Half Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 5.NumberOut Part 5.NumberOut Part 5.NumberOut	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUE N NQUE N NQUE N NQUE N N N N N N N N N N N N N N N N N N N	Half Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000	
TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut Part 4.NumberOut Part 6.NumberOut Part 6.NumberOu	Average H 41.992 55.347 51.950 52.089 53.664 53.779 Average H .36038 .31867 .32117 .23800 .42657 .47133 nQueue n n n n n n n n n n n n n n n n n n	Half Width         (Insuf)	Minimum 34.000 44.557 41.181 45.861 44.000 40.313 Minimum .00000 .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximun 52.852 78.018 76.276 66.479 75.000 67.051 Maximun 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	n Observ 16 14 15 16 19 20 n Final Va 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000 2.0000 2.0000	ations alue .00000 .00000 .00000 .00000 .00000 .00000 .00000	

## Summary for Replication 17 of 20

TALLY VARIABLES		16 14 11			
Identifier	Average H	alf Width	Minimum	Maximum Obse	ervations
Part 1 TotalTime	47 011	(Insuf)	34 234	63 573 9	
Part 2 TotalTime	53,503	(Insuf)	39.562	65.965 14	
Part 3.TotalTime	50.816	(Insuf)	39.000	71.377 18	
Part 4.TotalTime	51.273	(Insuf)	39.296	61.607 22	
Part 5.TotalTime	54.766	(Insuf)	43.126	64.214 21	
Part 6.TotalTime	53.550	(Insuf)	42.561	68.697 17	
DISCRETE-CHANGE VARIABLES					
Identifier	Average H	alf Width	Minimum	Maximum Fina	Value
Machine 1. Utilization	.39917	(Insuf)	.00000	1.0000 1.000	0
Machine 2. Utilization	.31915	(Insuf)	.00000	1.0000 .0000	0
Machine 3. Utilization	.35318	(Insuf)	.00000	1.0000 1.000	0
Machine 4. Utilization	.22867	(Insuf)	.00000	1.0000 .0000	0
Machine 5. Utilization	.43954	(Insuf)	.00000	1.0000 1.000	0
Machine 6. Utilization	.50724	(Insuf)	.00000	1.0000 1.000	0
Work Station 4.Queue.NumberIr	nQueue	.01429	(Insuf)	.00000 1.0000	.00000
Work Station 5.Queue.NumberIr	nQueue	.07393	(Insuf)	.00000 2.0000	.00000
Work Station 1.Queue.NumberIr	nQueue	.02814	(Insuf)	.00000 2.0000	.00000
Work Station 6.Queue.NumberIr	nQueue	.11765	(Insuf)	.00000 2.0000	.00000
Work Station 2.Queue.NumberIr	nQueue	.04381	(Insuf)	.00000 2.0000	.00000
Work Station 3.Queue.NumberIr	nQueue	.08176	(Insuf)	.00000 3.0000	.00000
			· · ·		
OUTPUTS					
Identifier	Value				
Part 1.NumberOut	9.0000				
Part 2.NumberIn	15.000				
Part 2.NumberOut	14.000				
Part 3.NumberOut	18.000				
Part 4.NumberOut	22.000				
Part 5.NumberOut	21.000				
Part 5.NumberOut Part 6.NumberOut	21.000 17.000				
Part 5.NumberOut Part 6.NumberOut	21.000 17.000				
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18	21.000 17.000 of 20				
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES	21.000 17.000 of 20				
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier	21.000 17.000 of 20 Average H	alf Width	Minimum	Maximum Obse	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier	21.000 17.000 of 20 Average H	alf Width	Minimum	Maximum Obse	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	21.000 17.000 of 20 Average H 46.351	alf Width (Insuf)	Minimum 34.000	Maximum Obse	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154	alf Width (Insuf) (Insuf)	Minimum 34.000 44.000	Maximum Obse 55.769 15 72.506 17	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494	alf Width (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000	Maximum Obse 55.769 15 72.506 17 64.768 20 (5.701 10	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949	alf Width (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 20.000	Maximum Obse 55.769 15 72.506 17 64.768 20 65.791 18 89.002 12	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 5.TotalTime Part 5.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.200	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 27.030	Maximum Obse 55.769 15 72.506 17 64.768 20 65.791 18 88.603 13 47.96 10	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19	ervations
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum	Maximum Obse 55.769 15 72.506 17 64.768 20 65.791 18 88.603 13 67.863 19 Maximum Fina	Value
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Final	Value
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000	Value
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.494 51.949 58.042 52.399 Average H .38267 .32781	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.0000	Value
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.0000           1.0000         .00000	Value
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.0000           1.0000         .0000           1.0000         .0000	Value
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000	Value
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 .00000	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         1.000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000	Value 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .00000           1.0000         .00000           0.00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 5.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .00000           1.0000         .00000           1.0000         .00000           1.0000         .00000           1.0000         .00000           0.00000         2.0000           .000000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 6.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03439 .05171 .03522	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 6.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (03439 .05171 .03522 .15524	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         2.0000           .00000         3.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03439 .05171 .03522 .15524 .03218	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         3.0000           .00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 3.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03439 .05171 .03522 .15524 .03218 .07265	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03439 .05171 .03522 .15524 .03218 .07265	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIn Work Station 1.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 2.Queue.NumberIn Work Station 3.Queue.NumberIn	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03439 .05171 .03522 .15524 .03218 .07265	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 3.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 5.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 2.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03439 .05171 .03522 .15524 .03218 .07265	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Part 5.NumberOut Part 6.NumberOut Summary for Replication 18 TALLY VARIABLES Identifier Part 1.TotalTime Part 2.TotalTime Part 3.TotalTime Part 4.TotalTime Part 5.TotalTime Part 6.TotalTime DISCRETE-CHANGE VARIABLES Identifier Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Machine 6.Utilization Work Station 4.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 1.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr Work Station 3.Queue.NumberIr	21.000 17.000 of 20 Average H 46.351 55.154 51.494 51.949 58.042 52.399 Average H .38267 .32781 .31445 .24723 .42778 .50333 nQueue nQueue nQueue nQueue nQueue nQueue NQueue NQueue	alf Width (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .03439 .05171 .03522 .15524 .03218 .07265	Minimum 34.000 44.000 41.000 40.292 39.000 37.970 Minimum .00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	Maximum         Observation           55.769         15           72.506         17           64.768         20           65.791         18           88.603         13           67.863         19           Maximum         Fina           1.0000         .0000           1.0000         1.000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           1.0000         .0000           0.0000         2.0000           .00000         2.0000           .00000         2.0000           .00000         2.0000	Value 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Part 1.NumberOut	15.000
Part 2.NumberOut	17.000
Part 3.NumberOut	20.000
Part 4.NumberOut	18.000
Part 5.NumberOut	13.000
Part 6.NumberOut	19.000

# Summary for Replication 19 of 20

TALLY VARIABLES Identifier	Average H	lalf Width	Minimum	Maximur	n Observ	ations	
Part 1.TotalTime	46.220	(Insuf)	39.843	56.734	14		
Part 2.TotalTime	54.942	(Insuf)	41.808	68.841	17		
Part 3.TotalTime	55.836	(Insuf)	44.000	81.003	19		
Part 4.TotalTime	48.950	(Insuf)	41.000	65.000	18		
Part 5.TotalTime	53.582	(Insuf)	41.328	85.879	17		
Part 6.TotalTime	57.288	(Insuf)	40.542	69.656	14		
DISCRETE-CHANGE VARIABLES Identifier	S Average H	lalf Width	Minimum	Maximur	m Final V	alue	
Machino 1 Utilization	26122	(Incuf)	00000	1 0000	00000		
Machine 2 Utilization	.30133	(Insuf)	00000	1.0000	00000		
Machine 3 Utilization	32708	(Insuf)	00000	1.0000	1 0000		
Machine 4 Utilization	24267	(Insuf)	00000	1.0000	00000		
Machine 5 Utilization	44643	(Insuf)	00000	1.0000	1 0000		
Machine 6 Utilization	48400	(Insuf)	00000	1.0000	00000		
Work Station 4 Queue Number	InQueue	02639	(Insuf)	00000	2 0000	00000	
Work Station 5 Queue Number	InQueue	08527	(Insuf)	00000	2,0000	00000	
Work Station 1 Oueue Number	InQueue	02836	(Insuf)	.00000	2,0000	.00000	
Work Station 6 Queue Number	InOueue	.10419	(Insuf)	.00000	2.0000	.00000	
Work Station 2. Queue Number	InOueue	.04778	(Insuf)	.00000	1.0000	.00000	
Work Station 3.Queue.NumberI	InQueue	.08249	(Insuf)	.00000	2.0000	.00000	
OUTDUTS							
Identifier	Value						
	-						
Part 1.NumberOut	14.000	)					
Part 2.NumberOut	17.000	)					
Part 3.NumberOut	19.000	)					
Part 4.NumberOut	18.000	)					
Part 5.NumberOut	17.000	)					
Part 6.NumberOut	14.000	)					
Summary for Replication 20	) of 20						
TALLY VARIABLES							
Identifier	Average H	lalf Width	Minimum	Maximur	m Observ	ations	
Part 1 TotalTime	13 824	(Insuf)	33 340	5/ 28/	15		
Part 2 TotalTime	40.000 51 251	(Insul)	15 000	54.304 60 50 <i>1</i>	15		
Part 3 TotalTime	54.501 51 Q14	(Insul)	43.000	72 026	10		
Part / TotalTime	51.010	(Insuf)	43.000 30 000	77 074	13 22		
Part 5 TotalTime	JU.000 52 00F	(IIISUI) (Incuf)	37.000 11 200	11.070 68.014	∠∠ )1		
Part 6 TotalTime	00.070 51.070	(Insul)	44.000 12 020	00.040 7/ 211	∠ I 1 /		
rait 0.10tdi111110	54.813	(msur)	43.829	14.311	14		
DISCRETE-CHANGE VARIABLES	S	- 16 14/2 11	N dias in	N		- 1	
Identifier	A	iait width	IVIINIMUM	waximur	n ⊧inal V	alue	
	Average F						
Machine 1.Utilization	Average F .33594	(Insuf)	.00000	1.0000	1.0000		
Machine 1.Utilization Machine 2.Utilization	Average F 	(Insuf) (Insuf)	.00000	1.0000 1.0000	1.0000		
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization	Average F .33594 .33400 .33800	(Insuf) (Insuf) (Insuf)	.00000 .00000 .00000	1.0000 1.0000 1.0000	1.0000 .00000 .00000		
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization	Average F .33594 .33400 .33800 .24867	(Insuf) (Insuf) (Insuf) (Insuf)	.00000 .00000 .00000 .00000	1.0000 1.0000 1.0000 1.0000	1.0000 .00000 .00000 .00000		
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization	Average F .33594 .33400 .33800 .24867 .44803	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	.00000 .00000 .00000 .00000 .00000	1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 .00000 .00000 .00000 1.0000		
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization	Average F .33594 .33400 .33800 .24867 .44803 .45667	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	.00000 .00000 .00000 .00000 .00000 .00000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 .00000 .00000 .00000 1.0000 .00000		
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberI	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776	.00000 .00000 .00000 .00000 .00000 .00000 (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 .00000	1.0000 .00000 .00000 .00000 1.0000 1.0000 1.0000	.00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberI Work Station 5.Queue.NumberI	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092	.00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000	.00000 1.0000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.Numberl Work Station 5.Queue.Numberl Work Station 1.Queue.Numberl	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392	.00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	.00000 1.0000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.Numberl Work Station 5.Queue.Numberl Work Station 1.Queue.Numberl Work Station 6.Queue.Numberl	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .10219	.00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000	.00000 1.0000 .00000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.Numberl Work Station 5.Queue.Numberl Work Station 1.Queue.Numberl Work Station 6.Queue.Numberl Work Station 2.Queue.Numberl	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue InQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .10219 .04409	.00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000	.00000 1.0000 .00000 .00000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberI Work Station 5.Queue.NumberI Work Station 1.Queue.NumberI Work Station 6.Queue.NumberI Work Station 2.Queue.NumberI Work Station 3.Queue.NumberI	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue InQueue InQueue InQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .10219 .04409 .07656	.00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 .00000 .00000 .00000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	.00000 1.0000 .00000 .00000 .00000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.Numberl Work Station 5.Queue.Numberl Work Station 1.Queue.Numberl Work Station 6.Queue.Numberl Work Station 3.Queue.Numberl OUTPUTS	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue InQueue InQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .02392 .0219 .04409 .07656	.00000 .00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00000 0.00000 0.00000 0.00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	.00000 1.0000 .00000 .00000 .00000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Work Station 4.Queue.Numberl Work Station 5.Queue.Numberl Work Station 1.Queue.Numberl Work Station 6.Queue.Numberl Work Station 3.Queue.Numberl OUTPUTS Identifier	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue InQueue InQueue InQueue InQueue NQueue	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .10219 .04409 .07656	.00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 00000 .00000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	.00000 1.0000 .00000 .00000 .00000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.NumberI Work Station 5.Queue.NumberI Work Station 1.Queue.NumberI Work Station 2.Queue.NumberI Work Station 3.Queue.NumberI OUTPUTS Identifier Part 1.NumberOut	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue InQueue InQueue NQueue Value	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .10219 .04409 .07656	.00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 00000 .00000 .00000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	.00000 1.0000 .00000 .00000 .00000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.Numberl Work Station 5.Queue.Numberl Work Station 1.Queue.Numberl Work Station 2.Queue.Numberl Work Station 3.Queue.Numberl OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue InQueue InQueue NQueue Value Value	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .10219 .04409 .07656	.00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	.00000 1.0000 .00000 .00000 .00000 .00000	
Machine 1.Utilization Machine 2.Utilization Machine 3.Utilization Machine 4.Utilization Machine 5.Utilization Machine 6.Utilization Work Station 4.Queue.Numberl Work Station 5.Queue.Numberl Work Station 1.Queue.Numberl Work Station 2.Queue.Numberl Work Station 3.Queue.Numberl OUTPUTS Identifier Part 1.NumberOut Part 2.NumberOut Part 3.NumberOut	Average F .33594 .33400 .33800 .24867 .44803 .45667 InQueue InQueue InQueue InQueue InQueue InQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQueue NQUEUE NQUEUE	(Insuf) (Insuf) (Insuf) (Insuf) (Insuf) .02776 .06092 .02392 .10219 .04409 .07656	.00000 .00000 .00000 .00000 (Insuf) (Insuf) (Insuf) (Insuf) (Insuf)	1.0000 1.0000 1.0000 1.0000 1.0000 .00000 .00000 .00000 .00000 .00000	1.0000 .00000 .00000 1.0000 1.0000 1.0000 1.0000 1.0000 2.0000 2.0000 2.0000	.00000 1.0000 .00000 .00000 .00000 .00000	

Part 5.NumberOut22.000Part 5.NumberOut21.000Part 6.NumberOut14.000

# APPENDIX D

Example of Summary for Result from Simulation

# APPENDIX E Sequence Codification Scheme (SCS) Adopted Form Lawrence (1994)

The first devised SCS represents any given machine by using a pair of numbers: +1 and -1. Thus, machine A is represented by (-1, -1), machine B by (-1, +1), machine C by (+1, -1), and machine D by (+1, +1). Table 4-2 illustrates how a job shop situation is mapped into this SCS. The application of this procedure to all possible job types and machines required a total of 26 digits.

The second scheme takes into account the type of job and the number of operations required by each job type. A '+1' represents an 'active' machine for that operation, while a '-1' indicates that the corresponding machine is 'inactive' or 'not used' for a given operation. For instance, if the first operation for job type 1 is to be performed on machine A, it is then represented by (+1, -1, -1). This means that machine A is the workcenter used for that operation, while machines B and C are not. If such an operation is instead performed on machine B, then, the resulting sequence code would be (-1, +1, -1). This SCS requires a total of 43 digits to represent any given sequence (Table 4-3).

A third approach consists of enumerating the whole set of 5184 possible machine sequences. Sequences were alphabetically ordered, i.e. sequence #1: ABC-ABCD-BCDABD, sequence #2: ABC-ABCD-BCD-ADB, and so on. After sorting the data, the order number corresponding to each sequence, i.e. a number between 1 and 5184 is converted into its equivalent binary number. In this way, each machine sequence is identified by a unique binary quantity. Finally, all '0's" in the binary code are replaced by '-1's'. Here, 13 digits are enough to represent any possible combination of sequences (Table 4-4).

Job No.	Sequence	Codification (SCS 1)
1	A-C-B	-1,-1;1,-1;-1,1
2	B-C-A-D	-1,1;1,-1;-1,-1;1,1
3	B-C-D	-1,1;1,-1;1,1
4	D-B-A	1,1;-1,1;-1-1

Table 4-2, SCS 1 – Problem mapping

Table 4-3, SCS 2 – Problem mapping

Job No.	Sequence	Codification (SCS 1)
1	A-C-B	1,-1,-1;-1,-1,1;-1,1,-1
2	B-C-A-D	-1,1,-1,-1;-1,-1,1,-1;1,-1,-1,-1;-1,-1,-1,1
3	B-C-D	-1,1,-1;-1,-1,1;-1,-1,1
4	D-B-A	-1,-1,1;-1,1,-1;1,-1,-1

Table 4-4, SCS 3 – Problem mapping

Sequence	Order	Order (binary)	Codification (SCS 1)
ABC-ABCD-BCD-ABD	1	0000000000001	-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,1
ABC-BADC-BDC-DAB	263	0001000000111	-1,-1,-1,1,-1,-1,-1,-1,-1,1,1,1,1
CBA-ACBD-CDB-DBA	4416	1000101000000	1,-1,-1,-1,-1,1,-1, -1, -1, -1, -1, -1,
CBA-DCBA-DCB-DBA	5184	1010001000000	1,-1,1, -1, -1, -1, 1, -1, -1, -1, -1, -