NEW INSIGHTS ON THE BLOCKING FLOW SHOP PROBLEM

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Abstract: We present some results attained with different algorithms for the Fm|block|C_{max} problem using as experimental data the well-known Taillard instances.

Keywords: Scheduling, heuristic algorithms, blocking flow shop.

1. **Introduction**.

This work deals with the permutation flow-shop scheduling problem without storage space between stages. If there is enough storage space between machine j and machine j+1, the job i can wait there for the next operation, machine j is released and can work on another job. But, if there is no storage space between stages, then intermediate queues of jobs waiting in the system for their next operation are not allowed. If operation on machine j for a job i is finished and the next machine, j+1, is still busy on the previous job, the completed job i has to be blocked into machine j. For simplicity purposes we call BFSP (blocking flow shop problem) the problem considered and PFSP (permutation flow shop problem) the equivalent case with unlimited storage space.

The most common criterion, here considered, is the minimization of the makespan or maximum completion time. Using notation of proposed by Graham et al. (1979) the problem is denoted by Fm|block|C_{max} (and Fm|prmu|C_{max} the PFSP).

Hall and Sriskandarajah (1996) published a review on flow shop with blocking and no-wait in-process. If the number of machines is two, Reddi and Ramamoorthy (1972) showed there exists a polynomial algorithm, which gives an exact solution for the BFSP. The problem F2|block|C_{max} can be reduced to a travelling salesman problem (TSP) with n+1 towns (0, 1, 2, ..., n). The sequence of towns in an optimal path corresponds to an optimal permutation for the original problem. Gilmore and Gomory (1964) proposed a polynomial algorithm to solve this problem that is $O(n \log n)$ time (Gilmore *et al.* (1985)). Hall and Sriskandarajah (1996) showed, using a result from Papadimitriou and Kanellakis (1980), that Fm|block|C_{max} problem for $m \geq 3$ machines is strongly NP-hard. Débora P. Ronconi (2004) proposes several heuristics for Fm|block|C_{max}, two of them based on NEH. Using an elaborated lower bound Ronconi (2005) presents a branch-and-bound algorithm; this algorithm becomes a heuristic because the CPU time of a run is limited. Józef Grabowski and Jaroslaw Pempera (2.007) develop a tabu search algorithm. A more detailed state of the art can be found in Companys et al. (to be published).

1.1 Problem description.

At time zero, n jobs must be processed, in the same order, on each of m machines. Each job goes from machine 1 to machine m. The processing time for each operation is $p_{j,i}$, where $j \in \{1, 2, \ldots, m\}$ denotes a machine and $i \in \{1, 2, \ldots, n\}$ a job. Setup times are included in processing times. These times are fixed, known in advance and positive. The objective function considered is the minimization of the makespan.

Given a permutation, **P**, of the n jobs, [k] indicates the job that occupies position k in the sequence. For example, in **P** = (3, 1, 2) [1] = 3, [2] = 1, [3] = 2. For this permutation, in every machine, job 2 occupies position 3. In a feasible schedule associated to a permutation, let $e_{j,k}$ be the beginning of the time destined in machine j to job that occupies position k and $f_{j,k}$ the time of the job that occupies position k releases machine j. The Fm|prmu|C_{max} problem can be formalized as follows:

$$e_{j,k} + p_{j,[k]} \leq f_{j,k} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (1)$$

$$e_{j,k} \geq f_{j,k-1} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (2)$$

$$e_{j,k} \geq f_{j-1,k} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (3)$$

$$C_{max}=f_{m,n} \qquad (4)$$

Being, $f_{j,0} = 0 \quad \forall j \quad , \quad f_{0,k} = 0 \quad \forall k$, the initial conditions.

The schedule is semi-active if equation (1) is written as $e_{j,k} + p_{j,[k]} = f_{j,k}$ and equations (2) and (3) are summarized as $e_{jk} = \max\{f_{j,k-1}; f_{j-1,k}\}$.

When there is no storage space between stages, Fm|block|C_{max} problem, if a job i finishes its operation on a machine j and if the next machine, j+1, is still busy on the previous job, the completed job i has to remain on the machine j blocking it. This condition requires an additional equation (5) in the formulation of the problem.

$$f_{j,k} \geq f_{j+1,k-1} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (5)$$

The initial condition $f_{m+1,k} = 0 \quad k=1,2,...,n$ must be added.

The schedule obtained is semi-active if equation (1) and (5) is summarized as (5'):

$$f_{j,k} = \min\{e_{j,k} + p_{j,[k]}, f_{j+1,k-1}\} \qquad (5`)$$

Consequently, the Fm|prmu|C_{max} problem can be seen as a relaxation of the Fm|block|C_{max} problem.

1.2. Reversibility for the permutation and blocking flow shop problems.

Given an instance ***I*,** of the Fm│prmu│C_{max} problem or the Fm│block│C_{max} problem. with processing times $p_{j,i}$ one can determine another instance ***I'***, with processing times $p'_{j,i}$ calculated as (6) :

$$p'_{j,i} = p_{m-j+1,i} \qquad j = 1, 2, ..., m \quad i = 1, 2, ..., n \qquad (6)$$

For a permutation **P,** the value C_{max} in ***I*** is the same as the one given in ***I'*** for the inverse permutation **P'**. So, the minimum of maximum completion time is the same for ***I*** and ***I'***, and the permutations associated to both instances are inverse one each other. It does not matter to solve ***I*** or to solve ***I'***. ***I*** an**d** ***I'*** can be seen as two views of the same instance. We call them the direct view and the inverse view, direct and inverse being relative. Some authors, as Brown and Lomnick (1966) and McMahon and Burton (1967), have found from computational results that the inverse view was sometimes solved more efficiently than the direct one when Branch and Bound procedures were used. The author has observed that sometimes the direct view behaves better for solutions, whereas the inverse view behaves better for bounds. Pinedo (1995) formalizes the relationship between direct and inverse views in two lemmas, one for each of the problems Fm│prmu│C_{max} and Fm│block│C_{max}.

2. Heuristic procedures.

The complexity of the Fm│prmu│C_{max} problem and the Fm│block│C_{max} problem does not allow to obtain efficiently the optimal solution using exacts methods for instances of more than few jobs and/or machines. This is the main reason for the different heuristics proposed in the literature. The heuristics can be divided in constructive heuristics, which build a feasible schedule progressively and the improvement heuristics, which try to improve an initial schedule, generated exploring its neighborhood. Obviously most effective heuristics are the melting of a (or several) constructive heuristic and a (or several) improvement heuristic.

The heuristic procedures here proposed are applied to the direct and inverse views of each instance retaining the best of the two solutions. These procedures are composed for three steps (see Figure 1). The two first steps, based on the NEH heuristic, construct an initial solution and then in step 3 an attempt to improve it is made through a iterative local search procedure which we have called Soft Simulated Annealing (SSA).

Different authors have observed that the NEH procedure, as proposed by Nawaz, Enscore and Ham (1983), can be considered to be made up of two phases: (1) the creation of the initial sequence of the jobs, (2) and the procedure of iterative insertion in accordance with the initial sequence obtained in step 1. Given the eficiency of this procedure, authors contributing to the literature on the subject have proposed different variants, the majority based on the way in which the jobs are ordered initially. In this article we have compared the performance of heuristics resulting from the implementation of 7 initial ordering procedures (LPT, NM, MM, PF, TR, PO, KK).

In step 2 of the NEH heuristic no explicit tie-breaking criterion is specified for when two different positions give the same makespan, as is stated for various authors, as

Kalczynski and Kamburowski (2008). We have used the minimization of the machine idle times as the principal tie-breaking criterion.

Step 3 consists of a iterative local improvement procedure by interchanging jobs not necessarily adjacent, working with tie-breaking, solutions with the same makespan, and random paths.

In the following sections each of the three steps are described.

2.1. **The First Step: initial ordering phase.**

Firstly we have considered 7 initial sequencing rules for the jobs. Each rule defines a variant of the procedure proposed. The rules considered are: the NEH proposal (LPT), the Nagano and Moccellin (NM), the ordering rule proposed by Ronconi (MM), the obtained by the *Profile Fitting heuristic* (PF) proposed by McCormick *et al.*, the sequence obtained through the Trapezium procedure (TR), the ordering proposed by Pour (PO). and the order proposed by Kalczynski and Kamburowski (KK). The MM and PF heuristics were designed for the $Fm|block|C_{max}$ problem. Both can be used in the permutation case without significant modifications but taking into account that the machines are never blocked. Ronconi has already proposed using MM and PF heuristics as the first step of the NEH heuristic but adapting them to the blocking case.

- LPT: Order the *n* jobs in descending order $P_i = \sum_{j=1}^{m} p_{ji}$;
- NM (Nagano and Moccellin, 2002): For each job *i* calculate $\overline{P}_i = P_i - \max_h \{BT_{hi}\}$, being BT_{hi} the lower bound for the waiting time for job *i* from the completion time of its operations in each machine to the beginning of the operation in the following machine, when job *h* immediately proceeds job *i* (and only jobs *h* and *i* are being considered). Order the *n* jobs in decreasing order $\overline{P}_i$;

- MM (Ronconi, 2004): Place those jobs with the lowest processing times in the first and last positions of the first and last machines respectively. Let k = 2. Select from among the unplaced jobs the one which gives the lowest value to the expression:
$$\alpha \cdot \sum_{j=1}^{m} | p_{j,i} - p_{j+1,h} | + (1-\alpha) \cdot \sum_{j=1}^{m} p_{j,i} \quad (6)$$
where *i* is the candidate job and *h* is the last job placed. Place this job in *k*. Let $k = k + 1$. If $k = n$, stop.
In our implementation α = 0.75 as was proposed in [17].

- PF (McCormick *et al.*, 1989): Place any job in first position. Let *k*=2. Select from among the unplaced jobs the one which gives the lowest value to the expression (7):
$$\sum_{j=1}^{m} w_j \cdot [\lambda \cdot it_j(i) + (1-\lambda) \cdot bt_j(i)] \quad (7)$$

Where i is the candidate job, w_j is a weight associated to the machine j (j = 1, 2, ..., m), $it_j(i)$ is machine j's idle time generated by the candidate job i when it is placed in the last position of the partial sequence generated, $bt_j(i)$ is the blocking time in the same conditions and λ a balance weight. If there is a tie between two candidate jobs, priority is given to the one which minimizes the expression (8):

$$\frac{\sum_{j=1}^{m}(it_j(i)+bt_j(i))}{P_i} \qquad (8)$$

If the numerator is null, priority is given to the job with the highest P_i. Place the candidate job in position k. Let k=k+1. If k=n+1, stop.

As there exists no efficient criterion for determining which the most suitable first job is, each one of the n jobs is tried successively. From all the permutations the one which gives the lowest value for the weighted idle time calculated as in (9) is selected.

$$\sum_{j=1}^{m}\sum_{i=1}^{n} w_j \cdot (it_j(i)+bt_j(i)) \qquad (9)$$

If there is a tie, the sequence with the lower C_{max} is chosen.

Two variants of PF, less time consuming, are considered: PL, on first position is selected the job with longest total processing time, and PS, on first position is selected the job with shortest total processing time.

- TR (Companys, 1966): $S_{1i} = \sum_{j=1}^{m}(m-j)\cdot p_{j,i}$ and $S_{2i} = \sum_{j=1}^{m}(j-1)\cdot p_{j,i}$ are calculated and Johnson's algorithm [3] is applied to the values given in order to obtain a sequence. If there is a tie, priority is given to the job with the lowest $S_{1i} - S_{2i}$ value. If the tie persists, priority is given to the job with the lowest p_{1i}. This heuristic is inspired by the idea of Palmer's slope [8].

- PO (Pour, 2001): the Pour heuristic was proposed by Pour (2001) and it creates a schedule that progressively tests each possible job in each position of the permutation, and can be summarized as follows:
  Step 1: Let r = 0 and σ void.
  Step 2: Be σ the partial schedule of r jobs already constructed, J the set of the jobs already scheduled in σ and $\overline{J}$ the set of the jobs not scheduled. For each $i \in \overline{J}$

  Step 2.1: Order operations on all jobs h, $h \in \overline{J}-\{i\}$by increasing $p_{j,h}$ independently in each machine. Compute an instant $\overline{c_{j,h}}$ (totally fictitious) at which each job $h \in \overline{J}-\{i\}$would finish its operation in machine j in the established operations order, beginning the first operation of the $n-r-1$ in the machine at instant 0. Compute $\overline{C_h}=\sum_{j=1}^{m}\overline{c_{j,h}}$ for $h \in \overline{J}-\{i\}$

  Step 2.2: Complete the partial schedule σ by placing i on the position r+1 followed by the jobs $h \in \overline{J}-\{i\}$ordered by creasing $\overline{C_h}$. Determine $C_{max.}$

Step 2.3: The job $i \in \bar{J}$ that provides the smaller C_{max} value is assigned to the position r+1 definitively.

Step 3: Do r=r+1 and add i at the end of the partial schedule σ. If $r < n$ go to step 2, else end.

- KK (Kalczynski and Kamburowski, 2008) : For each job i calculate $a_i = \sum_{j=1}^{m} (\frac{(m-1)\cdot(m-2)}{2} + m - j)\cdot p_{j,i}$ and $b_i = \sum_{j=1}^{m} (\frac{(m-1)\cdot(m-2)}{2} + j - 1)\cdot p_{j,i}$. The jobs are sequenced according to the increasing order of $c_i = \min\,(a_i; b_i)$.

2.2. The Second Step: insertion phase.

In step 2 we have implemented a new strategy which consists of two tie-breaking methods for when two different positions give the same makespan. The first method aims at minimizing the total idle time of machines (TIT), and the second method is the one proposed in Kalczynski and Kamburowski (2008).

Method TIT: The total idle time $\sum_{j=1}^{m} IT(j)$ is calculated for each possible inserting position, where $IT(j) = f_{j,n} - e_{j,1} - \sum_{i=1}^{n} p_{j,i}$.

If there is a tie between two positions the job is inserted in the position which has associated less total idle time.

- Method KK1: Let i be the job to be inserted, if there is a tie between two positions the position chosen is the one nearest to the first position if $a_i \le b_i$ and the nearest to the last one if $a_i > b_i$. Where a_i and b_i are calculated as is indicated in the KK rule of step 1.

As a consequence, step 2 is as follows:

- Step 2: in accordance with the order established in step 1, take the first two jobs and schedule them in such a way that they minimize the partial makespan, considering an instance with only two jobs. Then for k=3 up to n, insert the k-th job into one of the possible k positions of the partial sequence. The objective is to minimize the C_{max} of the Fm|block|C_{max} problem with k jobs. To break the tie, choose the sequence with the lowest idle time for the machines (method TIT). If there is still a tie, use the procedure defined in *loc. cit.* for NEHKK1 (method KK1).

2.3. **The Third Step**: **improvement phase**.

The improvement phase consists in four modules and we call it Soft Simulated Annealing (SSA).

The first module applies a local search on the incumbent solution (initially the incumbent solution is the obtained after the steps 1 and 2). The local search implemented is a variant of the non exhaustive descent algorithm (NEDA).

NEDA tries to improve the solution by swapping any two positions in the sequence. This procedure can, potentially, generate $\frac{n \cdot (n-1)}{2}$ neighbors. If during the process a new permutation improves the value of the objective function, it becomes the new current solution and the process continues until all the positions have been permuted without improvement. In this procedure the exploration of the neighborhood is always made in the same order. The SSA algorithm uses an auxiliary vector, called revolver, which allows exploring the neighborhood randomly. The revolver is a pointer vector whose components are initialized with the different positions that a job can have in the sequence. Next, the components are randomly mixed and used to codify the searching positions in the solution's neighborhood. Given two pointers to positions *i, j* in the job sequence, their equivalent i_{rev} and j_{rev} are searched in the revolver vector *rev*, being $i_{rev} = rev(i)$ and $j_{rev} = rev(j)$. These new positions are used when the non-exhaustive descents search is applied. In addition, during the procedure, solutions with the same value of the objective function (ties) are accepted with certain probability. When all the neighborhood of the current solution has been explored without improving the solution, the process restarts again accepting ties with a certain probability, γ. The improvement phase finishes when the number of ties reaches a predefined number Γ or there is no change in the incumbent solution. If after accepting ties the solution improves, the number of ties is initialized and the process continues without accepting ties. In our implementation $\gamma = 0.5$ and $\Gamma = \frac{n \cdot (n-1)}{2}$.

2.4. **The algorithm.**

When the algorithm runs are limited by CPU time, usually the local search is applied more than one time. In this case after a run of module one, it is necessary to take a decision on defining the initial sequence for the following run (acceptance criterion). The candidate sequences are the sequence obtained at the end of the step two, the resulting sequence of the precedent run and the best sequence known. In all cases this choose sequence is submitted to a perturbation by means of a deconstruction module and a construction module before it be taken as incumbent solution for the next run of first module.

Deconstruction Module:
Input, the incumbent sequence π
For i =1 to d
    remove one job of π randomly and insert it in π'' (in the remove order)
Next i
Output, π (original sequence without d jobs) and π''.

Construction Module:
Input, π and π''.
For i = 1 to d

insert $\pi''(i)$ in π according to the insertion procedure used in step 2.
Next i
Output, π (new incumbent solution)

To summarize, the complete algorithm has the following scheme

1. Initial ordering phase (first step)
2. Insertion phase. Evaluation.
3. Inversion (inverse view)
4. Initial ordering phase (first step)
5. Insertion phase. Evaluation.
6. Selection of the best solution as incumbent solution.
7. Iterative local search: Repeat until the end condition is met
   Local Search
   Current Solution Choice (Acceptance criterion)
   Deconstruction Module
   Construction Module

In the coded versions of the algorithm is a very simple version of the acceptance criterion, with 50 % of probability the resulting sequence of the precedent run is taken and with 50 % of probability the best sequence known.

3. Computational results

Various tests were carried out with the objective of analyzing the behavior of the proposed procedures. They are described in other papers. For the tests we used, usually, the 120 Taillard instances (1990) which combined 20, 50, 100, 200 and 500 jobs with 5, 10 and 20 machines. We obtain without tightness on time of the algorithm runs, solutions as good as the better known solutions.

The algorithms were implemented in Quick Basic and the experiments were run on an Intel Core 2 Duo E8400 CPU, 3GHz and 2GB of RAM memory.

The special algorithm to find good solutions has the following scheme:

1. Selection of the view.
2. Selection of the initial ordering
3. Initial ordering phase (first step)
4. Insertion phase. Evaluation.
5. Iterative local search: Repeat until the end condition (iteration limit) is met
   Local Search
   Acceptance criterion
   Deconstruction Module
   Construction Module

The acceptance criterion is: if the incumbent solution is worse that the best solution attained, then with probability θ, it is substituted by then best solution in the deconstruction module. A greater value of d, d-max, is used in this case. If the substitution is not made a normal value of d, d-min, is used. In the implementation θ = 0,1; d-max = 8 and d-min = 6.

We are considering three features to explore:

- Relationship between d and n. Perform experiments with d-max = $\lceil \sqrt{n} \rceil$ and d-min = $\lfloor 0.8 \times \sqrt{n} \rfloor$
- Sophistication of the acceptance criterion
- Addition of a perturbation between the Deconstruction Module and the Construction Module, especially in the case of incumbent solution substitution, to explore more extensively de solution space.

In annex I there is a list of the best solutions known for the 120 Taillard instances (Fm|block|C_{max} case) and in Annex II the corresponding sequences. The solutions for then instances 1, 2, 4, 5, 6, 7 and 9 correspond to the optimum value (Alemán, 2004).

This paper is an updated version of "Note on the blocking flow shop problem".

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ANNEX I: BEST SOLUTIONS KNOWN (14-01-10)

Taillard instances, Fm | block | C_{max}

	#	BEST	source		#	BEST	source		#	BEST	source
20×5	1	1374	1,4,5	50×5	31	3002	4	100×5	61	6151	4
	2	1408	1,4,5		32	3201	4		62	6022	4
	3	1280	1,4,5		33	3011	4		63	5927	4
	4	1448	1,2,4,5		34	3128	4		64	5772	4
	5	1341	1,4,5		35	3166	4		65	5960	4
	6	1363	1,2,4,5		36	3169	4		66	5852	4
	7	1381	1,2,4,5		37	3013	4		67	6004	4
	8	1379	1,4,5		38	3073	4		68	5915	4
	9	1373	1,4,5		39	2908	4		69	6123	4
	10	1283	1,2,4,5		40	3120	4		70	6159	4
20×10	11	1698	3,4,5	50×10	41	3638	4	100×10	71	7042	4
	12	1833	1,4,5		42	3507	4		72	6791	4
	13	1659	1,4,5		43	3488	4		73	6936	4
	14	1535	1,4,5		44	3656	4		74	7187	4
	15	1617	1,4,5		45	3629	4		75	6810	4
	16	1590	1.4,5		46	3621	4		76	6666	4
	17	1622	1,4,5		47	3696	4		77	6801	4
	18	1731	1,4,5		48	3572	4		78	6874	4
	19	1747	1,4,5		49	3532	4		79	7055	4
	20	1782	1,3,4,5		50	3624	4		80	6965	4
20×20	21	2436	1,4,5	50×20	51	4500	4	100×20	81	7844	4
	22	2234	4,5		52	4276	4		82	7894	4
	23	2479	1,4,5		53	4289	4		83	7794	4
	24	2348	1,3,4,5		54	4377	4		84	7899	4
	25	2435	4,5		55	4268	4		85	7901	4
	26	2383	4,5		56	4280	4		86	7888	4
	27	2390	1,4,5		57	4308	4		87	7930	4
	28	2328	1,4,5		58	4326	4		88	8022	4
	29	2363	1,3,4		59	4316	4		89	7969	4
	30	2323	4,5		60	4428	4		90	7993	4
200×10	91	13406	4	200×20	101	14912	4	500×20	111	36790	4
	92	13313	4		102	15002	4		112	37236	4
	93	13416	4		103	15186	4		113	37024	4
	94	13344	4		104	15082	4		114	37183	4
	95	13360	4		105	14970	4		115	36833	4
	96	13192	4		106	15101	4		116	37195	4
	97	13598	4		107	15099	4		117	36944	4
	98	13504	4		108	15141	4		118	36837	4
	99	13310	4		109	15034	4		119	36938	4
	100	13439	4		110	15122	4		120	37314	4

The five sources considered are:

1. R. Companys and M. Mateo (2.007). The solutions were obtained by A. Alemán with the LOMPEN algorithm (CPU time limit 20 minutes on a Pentium IV with 2.8 GHz PC).

2. Débora P. Ronconi (2.005). She uses a new bound (time limit 3600 seconds on a Pentium IV with 1,4 GHz PC).
3. J. Grabowski and J. Pempera (2.007). They use a Tabu Search (Iterations limit 30000 on Pentium IV with 1 GHz PC)
4. By means of the described algorithms without time limit.
5. Ling Wang, Quan-Ke-Pan, P. N. Suganthan, Wen-Hong Wang and Ya-Min Wang (2.010) They use an hybrid discrete differential evolution algorithm (HDDE algorithm). Maximum computational time set as T = 5·m·n ms on Pentium P-IV 3.0 GHz PC with 512 MB. Best C_{max} found (in 10 independent replications?).

All the best solution values indicated from TAIL0001 to TAIL0010 are optimum (Companys, 2.009, using LOMPEN algorithm).

ANNEX II: SEQUENCES (Taillard instances, Fm|block|C_{max})

TA0001: 20×5

```
1  1374  06-16-2009  MME  DIR
    3  17   9  14  11   6   5  18   4  10   7  12  19  15   8  16   1   2  13  20

2  1408  06-16-2009  MME  DIR
   15  12   2  17  10   6  20  11  19   5   3  16   7   9   1  13   4   8  18  14

3  1280  06-16-2009  MME  DIR
    3  15  14  10  19  11   6   8   4  16  18  12   7   5   9  13   1  20  17   2

4  1448  06-16-2009  MME  DIR
   13   9  16  14   3  20  17  19  15  10   2   5  12  11   7   1   8   6   4  18

5  1341  06-16-2009  MME  DIR
    3  10  12  19  18   4  14   7  15  13   9  17   2  16   6  11   1   8  20   5

6  1363  06-16-2009  MME  DIR
   14  20  17  13  12   7  16   8   4  11  10   6  19  15   9   1  18   5   3   2

7  1381  06-17-2009  NYM  INV
    5  11   3   8   6   9   7   4  20  13  12   2  15  16  17  18   1  19  10  14

8  1379  06-16-2009  MME  DIR
   12  17  16   9  18  19  15   8   7  13   5   3   2  14   4  20  11  10   6   1

9  1373  06-16-2009  MME  DIR
    4  10   7   8  18  17  14  13  15  12  16   2  20  11   1   6  19   3   9   5

10  1283  06-16-2009  MME  DIR
    5  12  11   4  16   1   2  18  13   6  10   8   3  14  20  17   7  19  15   9
```

TA0011: 20×10

```
11  1698  03-30-2009  MME  INV
   18   5   9   3  17  19  14  12  15  10  13   7   6   8   2  20  11   4   1  16

12  1833  06-16-2009  MME  DIR
   12  13  17  15   9   7   2   1   5   3   8  19  20  16  11  10  14   4   6  18

13  1659  06-16-2009  MME  DIR
    4   3   1  19   6  17   7   9  11  15  13  20  16  12  10   5   2  14  18   8

14  1535  06-16-2009  MME  DIR
   18  11  13   4  20   2   7   6  10   3  12  16   1  15   9  14  17  19   8   5

15  1617  06-16-2009  MME  DIR
   16   8   4   6  14  18  13  12  19   1  20   2  15   7   5   3  10  11   9  17

16  1590  06-16-2009  MME  DIR
   18   8   3  16  13  19   7   6   9  17  14   1  10   5  11   4   2  12  20  15

17  1622  06-16-2009  MME  DIR
   19   4   7  17   3  16  20  18   1   6  12   5  13  11   9   2  10  14   8  15

18  1731  06-16-2009  PFE  INV
    7  17  14   5   8   3  15   4  19  16  18   2   9   6  11  12   1  13  20  10
```

19 1747 06-16-2009 MME INV
14 12 8 11 18 17 4 2 20 19 5 15 16 6 7 1 3 13 10 9

20 1782 06-16-2009 MME DIR
5 16 17 14 13 19 6 4 7 10 2 8 15 18 20 1 9 3 11 12

TA0021: 20×20

21 2436 06-16-2009 MME DIR
16 18 15 20 1 12 10 14 7 13 8 9 11 5 2 6 17 4 3 19

22 2234 05-05-2009 MME DIR
18 11 10 4 20 12 13 16 15 1 7 19 5 6 14 3 8 17 9 2

23 2479 06-16-2009 MME DIR
4 14 16 15 1 13 5 9 18 10 11 12 20 17 19 6 8 3 2 7

24 2348 06-16-2009 MME DIR
14 3 4 20 8 13 6 2 15 18 1 12 7 5 19 16 10 9 17 11

25 2435 11-13-2008 PFE DIR
9 18 14 2 19 1 20 17 10 15 3 16 13 4 5 11 12 7 8 6

26 2383 06-05-2009 MME DIR
6 14 13 1 2 5 20 17 15 18 12 9 8 7 3 11 10 4 19 16

27 2390 06-16-2009 MME DIR
17 10 12 9 4 11 8 14 18 16 19 2 1 5 20 6 15 7 3 13

28 2328 06-16-2009 MME DIR
4 20 5 16 10 14 7 11 2 17 8 18 19 13 3 6 15 12 1 9

29 2363 06-16-2009 MME DIR
1 8 7 6 2 14 13 11 18 17 4 3 9 12 20 10 15 16 19 5

30 2323 11-06-2008 PFE INV
3 7 17 19 6 18 1 15 12 2 9 10 8 5 4 11 16 13 20 14

TA0031: 50×5

31 3002 06-07-2009 MME DIR
10 31 30 36 7 46 3 12 6 18 5 21 25 47 8 42 16 23 50 11
9 44 48 38 37 17 24 40 13 19 39 49 2 34 41 4 29 27 28 45
14 15 20 1 32 26 22 43 33 35

32 3201 06-16-2009 MME DIR
50 49 18 47 5 2 6 22 25 26 48 13 30 27 35 39 1 31 20 33
7 11 23 32 45 9 17 41 21 37 24 4 43 19 40 46 28 12 16 3
42 38 10 15 14 8 44 29 34 36

33 3011 06-08-2009 MME DIR
22 15 37 21 36 49 2 16 4 17 43 7 14 34 1 3 48 28 31 41
23 10 11 46 19 35 45 9 40 38 47 32 30 12 26 18 27 24 5 44
33 20 29 13 50 42 25 6 39 8

34 3128 11-20-2009 RAE INV
42 26 3 7 48 8 17 45 40 32 15 28 50 25 41 11 36 21 35 16
23 44 9 37 2 27 14 47 5 29 19 39 18 46 12 6 49 22 24 20
10 1 33 38 13 4 34 43 31 30

35 3166 06-08-2009 MME INV
46 48 29 31 16 36 17 45 20 19 3 34 13 27 39 18 40 30 35 12
25 50 23 14 1 2 47 43 24 33 32 28 5 4 11 15 26 22 37 6
10 38 7 44 41 21 8 49 9 42

36 3169 06-08-2009 MME DIR
4 21 1 33 40 29 22 28 47 11 41 38 3 37 48 42 24 39 10 13
17 45 7 49 44 15 23 18 2 14 27 46 9 5 25 30 6 50 35 26
8 32 19 34 20 36 43 16 12 31

37 3013 07-06-2009 MME DIR
19 41 22 13 18 12 17 26 47 43 21 20 32 24 48 29 39 35 6 46
33 11 31 3 7 2 49 9 10 15 44 23 1 27 34 30 40 5 4 50
37 14 8 36 45 42 38 16 25 28

38 3073 06-08-2009 MME DIR
34 17 1 20 46 24 29 43 3 15 26 9 47 30 22 21 7 10 18 37
32 4 5 8 31 39 42 36 50 14 25 6 28 44 11 45 48 33 19 16
12 41 49 27 23 35 2 13 38 40

39 2908 07-24-2009 RAE INV
10 12 7 1 47 11 20 38 39 21 44 15 23 33 19 42 48 30 49 25
36 31 6 27 3 16 28 9 24 50 43 40 2 37 22 41 5 35 18 26
34 32 4 45 13 29 46 8 17 14

40 3120 06-27-2009 MME INV
50 6 48 8 4 24 39 18 40 41 11 5 15 38 9 22 31 44 30 20
43 34 37 29 28 2 42 14 12 45 33 49 10 46 7 19 36 23 1 27
35 16 47 13 17 3 26 21 25 32

TA0041: 50×10

41 3638 06-08-2009 NEH DIR
42 44 33 18 37 34 19 2 30 36 21 22 32 13 8 35 10 24 20 7
49 26 14 31 29 46 15 9 40 12 38 3 5 11 4 28 23 17 25 16
45 6 43 50 41 47 1 48 39 27

42 3507 06-19-2009 RAE INV
35 22 50 11 18 1 32 23 31 33 37 20 7 36 44 49 45 4 2 19
6 39 12 43 41 27 34 21 8 25 29 16 15 9 40 5 30 10 38 14
28 42 47 46 17 26 13 3 24 48

43 3488 07-06-2009 MME INV
24 4 28 19 46 39 2 45 31 16 40 9 10 50 33 38 42 20 29 13
47 1 48 44 34 6 41 5 43 35 17 25 7 21 23 36 49 15 37 32
11 12 14 18 27 3 30 26 22 8

44 3656 11-20-2009 RAE INV
20 5 22 31 39 25 36 35 45 10 12 11 24 23 30 21 43 40 41 14
2 4 6 47 15 26 49 50 32 46 1 37 16 8 18 17 38 48 3 27
33 29 7 44 34 13 28 19 9 42

45 3629 06-28-2009 MME INV
6 10 42 1 48 36 31 3 49 12 45 29 27 39 23 21 43 34 35 33
11 5 9 46 40 22 41 37 19 28 24 2 15 14 4 13 47 26 16 38
7 17 8 32 20 18 44 30 50 25

46 3621 06-15-2009 MME DIR
3 24 38 5 11 14 39 29 9 36 8 48 13 43 7 19 47 49 33 20
40 45 17 31 44 37 15 28 27 26 35 42 25 34 6 22 10 21 30 46
1 18 2 50 4 16 41 32 23 12

47 3696 06-15-2009 MME INV
41 48 49 32 16 12 25 30 15 8 10 9 50 37 5 14 19 43 7 45
47 29 39 4 28 22 6 3 23 42 44 20 34 2 46 1 24 11 35 13
31 38 27 36 33 17 40 18 21 26

48 3572 06-15-2009 MME DIR

21 26 9 3 44 14 25 8 17 48 2 47 22 19 1 6 50 18 27 46
10 16 42 23 4 31 30 5 38 41 20 32 11 29 37 45 33 34 49 43
13 15 36 35 12 24 7 40 39 28

49 3532 06-20-2009 RAE INV

33 44 47 36 49 32 40 26 21 18 37 5 6 42 31 39 8 46 30 22
4 3 48 17 14 43 24 7 50 20 9 45 1 16 27 34 11 41 10 2
28 23 35 19 12 15 13 38 25 29

50 3624 06-28-2009 MME INV

49 38 10 27 15 28 8 44 42 4 39 6 1 48 16 34 11 3 47 20
31 25 35 5 7 50 36 30 22 18 9 43 17 46 32 23 26 24 29 40
33 13 37 45 2 12 14 41 21 19

TA0051: 50×20

51 4500 06-12-2009 PFE DIR

20 15 44 43 8 45 27 37 29 11 39 12 5 24 36 14 38 17 50 49
34 2 41 35 31 32 47 48 7 22 30 10 18 25 6 40 23 28 42 46
1 16 13 33 19 9 26 4 21 3

52 4276 07-30-2009 RAE INV

32 43 49 20 41 14 40 6 29 35 31 47 11 36 18 42 17 48 2 12
45 1 23 25 9 15 21 37 38 28 27 26 44 24 16 4 10 13 39 5
3 50 46 34 33 30 22 7 19 8

53 4289 12-17-2009 RAE INV

24 4 28 14 49 36 8 15 37 16 19 39 2 22 3 30 46 12 35 17
18 45 5 32 50 38 42 20 29 43 48 26 41 27 33 9 34 47 40 44
11 10 13 31 21 6 25 23 1 7

54 4377 07-03-2009 MME DIR

14 19 30 20 13 49 47 12 7 40 39 48 43 23 45 3 21 31 11 32
35 33 17 29 22 18 24 28 5 26 16 9 6 41 46 2 10 38 44 50
15 4 25 37 42 8 36 1 34 27

55 4268 11-05-2009 RAE INV

40 4 28 48 24 23 47 20 19 49 22 8 18 39 14 2 12 50 33 1
41 3 38 27 10 26 7 36 45 31 21 32 17 30 44 34 13 43 16 6
9 42 15 29 5 25 46 37 35 11

56 4280 11-04-2009 RAE INV

14 5 18 49 50 6 42 47 26 21 11 37 46 30 7 33 20 45 43 32
41 28 16 1 40 23 8 25 10 48 19 44 36 34 2 22 17 27 31 9
35 15 24 4 39 13 29 12 3 38

57 4308 12-23-2009 RAE INV

4 23 12 38 47 21 45 39 11 13 20 15 2 30 49 24 28 9 1 31
50 10 22 19 33 37 34 14 48 17 29 3 36 46 8 18 32 41 40 35
44 7 27 6 25 42 5 26 43 16

58 4326 06-14-2009 MME INV

32 33 39 30 31 42 15 7 27 5 37 36 19 38 29 6 8 26 35 9
41 49 3 4 21 14 47 17 48 44 24 20 46 34 18 11 16 25 40 45
10 1 13 43 12 22 28 2 50 23

59 4316 11-04-2009 NEH INV

37 14 32 3 11 50 16 9 41 31 8 22 1 27 28 46 18 43 26 17
34 38 24 7 19 48 49 42 30 25 2 13 33 10 6 12 4 36 40 23
47 5 21 45 35 39 20 29 15 44

60 4428 06-29-2009 MME INV

33 12 22 18 14 8 31 21 11 16 3 2 40 7 38 39 41 19 1 42
47 50 32 9 15 23 27 37 5 46 13 44 36 34 24 35 25 28 26 20
29 17 45 10 30 48 49 6 43 4

TA0061: 100×5

```
61  6151  11-09-2009  RAE  DIR
     10  93  42  67  28  21  97  99  90  25  37   3  48   2  94  11  57  88  53  98
     72  56  26  65  96  16  66   4  30  46   5  85  58  22  38   6  51  23  59   1
     84  24  60  50  29  32  34  68  35  20  40  45  78  47  36  64  87  31  27  43
    100  73   8  92  61  83  71  39  70  63  89  69  86  17  15  77  75  33  13  54
     14  19  82  12  76  62   7  49  74  52  44  41  81  95  91  18   9  80  79  55

62  6022  11-09-2009  RAE
     88  15  83  16  46  90  67  74  11   4  49  44  73  17  34  66  20  56   8  23
     48  58  47  65  29  12  85  52  10  86  45  99  89  31  37  39  76  40  61 100
     60  19  28  43  78  94  62  63  95  96   3  87   2  32  13   9  42   5  80  68
     98  77  33  54  75  51  59  50  24  97  84  70  91  82  27  14   6  64  30  41
     21  55  36  35  71  18  38  72  81  93  92  25  26   1   7  22  57  53  79  69

63  5927  11-09-2009  RAE  DIR
     14  70  79   5  71  97  58  26  41  18  57  51  96  12  23  25  95  33  78  63
     27  64  67  91  22  56  42   2  38  10  90  53  76  94  31  13  11  82  30  17
     74   4  73  15  20  98  52  85  65 100  61  34  60  68  89  59  81  84  66  72
     50  36  86  19  43  49   6  93   7  48   1  40  32  46  37  69  35  62  92   8
     88  16  54  44  24  83  80  45   3  77  75  99  29  21  47  87   9  28  39  55

64  5772  11-09-2009  RAE  DIR
     20  69  23  89  17  44  75  12  34  29  27   8  86   5  10   1  39  47  41  36
      3  76  62  85  37  45  82   7  72  46 100  99  11  40  74  87  48  24  30  53
     68  63  42  93  51  59  55  54  98  58  80  77  79  71  73  90  94  14  65  35
     78  21  16  83  32  19  33  95  88  26  22  70  31  64  43  56  18   2   6  97
     50  61  52  96  67  28   9   4  60  81  66  49  92  15  25  13  84  91  57  38

65  5960  06-25-2009  PFE  DIR
     74  68  10  16  12  33  77  82  86  54  60  40  71   6  32  39  56   4  52  75
     93  14  88  90  76   5  94  96  55  59  35  34  19  61   3  84  89  48   9  65
     31  36  25  20  26  13  85  29  99  15  69  62  81  46  97   8  70  47  53  23
     73  30  28  87  41  51  21  80  42  43  27  17  95  78   7  37  44  66 100  58
     18  24  72  11  50  98   2  57  64  91  22  92  38  67  45  49  83  63  79   1

66  5852  11-10-2009  RAE  DIR
 61   8  28  62  30  87  79  34  13  81  60  25  84  64  23  67  90  20   3  97
     35  63  75  41  10  55  71  47  98  72  22  74  89  17  58  26  94  56  21   6
     73  18  48   2  69  42   5  57  68  59  14  39   9  32  80  91  76  65  44  96
     99  45  77  50 100  53   1  51  54  83  70  37  40  82  31  38  46  86  49  95
      7  33  78  27  92  85  88  19  16  15  11  93  43  24  66  52  12  36  29   4

67  6004  06-25-2009  PFE  DIR
     79  35  89   2  37  87  43  47  82  95  66  90  59  83  39  73  61  81  98  42
      8  20  80  30  86  26  34  25  74  65  53  69  38 100  85  94  75   4   6  55
     50  27  64  14   7  13  96  18  63  51  58  15  40  76  62  92  10  60  48  93
     11  23  21  72  99  29  77  68  70   5  12  19  41  52  88  31  44  56   9  84
     46  57  17   1  49  24  16  71   3  67  91  32  45  36  78  33  54  97  22  28

68  5915  11-10-2009  RAE  DIR
     26  73  22  85  79  51   7  33   9  91   8  35 100  47  49  57  38  63  16  89
     64  41  90  87   2  86  80  19   6  25  42  98  74  82  29   1  59  55  99  72
     11  69  44  31  28  37   5  52  15  56  53  21  97  30  14  18  83  93  13  60
     48  27  50  62  23  84  94  10  61  75  65  54  76  46  67  20  77  88  43  39
     58  78  34  36  70  12  32  24  71   3  45  68  17  96  92   4  81  66  40  95

69  6123  11-13-2009  RAE  DIR
     70  48  19  63  75  96  42  76  64  91  13   8 100  95   6  80  12  20  92  32
     61   1  59  99  85  98  18  39  79  93  68  65  50  54  87  86  71  74  14   3
     27  69  73  16  34  22  56  49  97   4  60  84   9  43  55  35   2  53  10  66
     21  51   5  41  38  45  28  90  44  57  23  67  37  77  89  46  36  52  29  40
     11  83  33  30  88  25  81  94  62   7  31  15  26  82  78  58  17  24  72  47
```

70 6159 11-13-2009 RAE DIR

2	20	70	46	31	51	28	88	57	49	64	99	54	48	33	87	18	1	58	11
98	75	27	92	29	24	16	38	80	73	19	76	82	45	61	56	77	39	91	3
59	78	86	89	96	17	30	6	8	36	85	7	72	43	22	68	81	15	55	93
14	41	84	97	95	40	21	5	13	60	50	35	47	44	69	67	79	4	66	9
42	32	23	100	26	62	74	37	10	90	83	94	63	71	52	34	53	25	12	65

TA0071: 100×10

71 7042 11-13-2009 RAE DIR

58	70	45	37	77	83	2	38	61	28	74	36	53	44	52	21	56	73	81	34
4	18	88	100	79	47	14	29	27	62	15	49	87	5	43	91	24	98	60	96
90	25	57	82	71	17	54	78	63	13	84	39	31	89	40	26	93	7	64	33
41	8	11	80	92	35	50	42	32	55	95	65	48	6	85	22	1	75	97	23
76	68	3	51	86	66	19	9	20	67	10	94	46	16	99	59	69	30	72	12

72 6791 11-13-2009 RAE DIR

69	49	87	66	60	81	9	52	53	10	22	18	19	82	96	29	93	63	45	5
92	47	79	14	21	46	16	24	85	76	3	80	8	72	95	4	11	91	78	1
61	57	12	83	40	28	97	36	6	86	37	44	64	68	73	71	31	58	65	27
77	17	20	42	48	26	90	39	33	30	41	55	84	74	98	62	32	50	59	100
94	88	35	70	67	75	25	13	34	15	54	89	7	23	38	56	43	2	51	99

73 6936 11-13-2009 RAE DIR

45	58	42	51	64	95	40	62	52	10	71	30	75	33	49	47	69	46	41	82
5	89	13	97	20	25	81	99	94	74	23	96	56	54	22	76	98	18	80	26
77	60	53	68	84	8	86	3	85	1	36	100	37	88	2	79	15	70	29	65
61	27	16	87	63	72	7	93	48	90	91	35	43	31	59	4	44	50	32	73
9	67	19	78	11	21	17	14	28	92	6	12	34	66	24	38	83	57	39	55

74 7187 11-16-2009 RAE DIR

24	90	5	2	56	52	58	15	55	81	12	80	76	21	35	65	71	91	47	49
54	18	69	72	16	51	87	74	84	96	92	32	67	41	29	68	75	70	79	63
33	14	62	3	64	20	40	53	48	60	42	13	73	82	43	57	1	9	34	11
26	8	77	83	22	19	7	28	31	100	86	93	17	99	88	25	4	66	44	98
45	36	89	10	50	94	59	6	78	27	37	23	97	95	30	61	38	39	46	85

75 6810 11-16-2009 RAE INV

83	79	65	33	20	19	56	97	10	45	30	47	41	64	24	25	70	40	42	77
92	12	37	34	60	21	8	16	6	35	89	74	59	53	31	93	5	51	38	87
44	18	94	71	36	49	66	4	73	96	39	81	43	84	15	32	7	48	11	72
9	29	58	75	68	23	27	61	54	98	67	3	86	14	80	28	88	85	62	82
76	22	17	57	99	90	1	13	50	2	55	69	63	46	95	100	91	26	78	52

76 6666 11-16-2009 RAE DIR

20	46	8	36	5	76	44	94	53	18	24	29	4	63	90	48	74	64	32	40
77	78	79	9	6	54	86	19	41	98	25	12	34	26	95	47	3	52	22	67
39	49	80	93	72	37	99	69	35	14	84	31	2	73	89	17	10	100	16	33
7	38	43	15	57	96	70	21	60	13	11	23	88	58	66	59	30	50	62	83
27	71	92	55	68	91	1	97	81	85	82	56	51	61	87	42	75	65	28	45

77 6801 11-16-2009 RAE DIR

56	53	14	5	39	25	28	42	13	79	89	32	9	21	68	18	43	66	91	94
98	73	84	69	77	59	65	24	33	99	50	70	37	44	93	82	36	72	46	41
80	10	29	19	81	54	38	67	97	35	45	55	48	88	74	87	1	15	86	4
83	40	23	61	58	16	31	27	26	71	3	11	8	49	96	64	100	34	20	95
63	60	2	78	30	51	57	62	90	17	92	75	85	47	6	22	7	52	76	12

78 6874 11-17-2009 RAE DIR

48	70	31	56	76	50	22	54	62	99	32	60	64	58	82	26	52	43	6	88
46	57	100	92	44	87	63	73	20	85	9	69	33	15	13	97	77	42	18	36
24	29	79	84	1	91	4	14	5	37	16	34	59	89	68	47	80	28	27	35
72	23	8	40	90	51	7	39	30	94	21	98	93	81	74	3	10	19	78	83
75	95	49	25	67	86	38	55	71	45	65	12	2	61	17	53	41	66	11	96

79 7055 11-17-2009 RAE DIR

54	92	91	87	5	43	72	67	98	75	60	10	99	18	95	36	11	25	9	38
37	29	79	21	68	61	97	62	17	48	23	51	15	65	40	1	80	26	14	55
58	4	76	6	53	46	42	3	49	16	86	12	27	78	41	28	47	82	63	83
88	69	93	50	22	13	32	8	74	19	35	30	57	7	71	85	90	44	96	39
84	24	45	59	77	31	34	100	81	70	89	52	56	73	94	20	2	66	64	33

80 6965 11-17-2009 RAE DIR

63	84	100	14	9	6	54	8	30	50	20	80	26	31	5	93	55	29	79	57
87	71	7	92	89	98	72	15	69	88	68	97	78	56	18	60	83	95	91	73
27	47	77	40	36	21	49	45	41	46	96	35	22	61	24	53	85	13	86	58
11	51	59	39	4	90	44	43	65	38	1	42	37	76	33	99	12	25	74	19
3	67	75	81	52	2	28	82	94	17	70	23	16	32	64	48	66	10	62	34

TA0081: 100×20

81 7844 11-17-2009 RAE INV

54	1	74	46	80	82	25	59	30	57	53	78	4	90	77	9	88	5	12	3
51	28	66	21	61	99	44	2	27	32	92	89	73	31	41	34	48	49	79	39
72	67	91	29	33	81	56	63	22	84	55	10	86	100	42	70	26	20	96	64
24	95	45	19	15	37	17	65	75	18	76	11	85	40	83	35	16	23	60	93
62	52	6	7	87	68	98	43	97	47	58	71	94	8	13	14	36	38	50	69

82 7894 11-17-2009 RAE DIR

50	49	100	95	65	69	79	76	14	43	82	72	70	96	20	71	84	97	88	11
63	46	15	75	23	77	18	66	7	62	78	4	21	28	81	73	64	87	58	56
22	59	32	25	47	91	5	68	40	45	41	34	80	31	16	60	42	54	67	86
13	74	38	29	98	6	10	52	2	33	53	8	37	36	44	1	90	26	85	27
61	48	83	89	19	30	24	93	3	9	51	17	35	92	55	99	94	12	39	57

83 7794 12-17-2009 RAE INV

64	92	9	87	67	96	80	20	97	81	63	22	42	58	44	82	75	23	36	74
91	32	8	49	12	78	66	43	77	27	76	17	31	48	93	2	24	69	60	16
99	3	30	100	41	71	40	10	54	56	84	11	85	90	94	29	51	26	98	47
13	61	86	57	88	70	25	5	50	53	35	79	89	33	6	73	7	34	1	39
18	72	46	4	59	68	28	19	37	15	52	55	62	21	14	95	45	83	38	65

84 7899 11-20-2009 RAE DIR

5	44	45	36	57	89	51	67	69	83	64	100	49	61	9	63	12	60	1	35
78	14	41	66	99	74	98	11	55	68	65	96	38	76	50	85	32	19	16	42
26	86	56	8	13	95	93	4	20	82	77	30	54	31	34	2	79	24	58	18
92	59	43	88	23	70	25	71	28	22	73	3	52	87	72	75	37	10	94	47
97	29	15	84	7	27	39	17	46	91	62	81	48	90	6	21	40	53	80	33

85 7901 11-18-2009 RAE DIR

33	12	49	30	98	72	58	71	61	100	80	15	37	8	24	50	94	97	90	47
64	17	74	39	31	55	14	96	28	53	2	20	99	46	76	95	85	41	60	40
82	1	69	70	81	56	29	88	92	48	89	66	45	35	59	65	22	42	4	16
44	6	87	63	5	7	21	57	62	68	13	86	25	38	10	93	34	36	26	3
52	32	54	67	75	78	83	11	9	79	73	43	27	23	84	91	19	77	18	51

86 7888 11-21-2009 RAE INV

83	39	33	100	66	12	69	82	78	37	56	52	79	58	57	45	86	22	55	71
11	3	49	89	28	73	92	95	85	26	77	99	9	53	74	97	64	14	10	81
48	7	98	20	40	8	27	62	32	46	17	16	94	68	34	6	61	59	5	65
25	80	35	4	54	67	70	36	47	51	75	21	60	24	84	23	1	19	41	2
38	91	87	76	63	88	50	43	13	30	29	93	96	18	42	15	44	31	72	90

87 7930 12-18-2009 RAE INV

95	88	85	62	93	80	73	19	6	96	72	84	54	94	27	34	14	43	49	97
66	42	17	82	46	63	100	32	74	87	3	65	45	18	26	79	29	23	55	11
67	31	7	70	98	48	89	4	58	61	68	10	8	56	12	53	15	24	44	99
28	9	39	38	47	2	1	20	91	41	71	50	36	40	5	60	21	13	30	92
69	37	33	59	16	77	51	90	64	83	52	57	78	22	81	35	25	86	76	75

88 8022 06-09-2009 NYM DIR

22	71	5	87	70	59	4	18	72	78	31	43	77	52	57	81	17	44	66	83
80	58	11	74	67	60	38	39	100	35	93	15	53	23	29	65	94	61	42	16
95	1	3	33	37	6	54	55	28	49	82	48	9	88	27	56	30	46	69	76
86	62	24	98	10	25	14	41	2	7	91	51	68	85	20	36	75	63	40	84
64	47	73	45	50	19	79	12	90	89	8	26	96	97	32	13	21	99	34	92

89 7969 11-22-2009 RAE DIR

7	44	80	74	47	22	16	66	75	55	97	37	63	19	6	67	49	77	2	10
29	58	5	81	43	68	92	45	48	13	36	3	35	34	99	15	4	41	60	71
24	95	70	78	21	51	42	50	33	31	25	79	39	86	18	87	56	12	27	26
11	82	73	38	8	32	100	76	57	96	69	61	84	28	9	85	40	23	88	83
62	17	90	59	89	14	93	65	94	46	30	1	53	20	64	72	54	52	91	98

90 7993 11-22-2009 RAE DIR

11	1	90	64	77	57	18	15	44	35	24	54	96	51	38	52	65	69	25	34
14	78	7	37	22	3	87	92	40	26	4	36	84	60	98	10	33	13	32	5
94	29	19	9	91	97	61	71	81	12	88	27	79	70	59	75	42	80	95	16
43	99	76	83	86	46	6	56	74	72	47	49	50	48	67	62	100	82	58	45
68	89	31	30	20	55	85	23	8	41	21	2	63	28	73	39	17	53	66	93

TA0091: 200×10

91 13406 11-20-2009 RAE DIR

73	156	160	15	188	3	152	57	124	198	87	106	164	63	158	24	77	76	155	138
42	49	194	44	51	93	178	21	74	104	64	71	50	97	6	136	129	167	149	65
94	172	117	147	187	66	12	9	105	128	161	132	79	48	53	40	177	32	143	145
95	130	111	39	197	30	33	127	29	110	150	103	16	101	139	125	52	46	67	90
1	61	28	47	96	134	107	14	179	83	184	54	84	114	151	142	176	140	92	146
41	91	98	43	22	113	159	118	165	191	100	175	173	45	193	7	200	183	80	75
2	11	26	199	88	86	20	192	38	68	102	25	81	170	72	135	85	162	196	120
69	115	8	166	59	171	31	17	186	122	195	123	157	18	163	116	154	181	174	108
189	153	131	62	56	185	119	141	126	35	58	5	121	169	27	70	182	89	10	13
112	144	19	4	180	82	55	168	60	37	190	36	23	109	137	34	78	99	133	148

92 13313 11-23-2009 RAE DIR

31	27	133	130	155	63	11	69	19	22	1	89	113	106	86	99	91	90	110	138
189	45	48	25	124	80	52	193	112	108	3	176	6	169	123	53	79	66	83	12
139	186	132	173	178	154	84	34	72	87	41	35	151	43	167	147	180	120	49	105
126	100	166	55	65	98	33	181	2	184	148	102	67	30	23	168	46	129	32	58
192	4	103	121	38	149	188	144	21	160	117	118	165	141	60	196	37	183	107	26
143	158	104	42	68	73	172	57	128	157	185	5	44	115	101	163	28	76	114	146
197	20	135	7	199	56	116	195	190	145	82	94	88	150	152	127	40	125	18	111
174	17	187	62	47	71	170	13	161	70	9	15	74	109	50	119	14	97	182	175
122	54	164	29	137	171	93	36	140	156	142	77	159	85	162	134	194	191	179	59
95	51	131	78	92	198	153	81	39	16	200	24	75	64	61	136	177	96	8	10

93 13416 11-24-2009 RAE DIR

97	52	133	166	157	92	20	24	95	66	199	34	70	27	164	5	136	101	3	32
29	192	128	180	150	126	50	198	2	18	187	68	73	74	99	117	131	197	107	158
80	79	30	168	200	28	78	44	134	83	89	8	147	14	119	146	174	61	33	102
103	159	129	42	51	15	1	135	9	41	91	140	125	141	184	182	16	122	148	170
7	161	75	145	149	38	67	23	10	177	63	144	193	45	113	71	43	139	94	93
191	88	60	77	86	181	115	26	49	36	190	178	64	31	151	124	123	47	55	56
194	165	195	127	137	152	76	19	106	90	54	156	53	105	162	13	111	196	114	11
40	81	138	163	17	118	167	112	143	87	130	172	12	6	65	116	176	179	189	104
85	98	175	57	154	39	4	84	21	82	142	48	169	171	46	109	188	96	155	35
132	110	121	120	22	100	186	69	185	37	58	153	62	183	108	59	72	160	25	173

94 13344 11-25-2009 RAE DIR

7	191	102	20	146	35	16	1	89	48	27	127	169	45	34	193	12	177	192	96
92	136	11	188	137	50	116	145	163	32	58	173	103	195	119	190	24	57	38	67
185	128	184	64	99	87	196	160	90	147	71	125	187	10	130	189	59	62	73	154
138	148	65	156	110	152	22	77	6	174	41	8	21	133	120	28	94	100	30	95
85	40	124	114	101	53	54	39	63	166	183	2	164	150	157	142	82	118	123	112
72	14	83	186	129	49	46	175	107	31	18	60	109	172	84	104	181	29	171	135
70	167	76	9	155	122	179	159	178	153	91	111	162	19	144	200	25	176	5	182
117	180	170	93	108	81	74	36	42	3	141	165	121	168	68	66	139	33	88	86
161	56	131	69	151	55	78	23	198	134	98	13	79	47	75	194	37	43	26	52
4	51	140	197	126	106	80	132	143	113	15	44	115	61	149	97	105	158	17	199

95 13360 11-23-2009 RAE DIR

198	29	193	108	33	98	26	64	65	124	196	37	17	121	128	79	97	106	80	126
151	177	71	109	66	47	95	23	43	153	15	6	191	94	149	144	96	185	72	12
110	40	18	2	60	14	192	57	140	190	36	100	54	28	44	145	62	116	197	123
147	168	131	155	50	73	4	51	8	163	102	137	187	53	129	162	119	104	49	13
78	82	161	58	171	84	89	105	181	63	38	135	200	74	46	61	32	120	10	45
99	85	184	31	93	24	107	81	48	165	101	172	22	175	164	67	11	154	3	194
166	30	146	186	157	178	180	188	150	52	70	117	55	127	132	111	21	152	83	75
176	122	68	182	138	87	27	59	156	25	5	76	167	183	160	56	173	20	112	42
9	88	133	115	148	158	1	142	19	34	199	41	134	69	170	169	39	139	136	179
91	141	113	143	92	114	130	77	16	159	118	103	7	195	35	125	189	90	86	174

96 13192 11-25-2009 RAE DIR

100	9	85	126	178	36	183	131	181	52	47	66	55	79	74	8	120	127	64	197
16	149	29	90	167	91	37	158	111	53	148	3	146	34	98	164	136	140	35	160
51	118	195	23	26	112	122	168	76	114	71	89	186	115	102	191	200	7	145	165
162	137	192	94	48	83	156	17	170	129	185	46	75	121	163	125	30	154	1	11
101	72	107	182	130	70	141	25	139	117	188	113	194	4	124	87	50	6	78	60
190	132	73	143	18	128	198	93	41	63	180	199	67	12	174	43	169	150	38	152
189	80	44	27	31	96	116	86	196	5	105	19	56	24	58	45	161	175	33	99
110	32	179	88	166	97	84	155	159	171	28	82	142	119	184	65	123	108	103	153
157	77	109	177	14	2	92	104	10	172	59	151	193	15	95	144	81	54	42	40
62	173	187	69	13	39	135	138	176	22	49	21	20	57	61	106	133	134	68	147

97 13598 11-26-2009 RAE DIR

147	15	198	155	37	153	96	65	85	176	166	115	51	10	186	81	128	44	21	121
129	174	127	19	105	42	24	122	50	154	162	108	194	107	28	18	6	142	159	199
99	191	84	112	137	158	82	113	110	200	172	180	74	156	41	133	150	14	192	33
20	141	178	131	152	7	95	90	117	185	17	83	164	49	54	11	119	30	62	3
4	184	8	68	72	193	79	69	125	102	132	67	64	171	140	87	55	146	183	1
48	66	92	138	175	124	59	43	103	88	57	73	148	181	39	151	86	169	197	52
2	144	190	12	189	123	61	109	94	91	195	13	136	31	38	111	29	98	58	26
25	100	63	36	182	101	45	118	89	16	5	165	35	93	167	70	114	161	71	78
160	47	163	135	56	145	187	60	40	80	173	188	22	9	34	53	77	179	170	46
104	196	75	76	116	32	27	130	106	134	157	120	143	149	139	168	177	23	126	97

98 13504 11-27-2009 RAE INV

112	87	1	114	185	43	181	91	184	64	8	51	159	182	113	171	173	57	52	183
70	54	129	163	12	18	102	28	154	191	101	21	5	31	79	109	3	176	99	49
165	151	58	120	37	167	135	2	125	29	26	197	67	68	34	23	143	168	38	16
131	76	73	108	24	45	36	106	150	190	50	189	192	148	89	152	46	66	199	94
128	98	44	146	27	95	195	63	69	121	86	198	178	11	111	156	105	65	137	170
9	186	187	142	33	194	124	88	48	196	127	47	161	145	177	59	6	141	126	122
117	140	136	110	157	158	14	42	174	78	172	160	61	39	97	139	53	149	130	169
90	155	83	80	179	7	162	96	200	17	20	166	103	85	175	4	60	10	75	93
116	71	72	100	55	118	32	107	115	77	104	15	144	133	13	56	62	134	35	22
138	41	123	40	164	147	81	92	30	188	193	119	132	82	25	19	180	74	84	153

99 13310 11-28-2009 RAE DIR

3	141	98	126	11	60	181	127	154	176	174	145	171	138	124	37	194	113	182	128
107	161	73	100	26	149	78	70	49	180	30	101	59	88	21	135	119	22	192	94
55	111	56	67	83	198	121	17	184	123	200	5	45	36	162	2	99	130	32	193
77	164	117	160	134	47	7	96	166	68	90	43	52	120	23	114	13	103	75	95
79	116	93	15	64	158	168	195	18	179	151	185	152	25	129	163	34	110	137	197
105	165	71	186	48	167	10	122	63	86	173	1	183	14	51	153	139	27	35	150
85	31	104	87	80	109	82	175	142	54	44	8	144	62	172	20	189	24	57	147
118	136	66	39	169	133	89	4	38	143	50	190	92	41	131	159	74	28	84	132
6	81	53	188	157	97	156	91	191	199	12	178	65	58	76	196	72	125	19	61
16	29	148	69	112	102	108	140	46	9	146	33	115	187	170	40	106	177	42	155

100 13439 11-26-2009 RAE DIR

177 148 12 138 179 105 193 33 171 26 144 189 129 124 30 15 100 41 79 48
141 82 106 28 119 6 128 36 133 29 114 61 113 93 13 192 167 153 112 23
57 190 152 110 47 154 163 54 99 178 107 1 84 185 175 183 169 92 51 98
70 173 16 9 150 96 130 27 63 62 198 66 196 40 103 184 52 86 69 65
165 10 147 172 182 131 109 195 50 117 25 76 31 45 21 97 38 5 68 151
91 104 136 156 111 39 108 164 140 197 87 43 199 3 81 132 121 142 74 176
19 95 46 77 2 116 24 168 186 101 8 120 145 32 134 162 22 161 174 64
166 4 20 11 187 18 75 44 191 137 56 59 17 72 102 37 78 49 115 122
160 146 118 55 67 80 125 88 194 139 180 85 188 94 60 14 123 135 143 149
89 53 127 83 58 158 200 159 181 34 42 90 35 170 71 126 7 155 157 73

TA0101: 200×20

101 14912 11-29-2009 RAE DIR

76 83 109 95 178 94 138 99 170 151 133 14 126 142 174 172 132 112 75 81
23 122 58 166 90 62 40 80 89 49 7 13 123 198 101 53 12 106 150 8
84 199 179 30 139 186 96 121 16 92 68 10 82 3 74 124 20 116 148 197
163 194 131 55 29 130 164 73 155 63 17 195 145 65 28 19 21 115 113 43
190 86 146 48 167 33 97 182 125 107 6 152 79 32 42 135 52 120 128 77
87 31 4 66 98 171 22 61 127 188 160 47 143 93 24 69 147 144 111 100
34 173 72 35 157 191 200 134 118 196 54 56 15 70 104 161 187 105 189 103
25 129 67 85 57 18 36 149 176 141 168 119 27 71 192 11 37 184 136 2
169 1 108 51 156 110 159 185 26 9 39 153 117 165 41 154 177 140 50 5
91 46 59 162 102 180 158 45 44 181 137 88 78 175 183 64 60 38 193 114

102 15002 11-29-2009 RAE DIR

56 132 60 168 136 74 149 18 89 119 52 11 117 97 135 114 184 101 90 20
198 47 169 23 88 181 13 54 77 183 154 139 2 10 78 85 192 188 138 82
55 111 110 75 113 162 112 65 28 95 130 197 94 12 25 79 68 172 124 108
46 193 163 170 81 176 195 107 1 31 6 158 58 185 116 148 127 194 16 14
199 161 104 200 165 115 153 76 145 182 157 5 106 61 26 120 43 151 69 49
50 32 118 144 29 4 150 8 84 45 187 30 39 100 59 83 125 189 51 128
109 21 98 40 105 126 64 99 35 7 171 38 186 190 179 159 143 103 142 177
156 27 121 87 147 92 63 70 178 141 24 166 80 123 167 174 122 91 71 66
19 72 137 17 146 134 175 42 9 196 62 102 129 44 41 33 73 131 53 86
164 37 48 15 93 160 155 96 191 34 67 22 173 152 57 36 180 140 3 133

103 15186 11-30-2009 RAE DIR

124 156 26 44 192 76 127 68 187 33 46 108 160 81 114 61 147 120 86 122
8 148 153 185 137 102 167 71 42 34 196 95 170 146 7 200 163 70 38 91
129 100 37 177 189 158 117 149 52 25 22 131 17 107 195 32 29 62 51 101
21 171 58 186 123 11 165 103 94 193 184 178 116 66 2 112 31 96 28 39
36 98 49 126 77 47 113 130 197 169 142 69 12 172 92 90 72 75 150 164
56 152 41 191 162 30 43 157 128 155 64 9 82 176 99 181 106 57 161 174
24 104 136 18 10 83 140 110 27 199 54 119 5 141 63 93 183 3 74 154
166 19 84 89 78 118 1 105 65 80 125 135 60 144 45 175 115 145 16 138
4 87 190 97 15 40 109 67 55 79 179 48 23 111 121 151 139 85 188 134
159 73 133 180 13 132 20 168 59 198 194 53 182 6 173 50 143 14 88 35

104 15082 11-30-2009 RAE DIR

66 43 111 8 183 16 124 15 30 150 84 87 6 112 4 50 2 167 198 154
27 132 83 17 134 105 26 31 106 169 187 75 24 186 165 23 180 34 122 93
103 37 90 110 98 152 158 172 1 71 195 14 120 60 114 69 21 38 72 19
54 18 184 181 189 175 146 141 130 118 88 46 86 81 135 190 63 91 109 41
191 78 170 123 20 85 28 107 138 194 199 145 177 144 52 64 162 157 7 196
100 70 49 128 9 32 115 12 44 104 59 174 96 13 166 56 95 97 161 92
25 140 11 176 143 129 142 61 164 33 163 136 36 74 101 155 171 45 185 10
125 55 89 149 53 42 48 153 131 119 62 179 193 126 182 58 76 200 79 117
108 192 102 80 156 40 51 82 159 121 178 5 116 22 127 147 94 77 67 197
113 173 99 35 151 57 68 160 139 168 137 47 39 3 133 65 188 73 29 148

105 14970 11-30-2009 RAE DIR

134 107 98 112 11 141 29 154 135 83 193 31 53 21 87 48 26 30 180 174
79 89 109 189 63 78 54 186 140 171 43 56 176 113 97 126 118 100 153 40
37 44 119 115 182 62 191 52 159 57 1 121 194 163 99 132 128 33 5 23
136 7 36 66 34 149 130 68 165 190 4 8 169 67 22 24 6 105 156 45
173 93 147 42 9 82 150 25 170 47 90 16 192 14 18 91 184 84 133 127
72 167 59 188 64 74 117 164 152 110 183 166 161 104 187 12 28 32 151 85
102 80 122 94 88 111 155 35 200 65 198 60 116 17 49 69 195 145 120 197
114 76 143 146 96 178 179 41 58 51 177 20 196 103 123 13 125 129 75 137
199 108 73 10 3 46 157 131 139 142 19 158 71 38 101 106 70 124 15 2
39 55 144 160 50 77 86 95 168 27 185 172 162 175 61 81 138 148 92 181

106 15101 12-01-2009 RAE DIR

98 152 195 160 142 121 44 180 154 89 88 139 76 90 33 164 141 29 101 145
184 1 99 94 81 119 54 84 191 60 171 177 4 109 85 56 123 110 198 149
92 124 155 162 20 67 10 2 186 3 36 125 51 40 82 43 21 144 48 87
134 34 128 117 75 15 22 179 24 135 8 108 153 74 12 23 69 166 133 130
182 28 137 174 143 105 91 131 147 55 32 136 14 52 102 126 63 183 168 176
103 178 175 93 190 185 71 157 78 73 50 66 41 193 200 173 5 165 49 161
115 172 188 169 46 114 111 57 132 6 189 79 146 83 96 156 129 47 106 113
59 122 167 181 7 196 120 140 70 65 100 19 112 13 72 138 194 25 53 31
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107 15099 12-01-2009 RAE DIR 183 13949.8125 0.0000

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108 15141 12-02-2009 RAE DIR

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109 15034 12-02-2009 RAE DIR

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110 15122 12-02-2009 RAE DIR

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111 36790 04-21-2009 NEH

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112 37236 04-22-2009 NEH DIR

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113 37024 04-24-2009 NEH INV

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114 37183 04-28-2009 TRP INV

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115 36833 05-02-2009 NYM INV

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463	178	97	224	362	79	297	293	461	287	203	129	185	188	167	302	363	435	418	136
30	141	499	316	319	210	109	154	125	161	112	343	371	189	256	191	383	193	279	70
306	457	237	103	173	139	151	204	5	476	340	460	323	106	50	110	43	48	4	261
133	344	485	23	44	288	313	62	223	46	130	206	359	337	75	417	320	87	186	426
92	328	53	389	80	291	335	194	183	492	78	368	229	212	314	358	121	56	239	21
439	234	155	318	436	410	88	377	232	180	113	477	307	25	356	364	128	58	166	55
456	443	327	47	367	156	487	22	296	404	465	431	336	73	115	163	122	162	422	117
168	98	453	378	310	238	442	158	479	253	470	388	258	61	486	216	493	301	373	221
209	419	142	392	218	380	49	104	437	338	228	471	102	208	384	245	278	94	495	491
101	96	276	331	83	451	199	481	172	413	72	262	119	27	382	347	41	138	345	385
394	290	317	35	315	10	111	7	459	9	68	381	59	494	425	386	414	400	321	452
416	16	225	33	445	357	406	277	74	366	67	217	490	488	150	403	408	146	292	421
309	118	472	350	484	190	26	430	244	375	198	184	108	500	329	147	468	32	17	334
144	269	467	411	116	299	169	428	424	149	176	99	220	126	427	399	429	280	478	393
369	235	81	137	360	243	175	249	247	333	474	348	2	8	464	483	330	498	246	420
260	82	352	192	365	76	370	303	77	230	250	264	181	124	395	282	157	448	127	18
440	231	409	3	64	105	402	42	251	444	341	254	170	153	152	469	407	195	226	140
165	222	415	398	433	182	432	60	305	273	294	242	405	449	52	274	1	462	65	353
11	379	355	482	489	66	304	95	295	107	475	85	268	89	257	255	308	159	174	285
197	38	134	325	196	265	473	86	458	164	187	270	480	423	434	390	272	275	31	71
51	450	6	84	259	497	143	12	207	171	14	131	326	496	233	202	37	289	20	205
396	36	438	120	349	263	372	219	123	374	455	200	446	90	401	354	466	342	441	300
132	311	236	286	248	145	24	135	376	19	213	227	45	179	215	201	351	312	29	15

116 37195 05-19-2009 MME DIR

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288	55	17	7	9	470	166	404	212	192	197	59	325	312	40	102	473	320	475	202
267	306	342	243	94	120	408	472	453	228	68	161	36	434	421	16	105	201	343	290
226	113	187	232	436	162	93	180	253	382	43	257	380	486	265	190	390	90	88	418
338	151	314	394	263	223	435	420	248	402	42	136	199	38	300	328	330	494	44	34
250	370	270	57	96	375	432	303	132	139	425	211	433	69	49	239	493	195	32	246
398	56	289	171	484	308	189	485	446	206	373	81	173	276	344	391	430	208	19	198
45	279	335	222	91	411	95	403	15	10	121	50	414	409	319	65	481	458	406	164
292	146	48	426	287	499	271	397	321	275	305	184	67	112	349	431	304	64	449	128
440	70	241	281	5	182	469	92	100	86	441	301	471	37	348	491	309	227	110	242
466	11	20	99	354	200	341	385	72	334	477	77	159	221	124	181	126	350	331	383
87	474	165	255	444	422	311	115	336	372	452	142	272	163	454	66	293	74	376	318
215	71	244	129	326	225	8	479	266	170	379	73	204	371	106	214	79	384	386	465
489	294	333	233	47	399	480	131	451	174	302	387	423	407	457	260	463	347	392	218
157	23	168	109	209	183	133	368	487	203	252	322	296	179	317	459	443	274	467	307
103	369	269	358	172	154	285	313	1	410	236	27	496	483	366	490	346	417	298	412
82	329	85	30	78	140	149	28	401	464	497	429	381	488	31	217	75	186	76	332
141	231	238	280	152	498	104	137	353	235	500	297	220	461	437	262	365	339	147	245
22	395	361	352	97	249	356	4	127	264	374	261	378	130	119	345	101	415	258	117
41	144	462	54	256	237	364	389	360	116	455	323	122	492	175	205	194	416	125	327
291	247	53	234	111	230	450	134	6	138	178	445	362	357	21	315	135	108	63	39
143	52	51	25	359	460	251	148	355	476	324	405	286	167	438	273	188	46	240	210
118	196	396	216	268	191	62	229	2	419	18	282	224	310	219	400	295	13	14	176
83	468	33	193	363	169	377	427	114	448	316	259	3	299	160	107	35	388	439	351
456	278	478	145	424	213	29	61	284	89	98	150	60	413	153	158	283	340	123	254

117 36944 05-20-2009 MME DIR

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379	317	234	188	23	67	451	443	349	425	459	222	195	174	356	473	265	209	465	37
221	52	21	351	180	207	391	4	65	342	327	392	120	129	272	158	440	331	282	323
191	226	8	5	305	446	353	89	70	263	200	6	467	301	3	53	56	311	340	362
373	227	125	326	132	141	217	149	258	77	315	364	299	71	178	186	357	387	321	11
332	324	385	105	292	476	456	322	295	228	352	360	378	429	136	109	154	173	24	248
142	457	167	255	432	19	106	393	485	215	130	54	498	134	20	329	181	413	348	439
175	288	309	9	296	165	297	94	68	73	168	361	239	404	80	303	17	115	192	95
370	143	376	64	487	414	246	338	397	233	308	205	179	480	359	231	287	403	384	407
377	170	416	7	423	107	223	93	267	350	161	319	97	310	112	454	448	163	307	78
182	477	22	252	83	30	29	197	266	34	450	358	343	273	46	171	201	235	336	13
380	415	381	344	499	290	118	420	229	484	208	48	81	85	421	212	447	444	45	116
493	49	27	193	236	146	396	196	368	194	110	157	462	139	155	31	417	402	325	293
152	99	437	43	144	25	424	382	60	128	232	483	92	486	84	79	138	427	479	133
386	123	91	430	117	216	285	470	51	371	189	241	113	187	369	206	127	276	224	76
365	33	39	102	15	494	375	264	458	111	401	238	203	304	419	69	481	151	185	119
169	289	478	367	495	214	177	466	471	164	277	269	409	388	366	426	75	199	433	271
122	10	42	354	2	101	463	449	441	339	36	492	475	26	445	103	162	490	482	341
61	347	316	489	452	245	114	55	253	274	126	1	166	488	108	44	460	428	328	275
184	280	291	58	66	294	135	314	204	35	90	219	491	124	334	121	172	497	50	38
453	279	298	418	63	435	412	468	160	198	442	32	14	383	372	408	211	318	243	406
302	254	395	59	74	183	455	268	137	363	461	41	87	131	333	256	496	346	148	374
147	262	28	284	72	40	47	411	100	400	399	202	220	250	394	281	389	218	159	12
104	176	86	240	474	300	153	335	270	190	283	225	249	278	306	390	257	156	405	345
431	251	261	259	230	16	410	434	469	62	500	313	436	320	247	213	260	244	96	88

118 36837 01-07-2010 MME DIR

6	432	189	194	494	420	113	442	268	491	448	116	84	451	220	462	226	478	23	293
17	108	359	272	450	246	35	282	273	402	319	121	380	37	240	191	257	346	186	445
290	161	341	97	403	233	374	77	283	223	118	129	263	183	213	312	423	201	397	343
366	306	281	411	320	322	72	250	136	200	8	205	114	337	264	103	228	156	453	231
135	277	265	498	309	436	438	428	339	352	241	355	381	373	421	105	117	115	386	43
485	391	434	261	323	316	45	148	185	305	493	476	247	51	370	342	202	67	181	71
57	164	354	471	190	193	107	369	172	81	9	139	24	299	11	159	235	258	484	288
199	31	393	147	401	123	180	482	367	87	473	284	211	154	497	294	413	271	144	155
182	396	12	168	74	229	441	274	225	389	141	36	443	175	125	80	384	198	63	394
204	407	171	96	29	78	463	49	119	331	48	2	296	91	149	310	433	256	329	75
419	266	260	34	405	278	56	267	137	298	398	483	245	375	60	16	109	59	143	351
140	255	98	126	492	64	157	349	338	275	414	70	195	262	429	300	335	47	314	132
487	124	176	301	330	3	408	253	26	317	206	54	461	62	61	100	469	459	173	184
452	383	455	110	111	252	65	479	169	20	327	431	347	151	88	287	472	422	457	259
345	94	30	458	390	222	308	15	444	40	179	360	95	244	297	307	251	361	480	28
237	1	236	101	239	295	376	417	21	318	22	280	481	217	104	477	90	187	368	388
348	162	276	279	167	216	404	249	289	158	44	79	134	82	25	66	210	427	353	19
465	379	325	500	203	315	395	490	142	50	439	68	410	18	13	212	334	285	365	177
160	153	460	344	165	5	488	424	7	152	357	145	328	426	372	392	133	377	440	234
69	363	131	464	178	112	106	416	41	340	435	89	454	269	130	238	53	474	270	122
58	120	382	385	46	292	496	446	128	324	102	400	4	38	437	378	447	358	495	291
52	332	467	486	248	466	221	406	14	449	224	196	227	214	209	83	188	430	311	32
218	150	174	39	73	93	336	326	399	55	304	243	27	409	230	364	86	286	418	208
197	138	303	85	207	254	415	33	42	302	232	166	333	99	499	362	192	456	371	127
170	475	215	350	387	242	219	92	10	76	146	163	321	412	425	313	470	468	489	356

119 36938 05-20-2009 MME DIR

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199	330	143	63	12	21	36	355	161	331	242	490	243	198	258	179	146	497	32	367
45	26	35	238	68	214	31	278	18	441	461	46	96	233	286	303	165	398	84	69
141	82	74	426	110	288	321	323	170	404	15	176	160	200	308	97	300	167	407	457
481	126	221	42	283	234	230	326	135	312	350	228	459	129	267	91	111	206	482	241
257	225	211	142	1	57	302	488	253	483	396	75	240	89	462	43	408	130	76	16
156	39	220	309	353	172	431	249	25	152	369	157	287	363	148	147	175	382	304	190
94	223	182	23	105	265	92	104	164	475	409	445	120	252	134	275	362	473	374	83
313	248	256	185	95	124	112	373	52	98	365	251	333	231	403	131	443	106	183	477
204	434	318	329	341	195	100	343	498	450	55	174	368	114	272	391	169	34	266	413
420	384	166	385	145	62	452	436	61	71	423	395	236	250	28	8	108	352	22	78
88	299	274	451	322	339	336	392	455	478	421	154	13	487	495	216	186	254	476	466
412	315	486	438	72	325	463	387	151	460	268	328	50	128	400	311	430	376	47	298
188	41	480	347	237	33	219	85	284	358	390	158	440	73	301	155	202	317	136	402
87	389	123	3	295	469	394	208	471	56	213	212	9	81	494	349	279	103	93	425
411	354	184	366	474	269	499	194	338	51	472	226	205	415	467	178	99	60	320	356
378	77	406	418	217	282	289	427	388	53	113	64	465	397	7	291	227	159	203	193
140	70	370	218	332	277	345	189	281	422	297	435	296	386	360	27	496	132	327	153
37	86	262	191	449	29	115	30	401	361	229	118	67	447	310	192	162	348	14	414
66	280	324	196	314	247	173	357	342	5	393	448	416	491	80	439	207	117	209	293
271	484	24	6	10	222	264	133	306	116	244	454	273	20	432	149	59	19	239	4
375	58	372	319	456	38	364	419	479	215	290	210	246	468	464	180	294	107	90	2
446	417	44	137	453	11	235	359	119	177	101	334	102	337	138	340	377	351	428	383
197	437	263	163	458	489	485	405	429	168	65	470	150	410	121	380	399	139	261	122
49	493	381	255	433	187	171	276	48	444	379	270	371	259	17	492	181	201	109	346

120 37314 05-21-2009 MME DIR

111	245	38	225	351	158	215	47	84	488	342	272	183	45	398	9	426	339	421	276
423	352	220	46	394	431	91	251	365	306	13	246	310	271	204	145	477	73	456	211
261	54	149	146	379	413	392	167	127	360	460	252	332	377	277	10	62	50	229	361
362	240	83	288	480	222	311	374	66	151	458	42	59	22	34	51	485	294	305	4
435	180	407	82	475	315	490	203	98	140	119	48	366	3	14	126	309	184	86	496
389	445	396	405	171	357	297	25	257	301	130	262	425	278	143	436	248	341	205	172
393	308	483	153	265	207	99	317	300	178	335	408	274	399	195	382	441	187	155	223
224	287	464	206	492	148	307	350	268	281	450	433	156	457	417	103	313	465	280	468
372	194	65	74	12	160	410	85	100	107	346	283	199	181	321	219	43	314	132	19
120	334	147	326	88	298	478	395	11	385	497	58	275	57	273	208	31	455	49	386
134	56	494	376	329	139	391	286	474	162	173	52	373	174	359	499	430	7	449	295
133	105	462	289	30	93	355	16	141	36	170	320	216	247	76	481	118	440	434	234
33	89	319	135	343	348	418	400	290	209	432	422	416	61	21	28	358	258	285	177
368	438	420	253	161	60	123	446	68	29	484	2	228	378	459	344	101	472	237	367
192	419	324	198	179	94	303	32	284	136	331	453	243	333	235	138	108	500	401	6
157	491	443	487	70	35	90	175	217	444	26	117	154	231	448	115	63	95	353	404
259	364	226	469	304	67	8	340	388	354	270	233	20	166	189	369	75	318	185	471
163	482	451	299	110	337	202	463	370	53	387	267	291	493	327	109	282	473	242	55
81	296	18	322	168	116	371	79	380	201	412	214	17	227	210	71	122	486	442	191
44	15	402	415	256	266	152	476	363	397	302	190	1	24	406	221	176	114	292	182
80	316	212	5	150	429	411	131	230	137	279	102	165	144	269	345	96	78	461	37
489	409	381	403	23	330	312	197	77	349	64	27	325	260	97	427	383	106	437	263
470	495	356	232	250	384	336	218	164	87	414	293	255	452	112	200	338	424	129	241
323	428	113	186	454	213	375	447	390	188	39	254	104	498	40	72	159	196	124	69
328	169	249	193	236	238	41	92	264	121	128	125	244	142	347	466	467	479	239	439