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NOVA SBE'S CANTEEN: CASE STUDY ON QUEUEING THEORY

CAROLINA FERREIRA GASPAR

26037

A project carried on the International Master in Management Program, under the supervision of:

Manuel Baganha

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ABSTRACT

Nova SBE'S canteen: case study on queueing theory

This case study aims at studying the behavior, patterns and times of arrivals and services of Nova SBE's canteen, to compare the existing two lines, detect inefficiencies and suggest solutions to improve the process. Through observation method, data was collected regarding arrivals and services. Queuing theory and model M/M/1 will be used to bring meaning to data. The different lines will be found to have different impacts on customers waiting and service times, being the layout of the process and payment method, the major problems identified. Several recommendations will be proposed. One is a complex change in both the layout, payment methods and the number of waiting lines.

Keywords: Waiting times, Queuing theory, M/M/1 Model, improvement recommendations

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INTRODUCTION

Being a student at Nova SBE, I have experienced first-hand the long waiting lines of the canteen, the desperate students complaining and the inefficiencies of the whole process. Besides this, my path in the International Master's in Management has presented me with a major in Operations Management which I like to describe as a degree on how to solve inefficiencies. Putting this together, when the time to write my thesis came it was obvious to me that it should be about solving the inefficiencies of the canteen. This said, this case study will address questions such as: which of the canteen lines has a lower service time? And waiting time? Which problems can be identified? And what solutions can be proposed to solve these issues and improve the process? Moreover, I would like to contribute to the improvement of the brand-new campus that has already given students so much. I believe the way to solve the canteen problem is achievable and not that complicated, especially for a university like Nova SBE, full of powerful minds that always follow a clear horizon.

LITERATURE REVIEW

Waiting in lines is part of human daily life. In fact, one waits for a coffee in the morning, for public transportation or to pay at the grocery. A New York Times article states that Americans spend, on average, **37 billion hours every year in waiting lines** [for airlines, coffee or ticket lines] (Stone, 2012). Waiting lines and their corresponding waiting times vary depending on what is being offered, either a service or a product. Sometimes it might be difficult to distinguish between them, for instance when a customer goes to a canteen, is he paying for a service or product? The answer is both. Some services require supporting goods to be useful and vice versa. The canteen's final good, one's lunch, cannot exist without the service provided by the employees. In this case-study, the **canteen service** is considered as a service since it compounds all its characteristics: intangibility, perishability, inseparability, inconsistency, and involvement (Singer, 2019). This said, and due to its perishability, **services cannot be stored in inventory**, making it a difficult task to synchronize supply and demand (Zeithaml, Parasuraman, & Berry, 1985). As a consequence, there is a **higher probability queues will form** since,

waiting lines occur when there is more customer demand than the one that can be provided. (Eiselt, Sandblom, Eiselt, & Sandblom, 2010).

The question arises: **why is it important to reduce or even eliminate waiting times and queues?**

Firstly, nowadays the constant development of communities and the high paced rhythm of technology development leads customers to put even more value on time. (Davis, Aquilano, & Chase, 2002).

Secondly, despite the inconvenience caused to customers, waiting also represents costs both to individuals and organizations (Tsernov, 2019). Lastly, studies have shown that waiting time is negatively correlated with customer satisfaction (Pruyn & Smidts, 1998). However, customer satisfaction is not only based on the actual time customers wait in line but also on the **perceived waiting time** (Pruyn & Smidts, 1998). Thus, customers' perception of waiting time is also an important variable to analyze since customers often overestimate their waiting time. In fact, research shows that people overestimate, on average, by 36 percent how long they wait in queues. (Stone, 2012).

In order to quantify waiting times and clarify the queue's related problems, queueing theory has been widely used. **Queueing theory** is defined as being the body of knowledge about waiting lines (Prabhu, 1997) and a queueing system may be defined as a system in which customers' arrival is being placed upon a finite capacity on the resource side (Anthony et al., 2015). This said, queueing theory is also based on mathematical models to measure performance. **All queueing models have 3 major components: 1) customers' arrivals, 2) service discipline and 3) queue characteristics** (Baker, 2006). The first component has to do with the characteristics of customers: population size, behavior and statistical distribution (Eiselt et al., 2010). In what concerns population it might be finite (limited number of potential users) or infinite (virtually infinite number of customers, applicable, for example, in finite populations if customers can repeat the service). Moreover, the behavior of customers includes the evaluation of customers' actions: either they perform balking (deciding not to go to the line), reneging (exiting the line before being served) or jockeying (switching lines) (Samson & Singh, 2008). As for service discipline, it includes the number of channels (servers or waiting lines) available, the number of

phases (steps) needed for the service to be completed and the service design itself. Last but not least, queue characteristics have to do with the length of the waiting lines and queueing priority - the rules by which customers are selected from queue to service [FIFO - First come first served, LIFO - Last come last served, SIRO - Random order service, PNP - priority service or PS - processor sharing] (Shastrakar, 2016).

RESEARCH QUESTION

Statement of the problem

Universities must, by Portuguese law, have a canteen in their facilities, inserted in their Social Services scope. This said a healthy and cheap meal is considered a need for college students. (Assembleia da República Portuguesa, 2007).

Thus, and given the possibility of outsourcing, also stated by law, Nova outsourced the service to **ICA – Indústria e Comércio Alimentar, S.A.** ICA is a company that provides corporate catering for firms, industries, and public schools (“Ica - Indústria E Comércio Alimentar S.A.,” n.d.). Accordingly, Nova SBE's ICA [*also referred as ICA or canteen from now on*] provides meals during lunch and dinner time while also providing a wide range of bakery and cafeteria products. The canteen is open from 8:00 am to 8:30 pm. In this research, the focus will be on the **lunch meals served during lunchtime**. Regarding this, the canteen has a specific way to sell meal tickets and, therefore, arrange the waiting lines:

1. One can go to the canteen during the day (from 8:00 am to 12:00 pm and from 3:00 pm to 8:30 pm) and pre-buy a meal ticket to be used later on. This ticket is bought in the cashier 1, close to line 1. If one has done this previously (either on the same day or in previous days of the same month), during lunchtime one will have a specific waiting line – the **pre-paid ticket's waiting line (line 1)**.
2. One can go to ICA during the regular lunchtime (from 12:00 pm onwards) and be firstly served and only after paying for the meal. If this is the case, the customer must go to the **without pre-paid ticket's waiting line (line 2)**. It is important to clarify that if one goes to the canteen to have lunch between 12:00 pm and 3:00 pm and has not pre-bought the ticket, one **MUST** go to line 2, inevitably.

Moreover, there are **4 workers** (2 for each line) serving during lunch and **1 extra worker** in charge for repositioning of items and help in the kitchen, where there are more workers, not relevant for the present study. It is also important to state that **part of the service is done by the customer** since he is required to pick up its own tray, cutlery, napkin, glass of water or juice and pick up from the counter the food desired (soup, main course, dessert, and bread). More information about the display and functioning of the canteen service can be found in the appendix below.

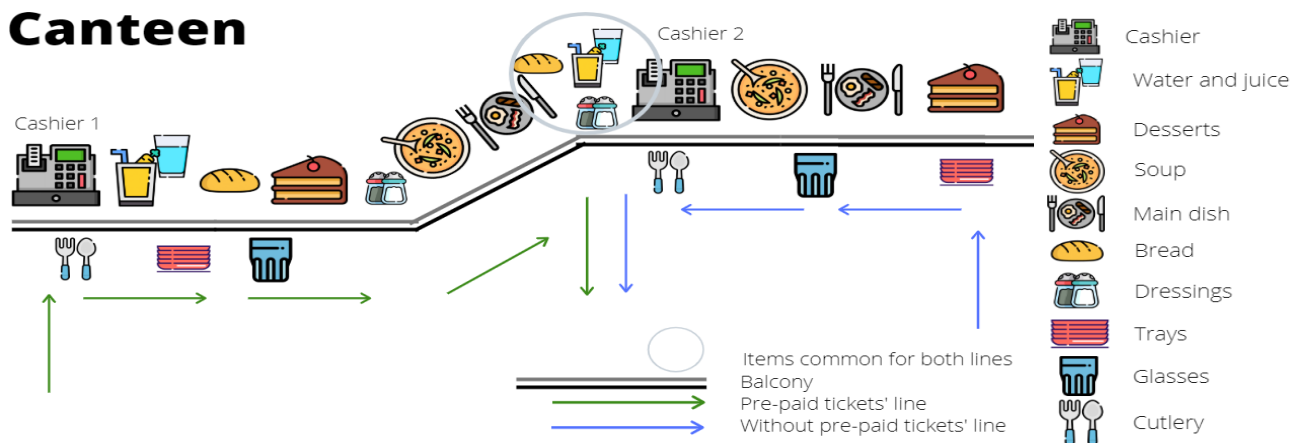


FIG. 1 – Display of items and queues in Nova SBE's canteen. *Source: Built based on data collection.*

In addition to this, **students**, by default, **only get 40 min of lunchtime** (bachelors' lunchtime is from 12:20 pm to 1:00 pm while masters' is from 1:50 pm to 2:30 pm). Therefore, there is the need to provide this service as fast as possible to allow, in an extreme case, that all students have lunch at the canteen in the time provided. A lot of students, however, have complained about the length of the waiting time, which may cause students to give up and go to other available restaurants, hurting the canteen's business. For those who still have lunch at the canteen, the time concern remains since they never know if they will manage to have lunch during the time provided.

Study justification and objectives

This study aims at creating insight on the service and waiting times of the canteen, alongside with **clarifying and quantifying the waiting times' problem and identify the possible causes**. Moreover, queueing theory and models will be applied to data collected. Furthermore, after all these analyses, the

goal is to make **recommendations** in order to minimize waiting time, improve service quality and, therefore, customers' satisfaction.

METHODOLOGY

Definition of terms

Arrivals: The total number of customers arrived at the system.

(Average) Arrival rate: average number of customers arriving per unit of time [λ].

Services: The total number of customers served in the system.

(Average) Service rate: average number of customers that can be served per unit of time [μ].

Cumulative sum of the average of arrivals/services: the sum of the average of arrivals/services up to a certain period of time.

Average time between arrivals: how long does it take, on average, to arrive one customer knowing one has just arrived.

Average service time: how long does it take, on average, to serve one customer knowing one has just been served.

Average utilization of the system: the proportion of potential capacity (economic output) that is actually being utilized (Kenton, 2019) [p].

Average number of customers in the system: average number of customers present in the system (from those who arrive, who has not been served yet) [L].

Average number of customers waiting / queue length: average number of customers in queue [L_q].

Average time spent in the system: how long, on average, one customer stays in the system (from the moment of arrival until the end of service – includes service) [W].

Average time in queue: how long one customer stays in the queue from the moment of arrival until before service [W_Q].

Probability system is empty: the probability that there is no one in the system.

Probability of a specific number of customers in the system: the probability of having a specific number of customers in the system (both being served and waiting in queue).

Data collection

Data was collected through **observation method** from the 12th of November until the 2nd of December of 2019 between 11:54 am and 2:32 pm (15 working days - 3 weeks). During this time, **the number of arrivals and services for a sample period of 2 minutes was collected for each one of the lines**. This said raw data consists of **413 two-min-samples for line 1 and 1017 two-min-samples for line 2** [*Refer to appendix A for the raw data collected*]. To clarify, each sample corresponds to data collected during the 2 min time range of the sample. The two waiting lines will be discussed and analyzed as separate lines. Data was collected under the following assumptions: 1) the number of customers that can be served per unit of time is the number of customers that are actually being served per unit of time; 2) arrivals are assumed to be uniformly distributed along the 2 min range (this means that if x people arrive in 2 min, $\frac{x}{2}$ are assumed to arrive in 1 min).

Data transformation

1. Plotting arrivals and services

Data was aggregated to get **averages of arrivals and averages of services per minute per weekday** [*Refer to appendix B for a detailed view on aggregated data*]. With this information, it was possible to plot graphs for both the average of arrivals and services, in order to better understand the differences between the two variables and to **identify the most problematic periods for both waiting lines** [*Refer to results discussion a. for more information and analysis*].

2. Theoretical queue

Based on the **cumulative sum of average arrivals and cumulative sum of average services** (based on the averages per minute computed before) [*Refer to appendix C for details on the cumulative sum of average or arrivals and services*] a graph was plotted to study when the queues would, theoretically, stop to exist. The difference between the cumulative arrivals and the cumulative services, at a certain given time, should be equal to **the number of people in the system** (includes customers waiting and being served). This said, whenever the difference between the two variables is zero, in theory, the queue

stops to exist [Refer to results discussion b. for the graph regarding the number of people in the system].

It is important to refer that since these sums are based on averages the results are not 100% accurate and are just to give us an idea of the length of the queue.

3. Weekday seasonality

Moreover, an analysis regarding the **differences of the arrivals throughout the week, based on the corresponding weekday**, was performed in order to better understand which weekdays are more problematic in terms of arrivals [Refer to appendix B for aggregated data and to results discussion c. for the graphs and analysis].

4. Queueing theory and ICA's model

With all this in mind, it is important to infer facts and figures to better compare the two lines and understand the problem. This said, the aim is to compute: **the average arrival rate, the average service rate, the average time between arrivals, the average service time, the average server utilization, the average number of customers in the system and waiting in queue, the average time in the system and waiting in the queue, the probability the system is empty and the probability of a specific number of customers in the system**. For this, there is the need to choose a queueing model [that considers how the waiting process is designed] that fits the data, based on queueing theory [the mathematical study of waiting lines] (J. Sherman, 2013). There will be a model for each one of the lines in order to do comparisons and infer conclusions.

To standardize the data described by the several **queueing models**, Kendall's notation has been widely used. Back in 1953, Kendall developed its own notation for queueing models using **3 main factors** (Kendall, 1953). Further down the road, other researchers have added 3 more factors to the main model, but these are optional. (Lee, 1966; Sen, 2010; Taha, 1968) All in all, any queueing model can be written according to the following notation:

$A/S/c/K/N/D$, where:

A: Stands for the behavior of the arrival process. After plotting the inter-arrival times both in density and cumulative distribution functions, and given their similarity to the reference ones for the exponential distribution, this research assumes $A=M$, this is, arrival process follows a Poisson distribution, for both lines [Refer to appendix D for more information on this assumption].

S: Stands for service Time distribution. As for service time distribution, it may seem fixed at first sight but, since it depends a lot on customers' effort, it is considered variable. To corroborate this, and after doing the same calculations as explain above for inter-arrival times, $S=M$, and service times are assumed to follow an exponential distribution. [Refer to appendix E for more information on this assumption].

c: Stands for the number of servers or number of service channels. It is clear the service as a whole is multichannel and the criterion for choosing the lines is the pre-paid ticket. However, since the present research is evaluating the two lines separately the service analyzed uses a single channel, so $c=1$.

K: Stands for the number of places in the system (optional). Consists of the capacity of the system, this is, the maximum number of customers that can be in the system, including the ones being served. Since there is no space limit for the length of the queue, $K = \infty$.

N: The size of the calling population (optional). Both lines present a finite arrival population since it is assumed no one will have lunch twice. Yet, this finite amount is very large, so it is assumed to be infinite, therefore $N = \infty$.

D: Queue discipline (optional). Stands for the priority according to which customers are served. Regarding priority rules, both lines work under FIFO (first in first out) assumption.

In summary, both lines will work under the following model: **$M/M/1/\infty/\infty/FIFO$** , that will be, from now on, simplified into **$M/M/1$** .

With this in mind, and following this model, **our result goals can be computed according to the following formulae** (Kendall, 1953; Oliveira, 1998; Samson & Singh, 2008):

- Average utilization of the system: $p = \frac{\lambda}{\mu}$
- Average number of customers in the system: $L = \frac{\lambda}{\mu - \lambda}$
- Average number of customers waiting in line: $L_p = p * L$
- Average time spent waiting in the system, including service: $W = \frac{1}{\mu - \lambda}$
- Average time spent waiting in line: $W_Q = p * W$
- Probability that n customers are in the service at a given time: $P_n = (1 - p)p^n$

This model works under the following assumptions:

1. $\mu > \lambda$. If contrary, the queue would grow infinitely large.
2. Customers are patient and therefore they do not balk, renege or jockey.
3. Customers come from an infinite population.
4. Customers arrivals follow a Poisson distribution with a mean arrival rate of λ and, therefore, inter-arrival time follows an exponential distribution with an average of $\frac{1}{\lambda}$.
5. Customer service also follows a Poisson distribution with a mean service rate of μ and, therefore, the service time follows an exponential distribution with an average of $\frac{1}{\mu}$.
6. Queue priority rule used is FIFO.

Besides this, all the computations of the research will be based on the following extra assumptions:

1. Arrivals can also be classified as scheduled (when students arrive in bundles) or random. Hence, **arrivals will be considered random** even though during the peak periods they seem scheduled.
2. Service can be considered a multi-phase or single phase depending on the number of steps of the process. As it was described above there are several steps that contribute to the final service, from

picking up food to paying. However, measuring all the small steps individually would be impossible and, in fact, irrelevant because the goal is to study the total service time. Therefore, the research works under the assumption the **service is a single-phase**, for both waiting lines.

RESULTS DISCUSSION

1. Arrivals and services

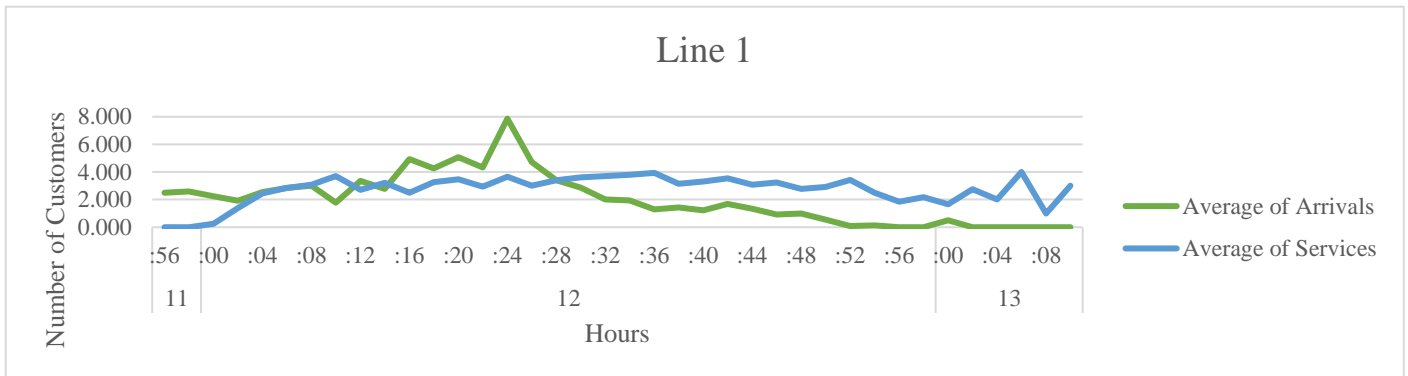


FIG. 2 – Plot of the average of arrivals and services during lunchtime for the pre-paid tickets waiting line. *Source: Data collection.*

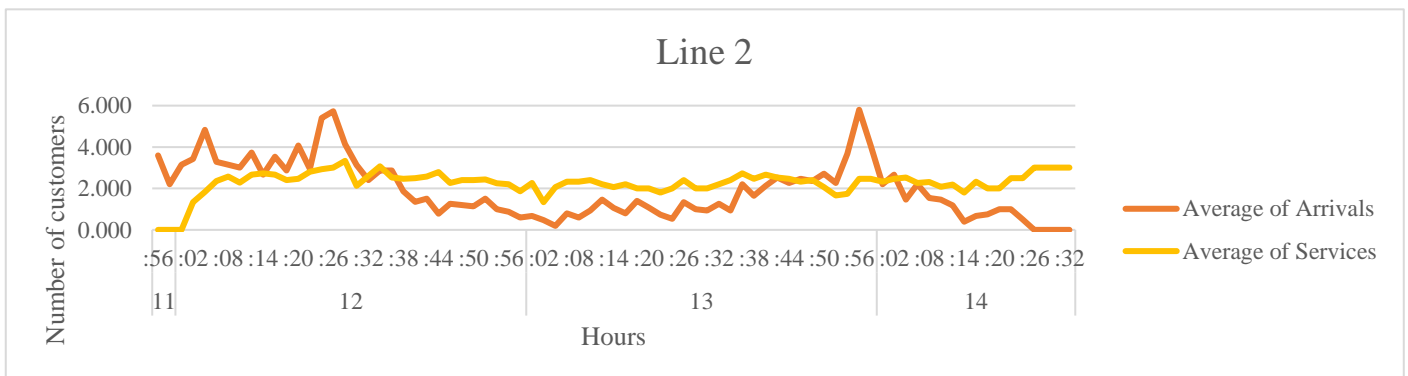


FIG. 3 – Plot of the average of arrivals and services during lunchtime for the waiting line without pre-paid tickets. *Source: Data collection.*

Several **conclusions** can be inferred from the data plotted:

1. **Line 1 only works during the first hour of lunchtime** since this is the period in which, on average, more customers arrive, in total. Arrive, on average per day, 77 customers at the line with pre-paid ticket and 89 at the line without pre-paid ticket (total of 166 customers), from 11:54 am to 1:10 pm, against 63 arriving from 1:10 pm to 2:34 pm at the only available line (without pre-paid ticket) *[Refer to appendix C for the sum of average arrivals].*

2. There is one **common peak of arrivals between 12:20 pm and 12:30 pm**, which corresponds to the hour bachelors leave classes. For line 2 there is also a **peak between 1:50 pm and 2 pm** which corresponds to the beginning of masters' lunchtime.
3. Looking at the **beginning of the period** (from 11:54 am to 12:04 pm) one can state that **services are really low and sometimes inexistent**. This means servers are not ready to start serving when the canteen opens for customers (around 11:54 am). This implies a queue exists almost from the opening of the canteen revealing a lack of planning from the canteen side since it should be ready to serve when the first customer arrives. This delays the whole process.
4. **Services** appear to be more or less constant and are **generally higher in line 1**. This may be an indicator that the service time in this queue is lower than in the one without pre-paid ticket.

2. Theoretical queue

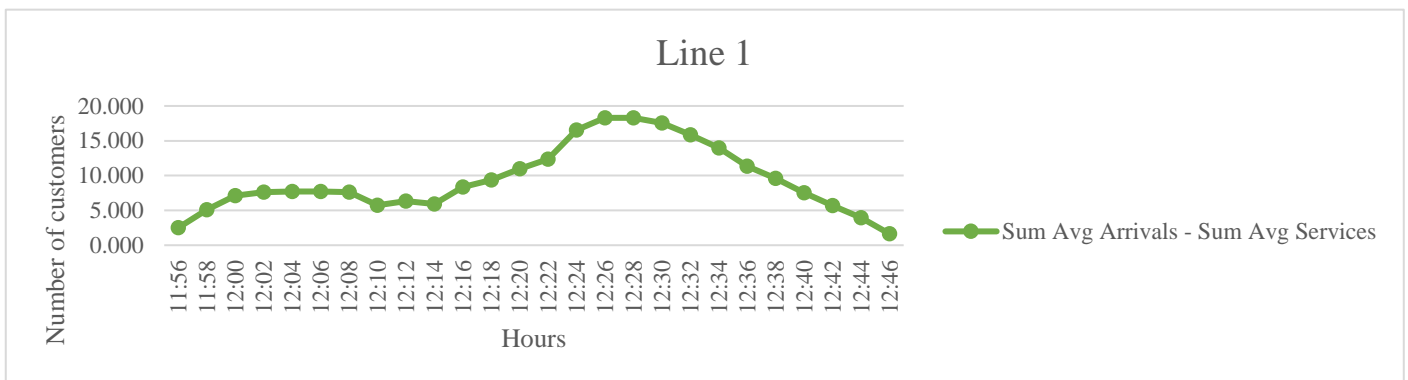


FIG. 4 – Plot of difference between the sum of the average of arrivals and the sum of the average of services for the waiting line with pre-paid tickets. *Source:* Data collection.

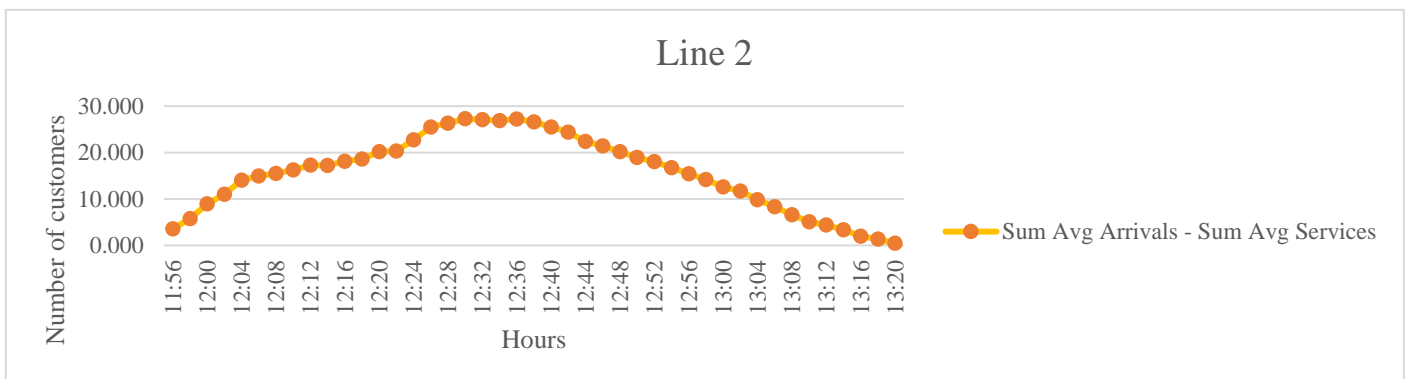


FIG. 5 – Plot of difference between the sum of the average of arrivals and the sum of the average of services for the waiting line without pre-paid tickets. *Source:* Data collection.

These graphs aim at having an idea of when, in theory, the queue would stop to exist (when the difference between the two sums reaches zero). It is important, however, to have in mind these are sums of the averages for each time period and, therefore, do not represent the actual reality but are a proxy to it. Nevertheless, in theory, for **Line 1, the queue would stop to exist at 12:48 pm**. For **line 2, the queue would vanish at 1:22 pm**. This means that, in theory, lines would not accumulate from the bachelors' lunchtime to masters' [Refer to appendix C for data on the cumulative sum of the average of arrivals and services].

3. Weekday seasonality

General note about weekdays: 1 – Monday and so on until 5 – Friday

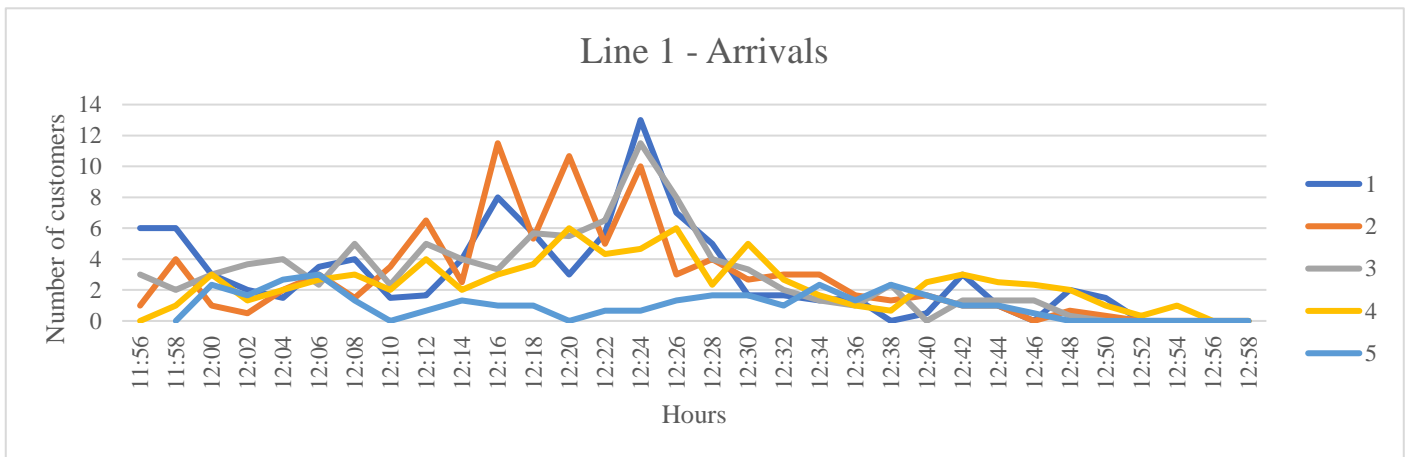


FIG. 6 –Plot of average arrivals for each one of the weekdays for Line 1. Source: Data collection.

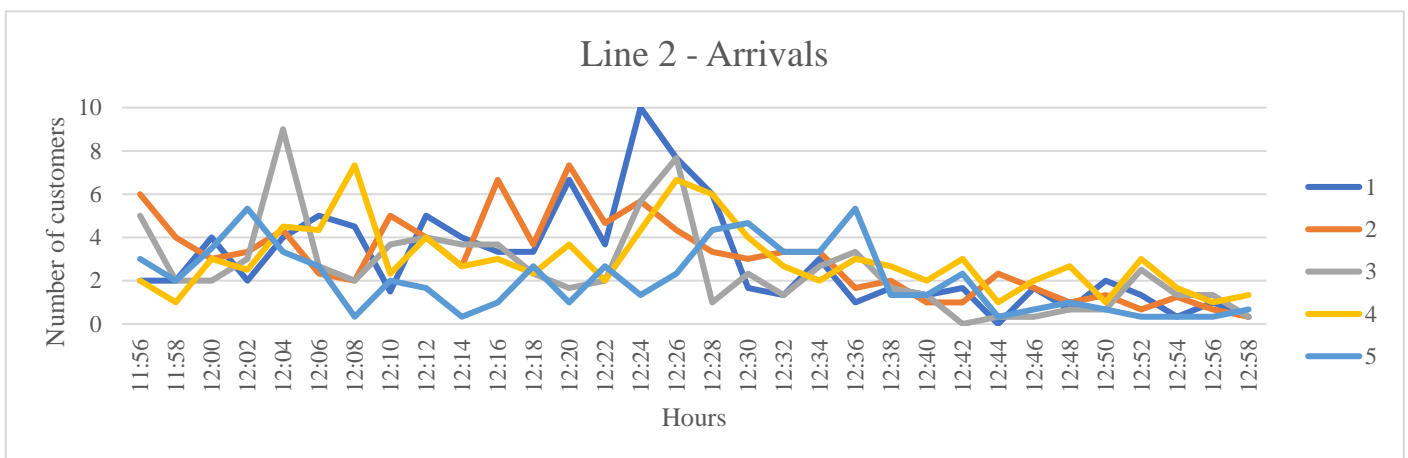


FIG. 7 –Plot of average arrivals for each one of the weekdays for Line 2. Source: Data collection.

By analyzing these graphs (plotted for the most problematic time period and for the one in which the patterns are different according to the day of the week) the following **conclusion** can be inferred: The **pattern of arrivals is similar in all days of the week**, except for Friday that follows a different pattern, for both lines. In fact, Fridays present a day with lower arrivals in general. This might be explained by the lack of classes for first-year students. Moreover, Monday, Tuesday and Wednesday are the weekdays with higher average rates of arrivals.

4. M/M/1 model applied

| M/M/1 | With Pre-paid Ticket Line 1 | Without pre-paid ticket Line 2 | |
|--|--------------------------------|-----------------------------------|---------------|
| | 11:54 am -1:10 pm | 11:54 am - 2:32 pm | |
| Inputs | | | |
| Arrival rate (lambda) | 1.014547185 | 0.970805555 | customers/min |
| Service rate (um) | 1.358800848 | 1.134042997 | customers/min |
| Intermediate Calculations | | | |
| Average time between arrivals (Inter-arrival time) | 59.1397 | 61.8043 | secs |
| Average service time | 44.1566 | 52.9080 | secs |
| Performance Measures | | | |
| Average utilization of the system | 74.66% | 85.61% | |
| Probability system is empty | 25.34% | 14.39% | |
| Average nr customers in the system | 2.9471 | 5.9472 | customers |
| Average nr customers waiting in queue | 2.2004 | 5.0911 | customers |
| Average time in the system | 2.9048 | 6.1260 | min |
| Average time in queue | 2.1689 | 5.2442 | min |
| Probability of a specific number of customers in the system | | | |
| Number (example) | 1 | 1 | customers |
| Probability | 18.92% | 12.32% | |

FIG. 8 –Summary of the results obtained by applying the M/M/1 queueing model (and its formulae) to both lines. Source: Data collection Note: the arrival rate and service rate were computed based on the averages per hour and not based on the raw data.

By applying the model formulae to our data, the results illustrated in the table above arose. From these results the following analysis can be made:

- 1. The arrival rate of line 1 (1.015 customers/min) is higher than the one of line 2 (0.97 customers/min).** This may happen due to the time frame considered – line 1 is basically focused on the first part of the lunchtime whereas for line 2 a wider time frame was considered, and this

includes periods of low arrivals. This translates into a **lower inter-arrival time for line 1 (59 s) when compared with line 2 (62 s).**

2. The service rate of line 1 (1.359 customers/min) is higher than line 2 (1.134 customers/min).

Considering there is the same number of workers (2) on both lines, this difference is assumed to come from the payment step (which is an extra step for line 2) that affects the number of customers that can be served per min. This means, as it was expected, **that it takes less time to be served (service time) if one has bought the ticket previously (44 s vs 53 s).**

3. As for the utilization rates, line 1 presents a lower value (74.66% vs 85.61%). Variations on service time due to customers' capability and supply variability (will be further explained on limitations) explain why the values are actually far from the maximum (100%). Following this rationale, this might indicate there are more resources unutilized in line 1.

4. Considering the probability the system is empty, it is higher for line 1 (25.34% vs 14.39%).

This may mean that this line receives fewer customers and/or serves them faster. This also is related to the utilization rate above described. It is logical that if there is a higher probability line 1 is empty then the resources will be less utilized than the ones for line 2.

5. In what concerns the average number of customers in the system, line 1 has, on average fewer people in the system when compared to line 2 (2.9471 customers vs 5.9472 customers). The same happens when considering only the average number of customers in queue (2.2004 customers vs 5.0911 customers). This a result of the differences in the arrival and service rates.

6. The average time a customer spends in the system is also lower for line 1 (2.9084 min vs 6.1260 min). The same happens when considering only the average time in queue (2.1689 min vs 5.2442 min). This is also a result of the differences in the arrival and service rates. In fact, the closer the arrival rate and service rate are, the higher the average time a customer spends in the system and, consequently, in queue. In fact, in line 2 the two rates are closer than in line 1 ($1.134 - 0.971$ [line 2] $< 1.359 - 1.015$ [line 1]) resulting in a higher average time a customer spends in the system.

7. Lastly, in what concerns the probability of having x customers in the system, it depends, of course, on the value of x . As an example, the probability of having 1 customer in the system is 18.92% for line 1 against 12.32% for line 2. For $x \leq 4$, line 1 has higher probabilities whereas, for $x \geq 4$, probabilities are higher for line 2. This means that the probability of having 4 or less customers in line is higher for line 1 whereas the **probability of having 4 or more customers in line is higher for line 2, indicating it has, usually a higher queue** [*Refer to appendix F for a table and graph with the probabilities described above*].

All this considered, it seems more time saving for customers to use line 1. However, it is clear that not all customers pre-buy the ticket and benefit from this advantage. This can be due to several reasons: 1) they only arrive during lunchtime; 2) they do not decide what they will have for lunch until lunchtime; 3) having classes in the morning, one may not have time to pre-buy the ticket.

5. Limitations of the study

Despite the conclusions this research has arrived to, some limitations were encountered:

1. **Students do part of the service.** Not all customers take the same time doing the different tasks described (pick up the tray, the cutlery, etc) since they have different levels of knowledge, skills, and physical abilities. Moreover, as customers usually arrive in groups, some tend to talk during this process, delaying it. This confers some variability to the service based on customers' capability – **capability variability** (Frei, 2006).
2. **Variability also exists on the supply side:** sometimes there are no trays, no cutlery, or no glasses available and customers must wait for their repositioning.
3. **Different days of the week** also influence the collect data since, for instance, on Monday and Friday there are fewer students in the university (no classes for first-year and second-year students respectively). Even though this was already further investigated, it influences the general average values computed and used for suggestions.

4. This study might not represent the everyday reality of the canteen since, on one hand, there is a high number of **students in exchange programs** and, on the other hand, in the **second-semester new master's students will start** their program. This said, the pool of possible customers will change and that might affect the conclusions of this research.
5. Sometimes, **servers send customers from line 2 to line 1 when line 1 is too small. This happens usually only between 1 pm and 1:15 pm.** This has consequences on the reliability of the data. Nevertheless, and even though data collection has been stopped whenever this occurs, this is not avoidable at 100%.
6. Some **students also cut the line** in order to be with their friends, influencing the reliability of arrivals.
7. The data collected was based on the concept of **averages**, more precisely, average rates (based on all the samples collected). Hence, this implies that **these values could have been highly influenced by an extreme value or outlier.**
8. Lastly, averages were computed for the whole timeframe considered for this study. It would be relevant to have **the service time, the average waiting time and the other variables computed above just for the most problematic period which is the bachelors' lunchtime.** However, these computations are impossible to calculate since, during this specific period, service rates are lower than arrivals rates breaking one of the model assumptions and making it impossible to calculate the aimed results.

MAIN PROBLEMS AND RECOMMENDATIONS

Main problems and sources of inefficiencies

The main problems and sources of inefficiencies identified in the course of this study will be presented in order to synthesize the problem:

1. Firstly, the design and **layout of the canteen** do not facilitate the process, for two reasons:

- a. The positioning of some items is not thought through: dressings are positioned before the place customers pick up the main dish (for line 1) and cutlery is (for line 1) positioned before the tray.
 - b. The two lines end up in the same finish point, where people often collide before leaving and where customers are allowed to use the dressings to better season their dishes.
2. Furthermore, the data collection process allowed the identification of another source of delay that would be impossible to infer from numbers: not everyone checks the menu before service, so **customers ask the servers, during the service, what the options are, or which are the ingredients before choosing and picking up the main dish**. This not only obliges servers to say the same information several times, but it also consumes time that could be used to serve other customers. In fact, a paper with the menu and the ingredients is available before the line but it is often difficult to make a match between what is in the list and the actual trays of food, especially for foreign people
 3. Moreover, also identified during the observation, for a certain period of time (before servers tell customers to mix lines) the **facilities destined to line 1 are unutilized**. Furthermore, from 1:50 pm onwards line 2 is the only one functioning (except for occasional arrivals on the other line). This represents a problem of unutilized capacity. This capacity could be used to reduce the waiting time of customers.
 4. Besides this, the **payment seems to take a lot of time**, proven by the differences in the average service times ($52\text{ s} - 44\text{ s} = 8\text{ s}$) since it is done by a server, representing 15% of total service time in line 2. Even though one can pay with credit card or MBWAY, there is no contactless option, for example. Moreover, if one wants an invoice with tax number this task takes even more time.
 5. Additionally, and probably the most relevant problem: **customers spend too much time in the system** (includes queue and service), even though the average numbers do not reflect it. During peak times **one can take 15 min to be served in line 1 and 20 min to be served in line 2**. [Source: collection of some spontaneous times] (based on limitation 8). This represents a concern since it can

be seen as an inefficiency that does not contribute to customer satisfaction and may prevent possible customers to choose to have lunch at the canteen.

Recommendations

In order to tackle the described problems, some suggestions will be presented:

1. In what concerns the layout of the canteen some things can be done:
 - a. Concerning bad positioning of the items, there are two main suggestions: 1) **Re-arrange the order** of the items for them to be, as much as possible, in the following order: tray, cutlery, napkin, glass, bread, dessert, soup, main dish and juice (This is assumed to decrease process time, on average, in 2 s); 2) **Remove the dressings from the middle of the process** to save time and allow customers to enter the process while others are just dressing the dish. This can be done by including a side table just for dressings purposes (This is assumed to decrease process time, on average, in 5s).
 - b. In order to solve the common finish line problem (same finishing point for both models), **a change in the start point of one of the queues is proposed**. It is important to say that, this suggestion to work, it is necessary to transform the non-linear balcony into a linear one since that also leads to collisions and is one of the sources of this problem. Moreover, we are assuming everything else constant. This said the layout would be as follows:

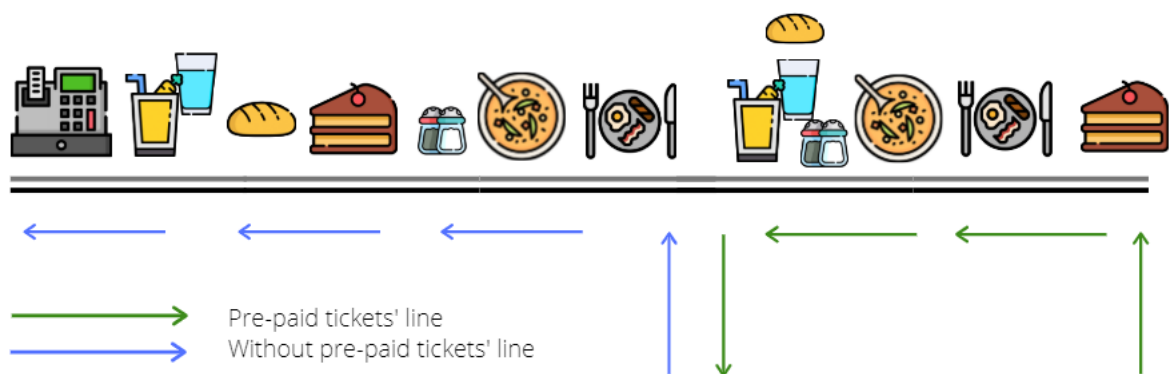


FIG. 9 – Display of items and queues in Nova SBE's canteen according to recommendation 1b.

This would help to decrease the traffic of people exiting and would also save space and costs since only one register machine would be necessary.

2. Concerning the problem of customers not knowing the main dishes and their ingredients previously to order it is suggested to include **next to the tray with food a paper stating the name of the dish and their ingredients**. This will allow customers to check this information right before order. (This is assumed to save, on average, 2 s of service time).
3. As for the slowness of the payment process, there are several recommendations. The solutions will be classified from easy (1) and cheap to implement (1) to expensive (5) and complicated (5):
 - a. Include the option of **contactless payment** through credit card. There is only the need to change the payment machine [Easiness of implementation: 1/5 and cost of implementation: 1/5].
 - b. Replace the manual payment done by a worker by an **automatic payment machine**. This could be placed before the customer starts to be served in order not to congest the process. This machine would allow customers to buy the ticket and pay directly in the machine with card, MBWAY or cash. Then, a ticket would come out and should be delivered at the end of the process as proof of payment. This requires an investment in the machine and re-education of customers. However, it will not only save time and release workers for other tasks but also decrease the perception of waiting time by the customers (because the customer would be occupied while waiting and waiting occupied decreases the precepted waiting time, as found in the literature review). Moreover, this represents benefits for the canteen: the process is more hygienic, there is less probability of human error in change and it would facilitate the reporting and tracking of the number of customers per day. Worth mentioning this could change the design and layout of the waiting lines, but this topic will be explored further down the paper [Easiness of implementation: 3/5 and cost of implementation: 3/5].
 - c. Create a **system that associates the student/staff card with the canteen service**. This means that, with the help of **an app**, students and staff could load their card account with money on the

app and also pre-buy and pre-pay the tickets for lunch at the canteen. When the customer arrived at the canteen there would be a machine (similar to the ones in public transportation) in which customers would validate the card. This would have several benefits for the canteen and customers, mostly the same described above with the extra benefit that there would be no money transactions taking place at the canteen. It has then to be decided if this would be mandatory or optional. If mandatory, this system could prevent external customers to have lunch. This recommendation might also change the design of the waiting lines. However, if optional the benefits of its implementation might not be achieved since the traditional method has to be kept [Easiness of implementation: 4/5 and cost of implementation: 4/5].

4. Lastly but not least, in order to solve the main issues that are the long waiting time and the unutilized capacity (mostly in line 1), **a more complex solution** will be presented, based on the following assumptions:
 - a. Recommendations 1a. (both 1) and 2) referring to the positioning of items), 2. (identification of dishes) and either 4a. or 4b. (automatic machine payment or system with student/staff card and app, this is, the payment is done previously to the service) are implemented successfully.
 - b. This first assumption (4a.) and the ones regarding how the suggestions would influence the time of service are considered true, and therefore, the service time is assumed to be lower in 9s.
 - c. The balcony is assumed to be changed to a linear one, instead of the current non-linear.
 - d. The reference service time used for this new model is the average service time for the line with pre-paid ticket (line 1) due to assumption 1 regarding recommendations 4a. or 4b.
 - e. The arrival rate was computed based on the averages of the sum of arrivals of both lines, per minute. This is, for 12:36 pm, for instance, the arrivals for this new recommendation are equal to the average of arrivals for line 1 plus the average of arrivals for line 2 from 12:34 pm to 12:36 pm [Refer to appendix G for more information on this calculation].

- f. The service time was determined previously to the service rate. The service time was computed as the service time calculated before for line 1 minus 9 s accordingly to the aforementioned assumptions.
- g. This new model is assumed to be a M/M/1 model as the ones used before.

All of this said, this new recommendation consists of the change of the layout and waiting lines design into a single line displayed as follows:

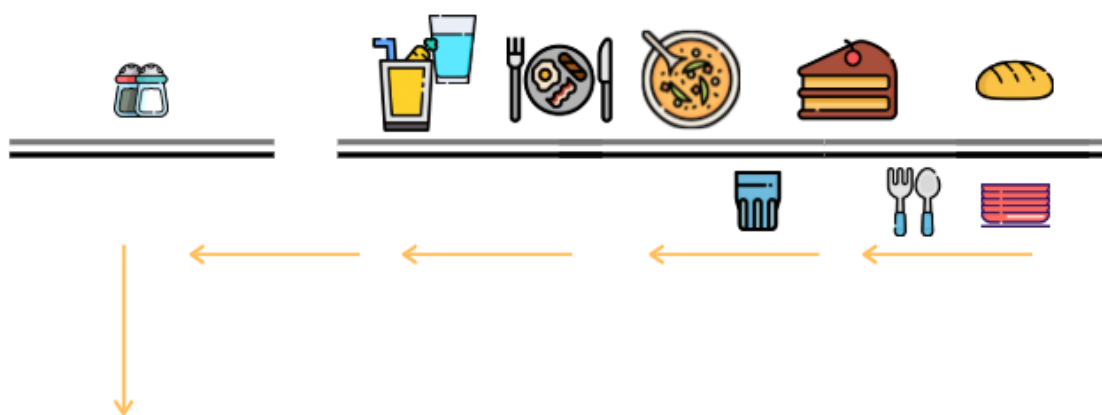


FIG. 10 – Display of items and queues in Nova SBE's canteen according to recommendation 5.

This said the following values would be the results of this new layout, according to all the aforementioned assumptions:

| | M/M/1 | Single Line | 11:54-14:32 |
|--|-------|--------------------------------------|---------------|
| Inputs | | | |
| Arrival rate (lambda) | | 1.458815593 | customers/min |
| Service rate (um) | | $\frac{1}{35.1566/60} = 1.706649676$ | customers/min |
| Intermediate Calculations | | | |
| Average time between arrivals (Inter-arrival time) | | 41.1293 | secs |
| Average service time | | $44.1566 - 9 = 35.1566$ | secs |
| Performance Measures | | | |
| Average utilization of the system | | 85.48% | |
| Probability system is empty | | 14.52% | |
| Average nr customers in the system | | 5.8863 | customers |
| Average nr customers waiting in queue | | 5.0315 | customers |
| Average time in the system | | 4.0350 | min |
| Average time in queue | | 3.4490 | min |
| Probability of a specific number of customers in the system | | | |
| Number | | 1 | customers |
| Probability | | 12.41% | |

FIG. 11 –*Summary of the results obtained by applying the M/M/1 queueing model (and its formulae) to a single line suggestion. Source: Data collection.*

According to this results, the following conclusions can be inferred:

1. The **service time would be lower** than in any of the current waiting lines. This implies the recommendation would increase the efficiency of the process.
2. **Average utilization rate (85.48%) would be very similar to the current of line 2 (85.61%)** and higher than current on line 1 (74.66%) but still under 100% meaning there is still some safe space if something out of ordinary happens, while still tackling the problem of unutilized capacity in line 1,
3. The probability of the system being empty is 14.52%, very similar to the current one of line 2 (14.39%) and lower than the current of line 1 (25.35%). One can conclude from results 2. And 3. that **capacity and facilities would be better exploited with these solutions, especially the ones currently allocated to line 1.**
4. As for the average number of customers and **the average time in queue and in the system**, the results are in between the current ones for the two lines, but still **lower than the current for line 2, representing a positive outcome** in what concerns one of the biggest problems of the canteen.

All in all, if all the assumptions can be satisfied and are correct, this seems a **good solution** to the problem. It is true that customers that usually use line 1 would be, at first sight, jeopardized but this solution also aims at making the process as fair as possible, while making the most out of the available resources. Nevertheless, it is clear that some assumptions might be hard to achieve [Easiness of implementation: 5/5 and cost of implementation: 5/5].

CONCLUSION

This study arrived at some important conclusions about the behavior of arrivals and services of ICA. Firstly, the line with pre-paid ticket (line 1) presents a higher arrival rate and a higher service rate, therefore, a lower inter-arrival time and a lower service time when compared to the line without pre-paid tickets (line 2). It also presents a lower utilization rate and a lower average number of customers

both in the queue and in the system. This results in a lower average time a customer spends in the system, making line 1 the most attractable line for customers, in theory. As for the sources of inefficiencies: the layout of the process was considered one of the main sources due to the misplacement of items and the common finish line for the two lines. Moreover, there are unutilized facilities, long service and waiting times and problems with payment methods. Several suggestions of improvement were presented from the change of order of items, going through the change of the payment methods ending up in a completely new display of the service with a single line and payment before the service. This last suggestion presents several benefits for both the canteen and the customer. Nevertheless, despite the success of this research, there are more topics to study regarding Nova SBE's canteen. As future research, the evaluation of the feasibility and efficiency of the cafeteria and the "made to order" business segments of ICA canteen in Nova SBE seem the way to go.

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APPENDICES

Appendix A: Raw data collect for the lines. Raw data includes weekday, day, start, end, min, arrivals, and services. The remaining values were computed as stated in the first line of the table.

Appendix A1: Raw data for line 1.

| | Weekday | Day | Start | End | min | Arrivals | Arrivals / Min Arrival Rate | 1 / Arrival rate Interarrival time | Services | Services / Min Service Rate | 1 / Service Rate Service time |
|----|---------|------------|-------|-------|-----|----------|--------------------------------|---------------------------------------|----------|--------------------------------|----------------------------------|
| 1 | 3 | 12-11-2019 | 12:00 | 12:02 | 2 | 0 | 0 | - | 0 | 0 | - |
| 2 | 3 | 12-11-2019 | 12:02 | 12:04 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 3 | 3 | 12-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 4 | 3 | 12-11-2019 | 12:06 | 12:08 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 5 | 3 | 12-11-2019 | 12:08 | 12:10 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 6 | 3 | 12-11-2019 | 12:10 | 12:12 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 7 | 3 | 12-11-2019 | 12:12 | 12:14 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 8 | 3 | 12-11-2019 | 12:14 | 12:16 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 9 | 3 | 12-11-2019 | 12:16 | 12:18 | 2 | 6 | 3 | 0.333 | 6 | 3 | 0.333 |
| 10 | 3 | 12-11-2019 | 12:18 | 12:20 | 2 | 15 | 7.5 | 0.133 | 3 | 1.5 | 0.667 |
| 11 | 3 | 12-11-2019 | 12:20 | 12:22 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 12 | 3 | 12-11-2019 | 12:22 | 12:24 | 2 | 4 | 2 | 0.500 | 7 | 3.5 | 0.286 |
| 13 | 3 | 12-11-2019 | 12:24 | 12:26 | 2 | 3 | 1.5 | 0.667 | 5 | 2.5 | 0.400 |
| 14 | 3 | 12-11-2019 | 12:26 | 12:28 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 15 | 3 | 12-11-2019 | 12:28 | 12:30 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 16 | 3 | 12-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 6 | 3 | 0.333 |
| 17 | 3 | 12-11-2019 | 12:32 | 12:34 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 18 | 3 | 12-11-2019 | 12:34 | 12:36 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 19 | 3 | 12-11-2019 | 12:36 | 12:38 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 20 | 3 | 12-11-2019 | 12:38 | 12:40 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 21 | 3 | 12-11-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 22 | 3 | 12-11-2019 | 12:42 | 12:44 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 23 | 3 | 12-11-2019 | 12:44 | 12:46 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 24 | 3 | 12-11-2019 | 12:46 | 12:48 | 2 | 2 | 1 | 1.000 | 6 | 3 | 0.333 |
| 25 | 3 | 12-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 26 | 3 | 12-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 27 | 4 | 13-11-2019 | 12:16 | 12:18 | 2 | 8 | 4 | 0.250 | 3 | 1.5 | 0.667 |
| 28 | 4 | 13-11-2019 | 12:18 | 12:20 | 2 | 10 | 5 | 0.200 | 5 | 2.5 | 0.400 |
| 29 | 4 | 13-11-2019 | 12:20 | 12:22 | 2 | 9 | 4.5 | 0.222 | 6 | 3 | 0.333 |
| 30 | 4 | 13-11-2019 | 12:22 | 12:24 | 2 | 14 | 7 | 0.143 | 4 | 2 | 0.500 |
| 31 | 4 | 13-11-2019 | 12:24 | 12:26 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 32 | 4 | 13-11-2019 | 12:26 | 12:28 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 33 | 4 | 13-11-2019 | 12:28 | 12:30 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 34 | 4 | 13-11-2019 | 12:32 | 12:34 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 35 | 4 | 13-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 9 | 4.5 | 0.222 |
| 36 | 4 | 13-11-2019 | 12:36 | 12:38 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 37 | 4 | 13-11-2019 | 12:38 | 12:40 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 38 | 4 | 13-11-2019 | 12:40 | 12:42 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 39 | 4 | 13-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 40 | 4 | 13-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 41 | 4 | 13-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 42 | 4 | 13-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 43 | 4 | 13-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 44 | 4 | 13-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 45 | 4 | 13-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 46 | 4 | 13-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 47 | 4 | 13-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 48 | 4 | 13-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 49 | 4 | 13-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 50 | 5 | 14-11-2019 | 12:00 | 12:02 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 51 | 5 | 14-11-2019 | 12:02 | 12:04 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 52 | 5 | 14-11-2019 | 12:04 | 12:06 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 53 | 5 | 14-11-2019 | 12:06 | 12:08 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 54 | 5 | 14-11-2019 | 12:08 | 12:10 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 55 | 5 | 14-11-2019 | 12:10 | 12:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 56 | 5 | 14-11-2019 | 12:12 | 12:14 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 57 | 5 | 14-11-2019 | 12:14 | 12:16 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 58 | 5 | 14-11-2019 | 12:16 | 12:18 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 59 | 5 | 14-11-2019 | 12:18 | 12:20 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 60 | 5 | 14-11-2019 | 12:20 | 12:22 | 2 | 6 | 3 | 0.333 | 5 | 2.5 | 0.400 |
| 61 | 5 | 14-11-2019 | 12:22 | 12:24 | 2 | 12 | 6 | 0.167 | 3 | 1.5 | 0.667 |
| 62 | 5 | 14-11-2019 | 12:24 | 12:26 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 63 | 5 | 14-11-2019 | 12:26 | 12:28 | 2 | 6 | 3 | 0.333 | 2 | 1 | 1.000 |
| 64 | 5 | 14-11-2019 | 12:28 | 12:30 | 2 | 5 | 2.5 | 0.400 | 5 | 2.5 | 0.400 |
| 65 | 5 | 14-11-2019 | 12:30 | 12:32 | 2 | 0 | 0 | - | 6 | 3 | 0.333 |
| 66 | 5 | 14-11-2019 | 12:32 | 12:34 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 67 | 5 | 14-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 68 | 5 | 14-11-2019 | 12:36 | 12:38 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 69 | 5 | 14-11-2019 | 12:38 | 12:40 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 70 | 5 | 14-11-2019 | 12:40 | 12:42 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 71 | 5 | 14-11-2019 | 12:42 | 12:44 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 72 | 5 | 14-11-2019 | 12:44 | 12:46 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 73 | 5 | 14-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 74 | 5 | 14-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 75 | 5 | 14-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 76 | 5 | 14-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 77 | 6 | 15-11-2019 | 11:58 | 12:00 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 78 | 6 | 15-11-2019 | 12:00 | 12:02 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 79 | 6 | 15-11-2019 | 12:02 | 12:04 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 80 | 6 | 15-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 81 | 6 | 15-11-2019 | 12:06 | 12:08 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 82 | 6 | 15-11-2019 | 12:08 | 12:10 | 2 | 0 | 0 | - | 0 | 0 | - |
| 83 | 6 | 15-11-2019 | 12:10 | 12:12 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 84 | 6 | 15-11-2019 | 12:12 | 12:14 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 85 | 6 | 15-11-2019 | 12:14 | 12:16 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 86 | 6 | 15-11-2019 | 12:16 | 12:18 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 87 | 6 | 15-11-2019 | 12:18 | 12:20 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 88 | 6 | 15-11-2019 | 12:20 | 12:22 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 89 | 6 | 15-11-2019 | 12:22 | 12:24 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 90 | 6 | 15-11-2019 | 12:24 | 12:26 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 91 | 6 | 15-11-2019 | 12:26 | 12:28 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 92 | 6 | 15-11-2019 | 12:28 | 12:30 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 93 | 6 | 15-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |

Work Project: Nova SBE's canteen: case study on queueing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 94 | 6 | 15-11-2019 | 12:32 | 12:34 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 95 | 6 | 15-11-2019 | 12:34 | 12:36 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 96 | 6 | 15-11-2019 | 12:36 | 12:38 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 97 | 6 | 15-11-2019 | 12:38 | 12:40 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 98 | 6 | 15-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 0 | 0 | - |
| 99 | 6 | 15-11-2019 | 12:42 | 12:44 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 100 | 6 | 15-11-2019 | 12:44 | 12:46 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 101 | 6 | 15-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 102 | 6 | 15-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 0 | 0 | - |
| 103 | 6 | 15-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 0 | 0 | - |
| 104 | 6 | 15-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 0 | 0 | - |
| 105 | 6 | 15-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 0 | 0 | - |
| 106 | 6 | 15-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 0 | 0 | - |
| 107 | 6 | 15-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 0 | 0 | - |
| 108 | 6 | 15-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 0 | 0 | - |
| 109 | 6 | 15-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 0 | 0 | - |
| 110 | 2 | 18-11-2019 | 12:10 | 12:12 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 111 | 2 | 18-11-2019 | 12:12 | 12:14 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 112 | 2 | 18-11-2019 | 12:14 | 12:16 | 2 | 8 | 4 | 0.250 | 2 | 1 | 1.000 |
| 113 | 2 | 18-11-2019 | 12:16 | 12:18 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 114 | 2 | 18-11-2019 | 12:18 | 12:20 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 115 | 2 | 18-11-2019 | 12:20 | 12:22 | 2 | 7 | 3.5 | 0.286 | 0 | 0 | - |
| 116 | 2 | 18-11-2019 | 12:22 | 12:24 | 2 | 20 | 10 | 0.100 | 2 | 1 | 1.000 |
| 117 | 2 | 18-11-2019 | 12:24 | 12:26 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 118 | 2 | 18-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 119 | 2 | 18-11-2019 | 12:28 | 12:30 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 120 | 2 | 18-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 121 | 2 | 18-11-2019 | 12:32 | 12:34 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 122 | 2 | 18-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 123 | 2 | 18-11-2019 | 12:36 | 12:38 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 124 | 2 | 18-11-2019 | 12:38 | 12:40 | 2 | 0 | 0 | - | 6 | 3 | 0.333 |
| 125 | 2 | 18-11-2019 | 12:40 | 12:42 | 2 | 4 | 2 | 0.500 | 6 | 3 | 0.333 |
| 126 | 2 | 18-11-2019 | 12:42 | 12:44 | 2 | 1 | 0.5 | 2.000 | 6 | 3 | 0.333 |
| 127 | 2 | 18-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 128 | 2 | 18-11-2019 | 12:46 | 12:48 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 129 | 2 | 18-11-2019 | 12:48 | 12:50 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 130 | 2 | 18-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 131 | 2 | 18-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 132 | 2 | 18-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 133 | 2 | 18-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 134 | 2 | 18-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 135 | 2 | 18-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 136 | 2 | 18-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 137 | 2 | 18-11-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 138 | 2 | 18-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 139 | 2 | 18-11-2019 | 13:08 | 13:10 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 140 | 3 | 19-11-2019 | 11:58 | 12:00 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 141 | 3 | 19-11-2019 | 12:00 | 12:02 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 142 | 3 | 19-11-2019 | 12:02 | 12:04 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 143 | 3 | 19-11-2019 | 12:04 | 12:06 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 144 | 3 | 19-11-2019 | 12:06 | 12:08 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 145 | 3 | 19-11-2019 | 12:08 | 12:10 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 146 | 3 | 19-11-2019 | 12:10 | 12:12 | 2 | 7 | 3.5 | 0.286 | 3 | 1.5 | 0.667 |
| 147 | 3 | 19-11-2019 | 12:12 | 12:14 | 2 | 3 | 1.5 | 0.667 | 8 | 4 | 0.250 |
| 148 | 3 | 19-11-2019 | 12:14 | 12:16 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 149 | 3 | 19-11-2019 | 12:16 | 12:18 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 150 | 3 | 19-11-2019 | 12:18 | 12:20 | 2 | 17 | 8.5 | 0.118 | 7 | 3.5 | 0.286 |
| 151 | 3 | 19-11-2019 | 12:20 | 12:22 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 152 | 3 | 19-11-2019 | 12:22 | 12:24 | 2 | 8 | 4 | 0.250 | 6 | 3 | 0.333 |
| 153 | 3 | 19-11-2019 | 12:24 | 12:26 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 154 | 3 | 19-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 155 | 3 | 19-11-2019 | 12:28 | 12:30 | 2 | 8 | 4 | 0.250 | 6 | 3 | 0.333 |
| 156 | 3 | 19-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 157 | 3 | 19-11-2019 | 12:32 | 12:34 | 2 | 6 | 3 | 0.333 | 6 | 3 | 0.333 |
| 158 | 3 | 19-11-2019 | 12:34 | 12:36 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 159 | 3 | 19-11-2019 | 12:36 | 12:38 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 160 | 3 | 19-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 161 | 3 | 19-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 162 | 3 | 19-11-2019 | 12:42 | 12:44 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 163 | 3 | 19-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 6 | 3 | 0.333 |
| 164 | 3 | 19-11-2019 | 12:46 | 12:48 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 165 | 3 | 19-11-2019 | 12:48 | 12:50 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 166 | 3 | 19-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 167 | 4 | 20-11-2019 | 12:00 | 12:02 | 2 | 8 | 4 | 0.250 | 0 | 0 | - |
| 168 | 4 | 20-11-2019 | 12:02 | 12:04 | 2 | 5 | 2.5 | 0.400 | 0 | 0 | - |
| 169 | 4 | 20-11-2019 | 12:04 | 12:06 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 170 | 4 | 20-11-2019 | 12:06 | 12:08 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 171 | 4 | 20-11-2019 | 12:08 | 12:10 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 172 | 4 | 20-11-2019 | 12:10 | 12:12 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 173 | 4 | 20-11-2019 | 12:12 | 12:14 | 2 | 4 | 2 | 0.500 | 5 | 2.5 | 0.400 |
| 174 | 4 | 20-11-2019 | 12:14 | 12:16 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 175 | 4 | 20-11-2019 | 12:16 | 12:18 | 2 | 8 | 4 | 0.250 | 3 | 1.5 | 0.667 |
| 176 | 4 | 20-11-2019 | 12:18 | 12:20 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 177 | 4 | 20-11-2019 | 12:20 | 12:22 | 2 | 6 | 3 | 0.333 | 2 | 1 | 1.000 |
| 178 | 4 | 20-11-2019 | 12:22 | 12:24 | 2 | 10 | 5 | 0.200 | 4 | 2 | 0.500 |
| 179 | 4 | 20-11-2019 | 12:24 | 12:26 | 2 | 5 | 2.5 | 0.400 | 6 | 3 | 0.333 |
| 180 | 4 | 20-11-2019 | 12:26 | 12:28 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 181 | 4 | 20-11-2019 | 12:28 | 12:30 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 182 | 4 | 20-11-2019 | 12:30 | 12:32 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 183 | 4 | 20-11-2019 | 12:32 | 12:34 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 184 | 4 | 20-11-2019 | 12:34 | 12:36 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 185 | 4 | 20-11-2019 | 12:36 | 12:38 | 2 | 0 | 0 | - | 6 | 3 | 0.333 |
| 186 | 4 | 20-11-2019 | 12:38 | 12:40 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 187 | 4 | 20-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 188 | 4 | 20-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 189 | 4 | 20-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 7 | 3.5 | 0.286 |
| 190 | 4 | 20-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 191 | 4 | 20-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 192 | 4 | 20-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 193 | 4 | 20-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 194 | 4 | 20-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 195 | 5 | 21-11-2019 | 12:00 | 12:02 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 196 | 5 | 21-11-2019 | 12:02 | 12:04 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 197 | 5 | 21-11-2019 | 12:04 | 12:06 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 198 | 5 | 21-11-2019 | 12:06 | 12:08 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 199 | 5 | 21-11-2019 | 12:08 | 12:10 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 200 | 5 | 21-11-2019 | 12:10 | 12:12 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 201 | 5 | 21-11-2019 | 12:12 | 12:14 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 202 | 5 | 21-11-2019 | 12:14 | 12:16 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 203 | 5 | 21-11-2019 | 12:16 | 12:18 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 204 | 5 | 21-11-2019 | 12:18 | 12:20 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |

Work Project: Nova SBE's canteen: case study on queuing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 205 | 5 | 21-11-2019 | 12:20 | 12:22 | 2 | 4 | 2 | 0.500 | 5 | 2.5 | 0.400 |
| 206 | 5 | 21-11-2019 | 12:22 | 12:24 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 207 | 5 | 21-11-2019 | 12:24 | 12:26 | 2 | 12 | 6 | 0.167 | 3 | 1.5 | 0.667 |
| 208 | 5 | 21-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 209 | 5 | 21-11-2019 | 12:28 | 12:30 | 2 | 11 | 5.5 | 0.182 | 2 | 1 | 1.000 |
| 210 | 5 | 21-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 8 | 4 | 0.250 |
| 211 | 5 | 21-11-2019 | 12:32 | 12:34 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 212 | 5 | 21-11-2019 | 12:34 | 12:36 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 213 | 5 | 21-11-2019 | 12:36 | 12:38 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 214 | 5 | 21-11-2019 | 12:38 | 12:40 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 215 | 5 | 21-11-2019 | 12:40 | 12:42 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 216 | 5 | 21-11-2019 | 12:42 | 12:44 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 217 | 5 | 21-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 218 | 5 | 21-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 219 | 5 | 21-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 220 | 5 | 21-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 221 | 6 | 22-11-2019 | 11:58 | 12:00 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 222 | 6 | 22-11-2019 | 12:00 | 12:02 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 223 | 6 | 22-11-2019 | 12:02 | 12:04 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 224 | 6 | 22-11-2019 | 12:04 | 12:06 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 225 | 6 | 22-11-2019 | 12:06 | 12:08 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 226 | 6 | 22-11-2019 | 12:08 | 12:10 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 227 | 6 | 22-11-2019 | 12:10 | 12:12 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 228 | 6 | 22-11-2019 | 12:12 | 12:14 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 229 | 6 | 22-11-2019 | 12:14 | 12:16 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 230 | 6 | 22-11-2019 | 12:16 | 12:18 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 231 | 6 | 22-11-2019 | 12:18 | 12:20 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 232 | 6 | 22-11-2019 | 12:20 | 12:22 | 2 | 0 | 0 | - | 0 | 0 | - |
| 233 | 6 | 22-11-2019 | 12:22 | 12:24 | 2 | 0 | 0 | - | 0 | 0 | - |
| 234 | 6 | 22-11-2019 | 12:24 | 12:26 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 235 | 6 | 22-11-2019 | 12:26 | 12:28 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 236 | 6 | 22-11-2019 | 12:28 | 12:30 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |
| 237 | 6 | 22-11-2019 | 12:30 | 12:32 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 238 | 6 | 22-11-2019 | 12:32 | 12:34 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 239 | 6 | 22-11-2019 | 12:34 | 12:36 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 240 | 6 | 22-11-2019 | 12:36 | 12:38 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |
| 241 | 6 | 22-11-2019 | 12:38 | 12:40 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 242 | 6 | 22-11-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 243 | 2 | 25-11-2019 | 12:00 | 12:02 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 244 | 2 | 25-11-2019 | 12:02 | 12:04 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 245 | 2 | 25-11-2019 | 12:04 | 12:06 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 246 | 2 | 25-11-2019 | 12:06 | 12:08 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 247 | 2 | 25-11-2019 | 12:08 | 12:10 | 2 | 3 | 1.5 | 0.667 | 5 | 2.5 | 0.400 |
| 248 | 2 | 25-11-2019 | 12:10 | 12:12 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 249 | 2 | 25-11-2019 | 12:12 | 12:14 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 250 | 2 | 25-11-2019 | 12:14 | 12:16 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 251 | 2 | 25-11-2019 | 12:16 | 12:18 | 2 | 7 | 3.5 | 0.286 | 4 | 2 | 0.500 |
| 252 | 2 | 25-11-2019 | 12:18 | 12:20 | 2 | 4 | 2 | 0.500 | 5 | 2.5 | 0.400 |
| 253 | 2 | 25-11-2019 | 12:20 | 12:22 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 254 | 2 | 25-11-2019 | 12:22 | 12:24 | 2 | 18 | 9 | 0.111 | 6 | 3 | 0.333 |
| 255 | 2 | 25-11-2019 | 12:24 | 12:26 | 2 | 7 | 3.5 | 0.286 | 4 | 2 | 0.500 |
| 256 | 2 | 25-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 257 | 2 | 25-11-2019 | 12:28 | 12:30 | 2 | 1 | 0.5 | 2.000 | 7 | 3.5 | 0.286 |
| 258 | 2 | 25-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 259 | 2 | 25-11-2019 | 12:32 | 12:34 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 260 | 2 | 25-11-2019 | 12:34 | 12:36 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 261 | 2 | 25-11-2019 | 12:36 | 12:38 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 262 | 2 | 25-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 263 | 2 | 25-11-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 264 | 2 | 25-11-2019 | 12:42 | 12:44 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 265 | 2 | 25-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 266 | 2 | 25-11-2019 | 12:46 | 12:48 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 267 | 2 | 25-11-2019 | 12:48 | 12:50 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 268 | 2 | 25-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 269 | 2 | 25-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 270 | 2 | 25-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 271 | 2 | 25-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 272 | 2 | 25-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 273 | 3 | 26-11-2019 | 11:54 | 11:56 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 274 | 3 | 26-11-2019 | 11:56 | 11:58 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |
| 275 | 3 | 26-11-2019 | 11:58 | 12:00 | 2 | 0 | 0 | - | 0 | 0 | - |
| 276 | 3 | 26-11-2019 | 12:00 | 12:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 277 | 3 | 26-11-2019 | 12:02 | 12:04 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 278 | 3 | 26-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 279 | 3 | 26-11-2019 | 12:06 | 12:08 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 280 | 3 | 26-11-2019 | 12:08 | 12:10 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 281 | 3 | 26-11-2019 | 12:10 | 12:12 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 282 | 3 | 26-11-2019 | 12:12 | 12:14 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 283 | 3 | 26-11-2019 | 12:14 | 12:16 | 2 | 19 | 9.5 | 0.105 | 5 | 2.5 | 0.400 |
| 284 | 3 | 26-11-2019 | 12:16 | 12:18 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 285 | 3 | 26-11-2019 | 12:18 | 12:20 | 2 | 5 | 2.5 | 0.400 | 6 | 3 | 0.333 |
| 286 | 3 | 26-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 6 | 3 | 0.333 |
| 287 | 3 | 26-11-2019 | 12:22 | 12:24 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 288 | 3 | 26-11-2019 | 12:24 | 12:26 | 2 | 0 | 0 | - | 6 | 3 | 0.333 |
| 289 | 3 | 26-11-2019 | 12:26 | 12:28 | 2 | 6 | 3 | 0.333 | 6 | 3 | 0.333 |
| 290 | 3 | 26-11-2019 | 12:28 | 12:30 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 291 | 3 | 26-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 5 | 2.5 | 0.400 |
| 292 | 3 | 26-11-2019 | 12:32 | 12:34 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 293 | 3 | 26-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 294 | 3 | 26-11-2019 | 12:36 | 12:38 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 295 | 3 | 26-11-2019 | 12:38 | 12:40 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 296 | 3 | 26-11-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 297 | 3 | 26-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 298 | 3 | 26-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 299 | 3 | 26-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 300 | 3 | 26-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 301 | 4 | 27-11-2019 | 11:54 | 11:56 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 302 | 4 | 27-11-2019 | 11:56 | 11:58 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 303 | 4 | 27-11-2019 | 11:58 | 12:00 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 304 | 4 | 27-11-2019 | 12:00 | 12:02 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 305 | 4 | 27-11-2019 | 12:02 | 12:04 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 306 | 4 | 27-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 307 | 4 | 27-11-2019 | 12:06 | 12:08 | 2 | 10 | 5 | 0.200 | 5 | 2.5 | 0.400 |
| 308 | 4 | 27-11-2019 | 12:08 | 12:10 | 2 | 0 | 0 | - | 7 | 3.5 | 0.286 |
| 309 | 4 | 27-11-2019 | 12:10 | 12:12 | 2 | 7 | 3.5 | 0.286 | 3 | 1.5 | 0.667 |
| 310 | 4 | 27-11-2019 | 12:12 | 12:14 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 311 | 4 | 27-11-2019 | 12:14 | 12:16 | 2 | 8 | 4 | 0.250 | 5 | 2.5 | 0.400 |
| 312 | 4 | 27-11-2019 | 12:16 | 12:18 | 2 | 5 | 2.5 | 0.400 | 5 | 2.5 | 0.400 |
| 313 | 4 | 27-11-2019 | 12:18 | 12:20 | 2 | 5 | 2.5 | 0.400 | 5 | 2.5 | 0.400 |
| 314 | 4 | 27-11-2019 | 12:20 | 12:22 | 2 | 7 | 3.5 | 0.286 | 4 | 2 | 0.500 |
| 315 | 4 | 27-11-2019 | 12:22 | 12:24 | 2 | 13 | 6.5 | 0.154 | 6 | 3 | 0.333 |

Work Project: Nova SBE's canteen: case study on queuing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 316 | 4 | 27-11-2019 | 12:24 | 12:26 | 2 | 11 | 5.5 | 0.182 | 3 | 1.5 | 0.667 |
| 317 | 4 | 27-11-2019 | 12:26 | 12:28 | 2 | 3 | 1.5 | 0.667 | 6 | 3 | 0.333 |
| 318 | 4 | 27-11-2019 | 12:28 | 12:30 | 2 | 3 | 1.5 | 0.667 | 5 | 2.5 | 0.400 |
| 319 | 4 | 27-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 6 | 3 | 0.333 |
| 320 | 4 | 27-11-2019 | 12:32 | 12:34 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 321 | 4 | 27-11-2019 | 12:34 | 12:36 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 322 | 4 | 27-11-2019 | 12:36 | 12:38 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 323 | 4 | 27-11-2019 | 12:38 | 12:40 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 324 | 4 | 27-11-2019 | 12:40 | 12:42 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 325 | 4 | 27-11-2019 | 12:42 | 12:44 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 326 | 4 | 27-11-2019 | 12:44 | 12:46 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 327 | 4 | 27-11-2019 | 12:46 | 12:48 | 2 | 1 | 0.5 | 2.000 | 6 | 3 | 0.333 |
| 328 | 4 | 27-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 329 | 4 | 27-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 330 | 5 | 28-11-2019 | 11:54 | 11:56 | 2 | 0 | 0 | - | 0 | 0 | - |
| 331 | 5 | 28-11-2019 | 11:56 | 11:58 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 332 | 5 | 28-11-2019 | 11:58 | 12:00 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 333 | 5 | 28-11-2019 | 12:00 | 12:02 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 334 | 5 | 28-11-2019 | 12:02 | 12:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 335 | 5 | 28-11-2019 | 12:04 | 12:06 | 2 | 0 | 0 | - | 0 | 0 | - |
| 336 | 5 | 28-11-2019 | 12:06 | 12:08 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 337 | 5 | 28-11-2019 | 12:08 | 12:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 338 | 5 | 28-11-2019 | 12:10 | 12:12 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 339 | 5 | 28-11-2019 | 12:12 | 12:14 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 340 | 5 | 28-11-2019 | 12:14 | 12:16 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 341 | 5 | 28-11-2019 | 12:16 | 12:18 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 342 | 5 | 28-11-2019 | 12:18 | 12:20 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 343 | 5 | 28-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 344 | 5 | 28-11-2019 | 12:22 | 12:24 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 345 | 5 | 28-11-2019 | 12:24 | 12:26 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 346 | 5 | 28-11-2019 | 12:26 | 12:28 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 347 | 5 | 28-11-2019 | 12:28 | 12:30 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 348 | 5 | 28-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 349 | 5 | 28-11-2019 | 12:32 | 12:34 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 350 | 5 | 28-11-2019 | 12:34 | 12:36 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 351 | 5 | 28-11-2019 | 12:36 | 12:38 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 352 | 5 | 28-11-2019 | 12:44 | 12:46 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |
| 353 | 5 | 28-11-2019 | 12:46 | 12:48 | 2 | 4 | 2 | 0.500 | 1 | 0.5 | 2.000 |
| 354 | 5 | 28-11-2019 | 12:48 | 12:50 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 355 | 5 | 28-11-2019 | 12:50 | 12:52 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 356 | 5 | 28-11-2019 | 12:52 | 12:54 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 357 | 5 | 28-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 0 | 0 | - |
| 358 | 5 | 28-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 359 | 5 | 28-11-2019 | 12:58 | 13:00 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 360 | 5 | 28-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 361 | 5 | 28-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 362 | 6 | 29-11-2019 | 11:56 | 11:58 | 2 | 0 | 0 | - | 0 | 0 | - |
| 363 | 6 | 29-11-2019 | 11:58 | 12:00 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 364 | 6 | 29-11-2019 | 12:00 | 12:02 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 365 | 6 | 29-11-2019 | 12:02 | 12:04 | 2 | 3 | 1.5 | 0.667 | 5 | 2.5 | 0.400 |
| 366 | 6 | 29-11-2019 | 12:04 | 12:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 367 | 6 | 29-11-2019 | 12:06 | 12:08 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 368 | 6 | 29-11-2019 | 12:08 | 12:10 | 2 | 0 | 0 | - | 0 | 0 | - |
| 369 | 6 | 29-11-2019 | 12:10 | 12:12 | 2 | 0 | 0 | - | 0 | 0 | - |
| 370 | 6 | 29-11-2019 | 12:12 | 12:14 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 371 | 6 | 29-11-2019 | 12:14 | 12:16 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 372 | 6 | 29-11-2019 | 12:16 | 12:18 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 373 | 6 | 29-11-2019 | 12:18 | 12:20 | 2 | 0 | 0 | - | 0 | 0 | - |
| 374 | 6 | 29-11-2019 | 12:20 | 12:22 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 375 | 6 | 29-11-2019 | 12:22 | 12:24 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 376 | 6 | 29-11-2019 | 12:24 | 12:26 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 377 | 6 | 29-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 378 | 6 | 29-11-2019 | 12:28 | 12:30 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 379 | 6 | 29-11-2019 | 12:30 | 12:32 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 380 | 6 | 29-11-2019 | 12:32 | 12:34 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 381 | 6 | 29-11-2019 | 12:34 | 12:36 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 382 | 6 | 29-11-2019 | 12:36 | 12:38 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 383 | 6 | 29-11-2019 | 12:38 | 12:40 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 384 | 6 | 29-11-2019 | 12:40 | 12:42 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 385 | 6 | 29-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 386 | 6 | 29-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 0 | 0 | - |
| 387 | 6 | 29-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 0 | 0 | - |
| 388 | 6 | 29-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 0 | 0 | - |
| 389 | 6 | 29-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 0 | 0 | - |
| 390 | 6 | 29-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 0 | 0 | - |
| 391 | 6 | 29-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 0 | 0 | - |
| 392 | 6 | 29-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 0 | 0 | - |
| 393 | 6 | 29-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 0 | 0 | - |
| 394 | 2 | 02-12-2019 | 11:54 | 11:56 | 2 | 6 | 3 | 0.333 | 0 | 0 | - |
| 395 | 2 | 02-12-2019 | 11:56 | 11:58 | 2 | 6 | 3 | 0.333 | 0 | 0 | - |
| 396 | 2 | 02-12-2019 | 11:58 | 12:00 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 397 | 2 | 02-12-2019 | 12:00 | 12:02 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 398 | 2 | 02-12-2019 | 12:02 | 12:04 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 399 | 2 | 02-12-2019 | 12:04 | 12:06 | 2 | 4 | 2 | 0.500 | 6 | 3 | 0.333 |
| 400 | 2 | 02-12-2019 | 12:06 | 12:08 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 401 | 2 | 02-12-2019 | 12:08 | 12:10 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 402 | 2 | 02-12-2019 | 12:10 | 12:12 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 403 | 2 | 02-12-2019 | 12:12 | 12:14 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 404 | 2 | 02-12-2019 | 12:14 | 12:16 | 2 | 10 | 5 | 0.200 | 3 | 1.5 | 0.667 |
| 405 | 2 | 02-12-2019 | 12:16 | 12:18 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 406 | 2 | 02-12-2019 | 12:18 | 12:20 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 407 | 2 | 02-12-2019 | 12:20 | 12:22 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 408 | 2 | 02-12-2019 | 12:22 | 12:24 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 409 | 2 | 02-12-2019 | 12:24 | 12:26 | 2 | 9 | 4.5 | 0.222 | 3 | 1.5 | 0.667 |
| 410 | 2 | 02-12-2019 | 12:26 | 12:28 | 2 | 11 | 5.5 | 0.182 | 6 | 3 | 0.333 |
| 411 | 2 | 02-12-2019 | 12:28 | 12:30 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 412 | 2 | 02-12-2019 | 12:30 | 12:32 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 413 | 2 | 02-12-2019 | 12:32 | 12:34 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |

Appendix A2: Raw data for line 2.

| Weekday | Day | Start | End | min | Arrivals | Arrivals / Min | | Completed | Services / Min | | |
|---------|-----|------------|-------|-------|----------|----------------|---------------------------------------|-----------|----------------|----------------------------------|-------|
| | | | | | | Arrival Rate | 1 / Arrival rate Interarrival time | | Service Rate | 1 / Service Rate Service time | |
| 1 | 2 | 12-11-2019 | 12:00 | 12:02 | 2 | 4 | 2 | 0.500 | 1 | 0.5 | 2.000 |
| 2 | 2 | 12-11-2019 | 12:02 | 12:04 | 2 | 4 | 2 | 0.500 | 1 | 0.5 | 2.000 |
| 3 | 2 | 12-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 4 | 2 | 12-11-2019 | 12:06 | 12:08 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 5 | 2 | 12-11-2019 | 12:08 | 12:10 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 6 | 2 | 12-11-2019 | 12:10 | 12:12 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 7 | 2 | 12-11-2019 | 12:12 | 12:14 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 8 | 2 | 12-11-2019 | 12:14 | 12:16 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 9 | 2 | 12-11-2019 | 12:16 | 12:18 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 10 | 2 | 12-11-2019 | 12:18 | 12:20 | 2 | 7 | 3.5 | 0.286 | 4 | 2 | 0.500 |
| 11 | 2 | 12-11-2019 | 12:20 | 12:22 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 12 | 2 | 12-11-2019 | 12:22 | 12:24 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 13 | 2 | 12-11-2019 | 12:24 | 12:26 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 14 | 2 | 12-11-2019 | 12:26 | 12:28 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 15 | 2 | 12-11-2019 | 12:28 | 12:30 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 16 | 2 | 12-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 17 | 2 | 12-11-2019 | 12:32 | 12:36 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 18 | 2 | 12-11-2019 | 13:26 | 13:28 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 19 | 2 | 12-11-2019 | 13:28 | 13:32 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 20 | 2 | 12-11-2019 | 13:32 | 13:34 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 21 | 2 | 12-11-2019 | 13:34 | 13:36 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 22 | 2 | 12-11-2019 | 13:36 | 13:38 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 23 | 2 | 12-11-2019 | 13:38 | 13:40 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 24 | 2 | 12-11-2019 | 13:40 | 13:42 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 25 | 2 | 12-11-2019 | 13:42 | 13:44 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 26 | 2 | 12-11-2019 | 13:44 | 13:46 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 27 | 2 | 12-11-2019 | 13:46 | 12:34 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 32 | 2 | 12-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 33 | 2 | 12-11-2019 | 12:36 | 12:38 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 34 | 2 | 12-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 35 | 2 | 12-11-2019 | 12:40 | 12:42 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 36 | 2 | 12-11-2019 | 12:42 | 12:44 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 37 | 2 | 12-11-2019 | 12:44 | 12:46 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 38 | 2 | 12-11-2019 | 12:46 | 12:50 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 39 | 2 | 12-11-2019 | 12:50 | 12:48 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 40 | 2 | 12-11-2019 | 12:48 | 14:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 41 | 2 | 12-11-2019 | 14:10 | 14:12 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 42 | 2 | 12-11-2019 | 14:12 | 14:14 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 43 | 2 | 12-11-2019 | 14:08 | 12:54 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 44 | 2 | 12-11-2019 | 12:54 | 12:56 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 45 | 2 | 12-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 46 | 2 | 12-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 47 | 2 | 12-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 48 | 2 | 12-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 49 | 2 | 12-11-2019 | 13:04 | 13:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 50 | 2 | 12-11-2019 | 13:06 | 13:08 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 51 | 2 | 12-11-2019 | 13:08 | 13:10 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 52 | 2 | 12-11-2019 | 13:10 | 13:12 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 53 | 2 | 12-11-2019 | 13:12 | 13:14 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 54 | 2 | 12-11-2019 | 13:14 | 13:16 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 55 | 2 | 12-11-2019 | 13:16 | 13:18 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 56 | 2 | 12-11-2019 | 13:18 | 13:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 57 | 2 | 12-11-2019 | 13:22 | 13:24 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 58 | 2 | 12-11-2019 | 13:24 | 13:30 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 59 | 2 | 12-11-2019 | 13:30 | 13:48 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 28 | 2 | 12-11-2019 | 13:48 | 14:04 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 64 | 2 | 12-11-2019 | 14:04 | 14:06 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 65 | 2 | 12-11-2019 | 14:06 | 12:52 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 66 | 2 | 12-11-2019 | 12:52 | 12:54 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 29 | 2 | 12-11-2019 | 13:50 | 13:52 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 30 | 2 | 12-11-2019 | 13:52 | 13:54 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 31 | 2 | 12-11-2019 | 13:54 | 13:56 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 60 | 2 | 12-11-2019 | 13:56 | 13:58 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 61 | 2 | 12-11-2019 | 13:58 | 14:00 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 62 | 2 | 12-11-2019 | 14:00 | 14:02 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 63 | 2 | 12-11-2019 | 14:02 | 13:48 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 92 | 3 | 13-11-2019 | 13:48 | 12:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 67 | 3 | 13-11-2019 | 12:06 | 12:08 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 68 | 3 | 13-11-2019 | 12:08 | 12:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 69 | 3 | 13-11-2019 | 12:10 | 12:12 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 70 | 3 | 13-11-2019 | 12:12 | 12:14 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 71 | 3 | 13-11-2019 | 12:14 | 12:16 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 72 | 3 | 13-11-2019 | 12:16 | 12:18 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 73 | 3 | 13-11-2019 | 12:18 | 12:20 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 74 | 3 | 13-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 75 | 3 | 13-11-2019 | 12:20 | 12:22 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 76 | 3 | 13-11-2019 | 12:22 | 12:24 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 77 | 3 | 13-11-2019 | 12:24 | 12:26 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 78 | 3 | 13-11-2019 | 12:26 | 12:28 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 79 | 3 | 13-11-2019 | 12:28 | 12:30 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 80 | 3 | 13-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 81 | 3 | 13-11-2019 | 12:32 | 13:26 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 82 | 3 | 13-11-2019 | 13:26 | 13:28 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 83 | 3 | 13-11-2019 | 13:28 | 13:32 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 84 | 3 | 13-11-2019 | 13:32 | 13:34 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 85 | 3 | 13-11-2019 | 13:34 | 13:36 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 86 | 3 | 13-11-2019 | 13:36 | 13:38 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 87 | 3 | 13-11-2019 | 13:38 | 13:40 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 88 | 3 | 13-11-2019 | 13:40 | 13:42 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 89 | 3 | 13-11-2019 | 13:42 | 13:44 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 90 | 3 | 13-11-2019 | 13:44 | 13:46 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 91 | 3 | 13-11-2019 | 13:46 | 12:34 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 96 | 3 | 13-11-2019 | 12:34 | 12:36 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 97 | 3 | 13-11-2019 | 12:36 | 12:38 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 98 | 3 | 13-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 99 | 3 | 13-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 100 | 3 | 13-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 101 | 3 | 13-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 102 | 3 | 13-11-2019 | 12:46 | 12:50 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 103 | 3 | 13-11-2019 | 12:50 | 12:48 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 104 | 3 | 13-11-2019 | 12:48 | 14:10 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 105 | 3 | 13-11-2019 | 14:10 | 14:08 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 106 | 3 | 13-11-2019 | 14:08 | 14:12 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 107 | 3 | 13-11-2019 | 14:12 | 14:14 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 108 | 3 | 13-11-2019 | 12:52 | 12:54 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 109 | 3 | 13-11-2019 | 12:54 | 12:56 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |

Work Project: Nova SBE’s canteen: case study on queueing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|---|-----|-------|---|-----|-------|
| 110 | 3 | 13-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 111 | 3 | 13-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 112 | 3 | 13-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 113 | 3 | 13-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 5 | 2.5 | 0.400 |
| 114 | 3 | 13-11-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 115 | 3 | 13-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 116 | 3 | 13-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 117 | 3 | 13-11-2019 | 13:10 | 13:12 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 118 | 3 | 13-11-2019 | 13:12 | 13:14 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 119 | 3 | 13-11-2019 | 13:14 | 13:16 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 120 | 3 | 13-11-2019 | 13:16 | 13:18 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 121 | 3 | 13-11-2019 | 13:18 | 13:22 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 122 | 3 | 13-11-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 123 | 3 | 13-11-2019 | 13:24 | 13:30 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 124 | 3 | 13-11-2019 | 13:30 | 14:04 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 129 | 3 | 13-11-2019 | 14:04 | 14:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 130 | 3 | 13-11-2019 | 14:06 | 13:50 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 93 | 3 | 13-11-2019 | 13:50 | 13:52 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 94 | 3 | 13-11-2019 | 13:52 | 13:54 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 95 | 3 | 13-11-2019 | 13:54 | 13:56 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 125 | 3 | 13-11-2019 | 13:56 | 13:58 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 126 | 3 | 13-11-2019 | 13:58 | 14:00 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 127 | 3 | 13-11-2019 | 14:00 | 14:02 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 128 | 3 | 13-11-2019 | 14:02 | 13:48 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 156 | 4 | 14-11-2019 | 13:48 | 13:50 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 131 | 4 | 14-11-2019 | 12:04 | 12:06 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 132 | 4 | 14-11-2019 | 12:06 | 12:08 | 2 | 6 | 3 | 0.333 | 2 | 1 | 1.000 |
| 133 | 4 | 14-11-2019 | 12:08 | 12:10 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 134 | 4 | 14-11-2019 | 12:10 | 12:12 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 135 | 4 | 14-11-2019 | 12:12 | 12:14 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 136 | 4 | 14-11-2019 | 12:14 | 12:16 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 137 | 4 | 14-11-2019 | 12:16 | 12:18 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 138 | 4 | 14-11-2019 | 12:18 | 12:20 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 139 | 4 | 14-11-2019 | 12:20 | 12:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 140 | 4 | 14-11-2019 | 12:22 | 12:24 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 141 | 4 | 14-11-2019 | 12:24 | 12:26 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 142 | 4 | 14-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 143 | 4 | 14-11-2019 | 12:28 | 12:30 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 144 | 4 | 14-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 145 | 4 | 14-11-2019 | 12:32 | 12:34 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 146 | 4 | 14-11-2019 | 13:26 | 13:28 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 147 | 4 | 14-11-2019 | 13:28 | 13:30 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 148 | 4 | 14-11-2019 | 13:32 | 13:34 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 149 | 4 | 14-11-2019 | 13:34 | 13:36 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 150 | 4 | 14-11-2019 | 13:36 | 13:38 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 151 | 4 | 14-11-2019 | 13:38 | 13:40 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 152 | 4 | 14-11-2019 | 13:40 | 13:42 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 153 | 4 | 14-11-2019 | 13:42 | 13:44 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 154 | 4 | 14-11-2019 | 13:44 | 13:46 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 155 | 4 | 14-11-2019 | 13:46 | 13:48 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 157 | 4 | 14-11-2019 | 13:50 | 13:52 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 160 | 4 | 14-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 161 | 4 | 14-11-2019 | 12:34 | 12:36 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 162 | 4 | 14-11-2019 | 12:36 | 12:38 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 163 | 4 | 14-11-2019 | 12:38 | 12:40 | 2 | 4 | 2 | 0.500 | 1 | 0.5 | 2.000 |
| 164 | 4 | 14-11-2019 | 12:40 | 12:42 | 2 | 6 | 3 | 0.333 | 2 | 1 | 1.000 |
| 165 | 4 | 14-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 0 | 0 | - |
| 166 | 4 | 14-11-2019 | 12:44 | 12:46 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 167 | 4 | 14-11-2019 | 12:46 | 12:48 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 168 | 4 | 14-11-2019 | 12:50 | 12:52 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 169 | 4 | 14-11-2019 | 14:10 | 14:12 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 170 | 4 | 14-11-2019 | 14:08 | 14:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 171 | 4 | 14-11-2019 | 12:52 | 12:54 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 172 | 4 | 14-11-2019 | 12:54 | 12:56 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 173 | 4 | 14-11-2019 | 12:56 | 12:58 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 174 | 4 | 14-11-2019 | 12:58 | 13:00 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 175 | 4 | 14-11-2019 | 13:00 | 13:02 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 176 | 4 | 14-11-2019 | 13:02 | 13:04 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 177 | 4 | 14-11-2019 | 13:04 | 13:06 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 178 | 4 | 14-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 179 | 4 | 14-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 180 | 4 | 14-11-2019 | 13:10 | 13:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 181 | 4 | 14-11-2019 | 13:12 | 13:14 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 182 | 4 | 14-11-2019 | 13:14 | 13:16 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 183 | 4 | 14-11-2019 | 13:16 | 13:18 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 184 | 4 | 14-11-2019 | 13:18 | 13:20 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 185 | 4 | 14-11-2019 | 13:20 | 13:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 186 | 4 | 14-11-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 187 | 4 | 14-11-2019 | 13:24 | 13:26 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 188 | 4 | 14-11-2019 | 13:30 | 13:32 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 193 | 4 | 14-11-2019 | 14:04 | 14:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 194 | 4 | 14-11-2019 | 14:06 | 14:08 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 158 | 4 | 14-11-2019 | 13:52 | 13:54 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 159 | 4 | 14-11-2019 | 13:54 | 13:56 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 189 | 4 | 14-11-2019 | 13:56 | 13:58 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 190 | 4 | 14-11-2019 | 13:58 | 14:00 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 191 | 4 | 14-11-2019 | 14:00 | 14:02 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 192 | 4 | 14-11-2019 | 14:02 | 14:04 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 222 | 5 | 15-11-2019 | 13:48 | 13:50 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 223 | 5 | 15-11-2019 | 13:50 | 13:52 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 195 | 5 | 15-11-2019 | 12:00 | 12:02 | 2 | 5 | 2.5 | 0.400 | 1 | 0.5 | 2.000 |
| 196 | 5 | 15-11-2019 | 12:02 | 12:04 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 197 | 5 | 15-11-2019 | 12:04 | 12:06 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 198 | 5 | 15-11-2019 | 12:06 | 12:08 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 199 | 5 | 15-11-2019 | 12:08 | 12:10 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 200 | 5 | 15-11-2019 | 12:10 | 12:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 201 | 5 | 15-11-2019 | 12:12 | 12:14 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 202 | 5 | 15-11-2019 | 12:14 | 12:16 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 203 | 5 | 15-11-2019 | 12:16 | 12:18 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 204 | 5 | 15-11-2019 | 12:18 | 12:20 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 205 | 5 | 15-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 206 | 5 | 15-11-2019 | 12:22 | 12:24 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 207 | 5 | 15-11-2019 | 12:24 | 12:26 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 208 | 5 | 15-11-2019 | 12:26 | 12:28 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 209 | 5 | 15-11-2019 | 12:28 | 12:30 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 210 | 5 | 15-11-2019 | 12:30 | 12:32 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 211 | 5 | 15-11-2019 | 12:32 | 12:34 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 212 | 5 | 15-11-2019 | 13:26 | 13:28 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 213 | 5 | 15-11-2019 | 13:28 | 13:30 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 214 | 5 | 15-11-2019 | 13:32 | 13:34 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 215 | 5 | 15-11-2019 | 13:34 | 13:36 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |

Work Project: Nova SBE's canteen: case study on queueing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 216 | 5 | 15-11-2019 | 13:36 | 13:38 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 217 | 5 | 15-11-2019 | 13:38 | 13:40 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 218 | 5 | 15-11-2019 | 13:40 | 13:42 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 219 | 5 | 15-11-2019 | 13:42 | 13:44 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 220 | 5 | 15-11-2019 | 13:44 | 13:46 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 221 | 5 | 15-11-2019 | 13:46 | 13:48 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 226 | 5 | 15-11-2019 | 12:48 | 12:50 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 227 | 5 | 15-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 228 | 5 | 15-11-2019 | 12:40 | 12:42 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 229 | 5 | 15-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 230 | 5 | 15-11-2019 | 12:34 | 12:36 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 231 | 5 | 15-11-2019 | 12:36 | 12:38 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 232 | 5 | 15-11-2019 | 12:44 | 12:46 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 233 | 5 | 15-11-2019 | 12:46 | 12:48 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 234 | 5 | 15-11-2019 | 12:50 | 12:52 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 235 | 5 | 15-11-2019 | 14:14 | 14:16 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 236 | 5 | 15-11-2019 | 14:10 | 14:12 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 237 | 5 | 15-11-2019 | 14:12 | 14:14 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 238 | 5 | 15-11-2019 | 12:52 | 12:54 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 239 | 5 | 15-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 240 | 5 | 15-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 241 | 5 | 15-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 242 | 5 | 15-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 243 | 5 | 15-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 244 | 5 | 15-11-2019 | 13:04 | 13:06 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 245 | 5 | 15-11-2019 | 13:06 | 13:08 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 246 | 5 | 15-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 247 | 5 | 15-11-2019 | 13:10 | 13:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 248 | 5 | 15-11-2019 | 13:12 | 13:14 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 249 | 5 | 15-11-2019 | 13:14 | 13:16 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 250 | 5 | 15-11-2019 | 13:16 | 13:18 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 251 | 5 | 15-11-2019 | 13:18 | 13:20 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 252 | 5 | 15-11-2019 | 13:20 | 13:22 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 253 | 5 | 15-11-2019 | 13:22 | 13:24 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 254 | 5 | 15-11-2019 | 13:24 | 13:26 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 255 | 5 | 15-11-2019 | 13:30 | 13:32 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 260 | 5 | 15-11-2019 | 14:04 | 14:06 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 261 | 5 | 15-11-2019 | 14:06 | 14:08 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 262 | 5 | 15-11-2019 | 14:08 | 14:10 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 224 | 5 | 15-11-2019 | 13:52 | 13:54 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 225 | 5 | 15-11-2019 | 13:54 | 13:56 | 2 | 6 | 3 | 0.333 | 1 | 0.5 | 2.000 |
| 256 | 5 | 15-11-2019 | 13:56 | 13:58 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 257 | 5 | 15-11-2019 | 13:58 | 14:00 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 258 | 5 | 15-11-2019 | 14:00 | 14:02 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 259 | 5 | 15-11-2019 | 14:02 | 14:04 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 322 | 1 | 18-11-2019 | 13:48 | 13:50 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 323 | 1 | 18-11-2019 | 13:50 | 13:52 | 2 | 4 | 2 | 0.500 | 1 | 0.5 | 2.000 |
| 263 | 1 | 18-11-2019 | 12:54 | 12:56 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 264 | 1 | 18-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 265 | 1 | 18-11-2019 | 12:58 | 13:00 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 266 | 1 | 18-11-2019 | 13:00 | 13:02 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 267 | 1 | 18-11-2019 | 13:02 | 13:04 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 268 | 1 | 18-11-2019 | 13:04 | 13:06 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 269 | 1 | 18-11-2019 | 13:06 | 13:08 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 270 | 1 | 18-11-2019 | 13:08 | 13:10 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 271 | 1 | 18-11-2019 | 13:10 | 13:12 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 272 | 1 | 18-11-2019 | 13:12 | 13:14 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 273 | 1 | 18-11-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 274 | 1 | 18-11-2019 | 13:16 | 13:18 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 275 | 1 | 18-11-2019 | 13:18 | 13:20 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 276 | 1 | 18-11-2019 | 13:22 | 13:24 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 277 | 1 | 18-11-2019 | 13:24 | 13:26 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 278 | 1 | 18-11-2019 | 13:30 | 13:32 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 283 | 1 | 18-11-2019 | 14:04 | 14:06 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 284 | 1 | 18-11-2019 | 14:06 | 14:08 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 285 | 1 | 18-11-2019 | 14:08 | 14:10 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 286 | 1 | 18-11-2019 | 14:10 | 14:12 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 287 | 1 | 18-11-2019 | 14:12 | 14:14 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 288 | 1 | 18-11-2019 | 12:52 | 12:54 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 289 | 1 | 18-11-2019 | 13:20 | 13:22 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 290 | 1 | 18-11-2019 | 14:14 | 14:16 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 291 | 1 | 18-11-2019 | 12:34 | 12:36 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 292 | 1 | 18-11-2019 | 12:36 | 12:38 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 293 | 1 | 18-11-2019 | 12:38 | 12:40 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 294 | 1 | 18-11-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 295 | 1 | 18-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 296 | 1 | 18-11-2019 | 12:44 | 12:46 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 297 | 1 | 18-11-2019 | 12:46 | 12:48 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 298 | 1 | 18-11-2019 | 12:48 | 12:50 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 299 | 1 | 18-11-2019 | 12:50 | 12:52 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 300 | 1 | 18-11-2019 | 12:10 | 12:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 301 | 1 | 18-11-2019 | 12:12 | 12:14 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 302 | 1 | 18-11-2019 | 12:14 | 12:16 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 303 | 1 | 18-11-2019 | 12:16 | 12:18 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 304 | 1 | 18-11-2019 | 12:18 | 12:20 | 2 | 11 | 5.5 | 0.182 | 3 | 1.5 | 0.667 |
| 305 | 1 | 18-11-2019 | 12:20 | 12:22 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 306 | 1 | 18-11-2019 | 12:22 | 12:24 | 2 | 17 | 8.5 | 0.118 | 2 | 1 | 1.000 |
| 307 | 1 | 18-11-2019 | 12:24 | 12:26 | 2 | 12 | 6 | 0.167 | 3 | 1.5 | 0.667 |
| 308 | 1 | 18-11-2019 | 12:26 | 12:28 | 2 | 10 | 5 | 0.200 | 2 | 1 | 1.000 |
| 309 | 1 | 18-11-2019 | 12:28 | 12:30 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 310 | 1 | 18-11-2019 | 12:30 | 12:32 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 311 | 1 | 18-11-2019 | 12:32 | 12:34 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 312 | 1 | 18-11-2019 | 13:26 | 13:28 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 313 | 1 | 18-11-2019 | 13:28 | 13:30 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 314 | 1 | 18-11-2019 | 13:32 | 13:34 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 315 | 1 | 18-11-2019 | 13:34 | 13:36 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 316 | 1 | 18-11-2019 | 13:36 | 13:38 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 317 | 1 | 18-11-2019 | 13:38 | 13:40 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 318 | 1 | 18-11-2019 | 13:40 | 13:42 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 319 | 1 | 18-11-2019 | 13:42 | 13:44 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 320 | 1 | 18-11-2019 | 13:44 | 13:46 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 321 | 1 | 18-11-2019 | 13:46 | 13:48 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 324 | 1 | 18-11-2019 | 13:52 | 13:54 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 326 | 1 | 18-11-2019 | 14:16 | 14:18 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 327 | 1 | 18-11-2019 | 14:18 | 14:20 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 328 | 1 | 18-11-2019 | 14:20 | 14:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 325 | 1 | 18-11-2019 | 13:54 | 13:56 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 279 | 1 | 18-11-2019 | 13:56 | 13:58 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 280 | 1 | 18-11-2019 | 13:58 | 14:00 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 281 | 1 | 18-11-2019 | 14:00 | 14:02 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 282 | 1 | 18-11-2019 | 14:02 | 14:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |

Work Project: Nova SBE's canteen: case study on queueing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 394 | 2 | 19-11-2019 | 13:48 | 13:50 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 395 | 2 | 19-11-2019 | 13:50 | 13:52 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 329 | 2 | 19-11-2019 | 14:10 | 14:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 330 | 2 | 19-11-2019 | 14:08 | 14:10 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 331 | 2 | 19-11-2019 | 14:12 | 14:14 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 332 | 2 | 19-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 333 | 2 | 19-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 334 | 2 | 19-11-2019 | 12:56 | 12:58 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 335 | 2 | 19-11-2019 | 12:58 | 13:00 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 336 | 2 | 19-11-2019 | 13:00 | 13:02 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 337 | 2 | 19-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 338 | 2 | 19-11-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 339 | 2 | 19-11-2019 | 13:06 | 13:08 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 340 | 2 | 19-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 341 | 2 | 19-11-2019 | 13:10 | 13:12 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 342 | 2 | 19-11-2019 | 13:12 | 13:14 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 343 | 2 | 19-11-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 344 | 2 | 19-11-2019 | 13:16 | 13:18 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 345 | 2 | 19-11-2019 | 13:18 | 13:20 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 346 | 2 | 19-11-2019 | 13:22 | 13:24 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 347 | 2 | 19-11-2019 | 13:24 | 13:26 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 348 | 2 | 19-11-2019 | 13:30 | 13:32 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 396 | 2 | 19-11-2019 | 13:52 | 13:54 | 2 | 5 | 2.5 | 0.400 | 0 | 0 | - |
| 353 | 2 | 19-11-2019 | 14:04 | 14:06 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 354 | 2 | 19-11-2019 | 14:06 | 14:08 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 355 | 2 | 19-11-2019 | 14:14 | 14:16 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 356 | 2 | 19-11-2019 | 12:48 | 12:50 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 357 | 2 | 19-11-2019 | 12:34 | 12:36 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 358 | 2 | 19-11-2019 | 12:36 | 12:38 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 359 | 2 | 19-11-2019 | 12:38 | 12:40 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 360 | 2 | 19-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 361 | 2 | 19-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 362 | 2 | 19-11-2019 | 12:44 | 12:46 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 363 | 2 | 19-11-2019 | 12:46 | 12:48 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 364 | 2 | 19-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 365 | 2 | 19-11-2019 | 11:58 | 12:00 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 366 | 2 | 19-11-2019 | 12:00 | 12:02 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |
| 367 | 2 | 19-11-2019 | 12:02 | 12:04 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 368 | 2 | 19-11-2019 | 12:04 | 12:06 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 369 | 2 | 19-11-2019 | 12:06 | 12:08 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 370 | 2 | 19-11-2019 | 12:08 | 12:10 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 371 | 2 | 19-11-2019 | 12:10 | 12:12 | 2 | 8 | 4 | 0.250 | 3 | 1.5 | 0.667 |
| 372 | 2 | 19-11-2019 | 12:12 | 12:14 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 373 | 2 | 19-11-2019 | 12:14 | 12:16 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 374 | 2 | 19-11-2019 | 12:16 | 12:18 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 375 | 2 | 19-11-2019 | 12:18 | 12:20 | 2 | 14 | 7 | 0.143 | 3 | 1.5 | 0.667 |
| 376 | 2 | 19-11-2019 | 12:20 | 12:22 | 2 | 8 | 4 | 0.250 | 3 | 1.5 | 0.667 |
| 377 | 2 | 19-11-2019 | 12:22 | 12:24 | 2 | 7 | 3.5 | 0.286 | 4 | 2 | 0.500 |
| 378 | 2 | 19-11-2019 | 12:24 | 12:26 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 379 | 2 | 19-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 380 | 2 | 19-11-2019 | 12:28 | 12:30 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 381 | 2 | 19-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 382 | 2 | 19-11-2019 | 12:32 | 12:34 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 383 | 2 | 19-11-2019 | 13:20 | 13:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 384 | 2 | 19-11-2019 | 13:26 | 13:28 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 385 | 2 | 19-11-2019 | 13:28 | 13:30 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 386 | 2 | 19-11-2019 | 13:32 | 13:34 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 387 | 2 | 19-11-2019 | 13:34 | 13:36 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 388 | 2 | 19-11-2019 | 13:36 | 13:38 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 389 | 2 | 19-11-2019 | 13:38 | 13:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 390 | 2 | 19-11-2019 | 13:40 | 13:42 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 391 | 2 | 19-11-2019 | 13:42 | 13:44 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 392 | 2 | 19-11-2019 | 13:44 | 13:46 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 393 | 2 | 19-11-2019 | 13:46 | 13:48 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 398 | 2 | 19-11-2019 | 14:16 | 14:18 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 399 | 2 | 19-11-2019 | 14:18 | 14:20 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 400 | 2 | 19-11-2019 | 14:20 | 14:22 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 397 | 2 | 19-11-2019 | 13:54 | 13:56 | 2 | 8 | 4 | 0.250 | 1 | 0.5 | 2.000 |
| 349 | 2 | 19-11-2019 | 13:56 | 13:58 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 350 | 2 | 19-11-2019 | 13:58 | 14:00 | 2 | 3 | 1.5 | - | 1 | 0.5 | 2.000 |
| 351 | 2 | 19-11-2019 | 14:00 | 14:02 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 352 | 2 | 19-11-2019 | 14:02 | 14:04 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 429 | 3 | 20-11-2019 | 13:48 | 13:50 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 430 | 3 | 20-11-2019 | 13:50 | 13:52 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 431 | 3 | 20-11-2019 | 13:52 | 13:54 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 401 | 3 | 20-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 402 | 3 | 20-11-2019 | 12:00 | 12:02 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 403 | 3 | 20-11-2019 | 12:02 | 12:04 | 2 | 10 | 5 | 0.200 | 1 | 0.5 | 2.000 |
| 404 | 3 | 20-11-2019 | 12:04 | 12:06 | 2 | 5 | 2.5 | 0.400 | 1 | 0.5 | 2.000 |
| 405 | 3 | 20-11-2019 | 12:06 | 12:08 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 406 | 3 | 20-11-2019 | 12:08 | 12:10 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 407 | 3 | 20-11-2019 | 12:10 | 12:12 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 408 | 3 | 20-11-2019 | 12:12 | 12:14 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 409 | 3 | 20-11-2019 | 12:14 | 12:16 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 410 | 3 | 20-11-2019 | 12:16 | 12:18 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 411 | 3 | 20-11-2019 | 12:18 | 12:20 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 412 | 3 | 20-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 413 | 3 | 20-11-2019 | 12:22 | 12:24 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 414 | 3 | 20-11-2019 | 12:24 | 12:26 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 415 | 3 | 20-11-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 416 | 3 | 20-11-2019 | 12:28 | 12:30 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 417 | 3 | 20-11-2019 | 12:30 | 12:32 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 418 | 3 | 20-11-2019 | 12:32 | 12:34 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 419 | 3 | 20-11-2019 | 13:26 | 13:28 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 420 | 3 | 20-11-2019 | 13:28 | 13:30 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 421 | 3 | 20-11-2019 | 13:32 | 13:34 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 422 | 3 | 20-11-2019 | 13:34 | 13:36 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 423 | 3 | 20-11-2019 | 13:36 | 13:38 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 424 | 3 | 20-11-2019 | 13:38 | 13:40 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 425 | 3 | 20-11-2019 | 13:40 | 13:42 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 426 | 3 | 20-11-2019 | 13:42 | 13:44 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 427 | 3 | 20-11-2019 | 13:44 | 13:46 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 428 | 3 | 20-11-2019 | 13:46 | 13:48 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 433 | 3 | 20-11-2019 | 12:34 | 12:36 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 434 | 3 | 20-11-2019 | 12:36 | 12:38 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 435 | 3 | 20-11-2019 | 12:38 | 12:40 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 436 | 3 | 20-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 437 | 3 | 20-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 438 | 3 | 20-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 439 | 3 | 20-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 440 | 3 | 20-11-2019 | 12:50 | 12:52 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |

Work Project: Nova SBE's canteen: case study on queuing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 441 | 3 | 20-11-2019 | 12:54 | 12:56 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 442 | 3 | 20-11-2019 | 12:56 | 12:58 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 443 | 3 | 20-11-2019 | 12:58 | 13:00 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 444 | 3 | 20-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 445 | 3 | 20-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 446 | 3 | 20-11-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 447 | 3 | 20-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 448 | 3 | 20-11-2019 | 13:08 | 13:10 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 449 | 3 | 20-11-2019 | 13:10 | 13:12 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 450 | 3 | 20-11-2019 | 13:12 | 13:14 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 451 | 3 | 20-11-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 452 | 3 | 20-11-2019 | 13:16 | 13:18 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 453 | 3 | 20-11-2019 | 13:18 | 13:20 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 454 | 3 | 20-11-2019 | 13:20 | 13:22 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 455 | 3 | 20-11-2019 | 13:22 | 13:24 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 456 | 3 | 20-11-2019 | 13:24 | 13:26 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 457 | 3 | 20-11-2019 | 13:30 | 13:32 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 432 | 3 | 20-11-2019 | 13:54 | 13:56 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 462 | 3 | 20-11-2019 | 14:04 | 14:06 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 463 | 3 | 20-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 458 | 3 | 20-11-2019 | 13:56 | 13:58 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 459 | 3 | 20-11-2019 | 13:58 | 14:00 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 460 | 3 | 20-11-2019 | 14:00 | 14:02 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 461 | 3 | 20-11-2019 | 14:02 | 14:04 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 493 | 4 | 21-11-2019 | 13:48 | 13:50 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 494 | 4 | 21-11-2019 | 13:50 | 13:52 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 495 | 4 | 21-11-2019 | 13:52 | 13:54 | 2 | 6 | 3 | 0.333 | 0 | 0 | - |
| 496 | 4 | 21-11-2019 | 13:54 | 13:56 | 2 | 15 | 7.5 | 0.133 | 3 | 1.5 | 0.667 |
| 464 | 4 | 21-11-2019 | 14:14 | 14:16 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 465 | 4 | 21-11-2019 | 12:00 | 12:02 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 466 | 4 | 21-11-2019 | 12:02 | 12:04 | 2 | 8 | 4 | 0.250 | 3 | 1.5 | 0.667 |
| 467 | 4 | 21-11-2019 | 12:04 | 12:06 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 468 | 4 | 21-11-2019 | 12:06 | 12:08 | 2 | 11 | 5.5 | 0.182 | 3 | 1.5 | 0.667 |
| 469 | 4 | 21-11-2019 | 12:08 | 12:10 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 470 | 4 | 21-11-2019 | 12:10 | 12:12 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 471 | 4 | 21-11-2019 | 12:12 | 12:14 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 472 | 4 | 21-11-2019 | 12:14 | 12:16 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 473 | 4 | 21-11-2019 | 12:16 | 12:18 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 474 | 4 | 21-11-2019 | 12:18 | 12:20 | 2 | 6 | 3 | 0.333 | 1 | 0.5 | 2.000 |
| 475 | 4 | 21-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 476 | 4 | 21-11-2019 | 12:22 | 12:24 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 477 | 4 | 21-11-2019 | 12:24 | 12:26 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 478 | 4 | 21-11-2019 | 12:26 | 12:28 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 479 | 4 | 21-11-2019 | 12:28 | 12:30 | 2 | 9 | 4.5 | 0.222 | 0 | 0 | - |
| 480 | 4 | 21-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 481 | 4 | 21-11-2019 | 12:32 | 12:34 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 482 | 4 | 21-11-2019 | 13:26 | 13:28 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 483 | 4 | 21-11-2019 | 13:28 | 13:30 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 484 | 4 | 21-11-2019 | 13:32 | 13:34 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 485 | 4 | 21-11-2019 | 13:34 | 13:36 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 486 | 4 | 21-11-2019 | 13:36 | 13:38 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 487 | 4 | 21-11-2019 | 13:38 | 13:40 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 488 | 4 | 21-11-2019 | 13:40 | 13:42 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 489 | 4 | 21-11-2019 | 13:42 | 13:44 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 490 | 4 | 21-11-2019 | 13:44 | 13:46 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 491 | 4 | 21-11-2019 | 13:46 | 13:48 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 492 | 4 | 21-11-2019 | 13:46 | 13:48 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 497 | 4 | 21-11-2019 | 14:10 | 14:12 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 498 | 4 | 21-11-2019 | 14:12 | 14:14 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 499 | 4 | 21-11-2019 | 14:16 | 14:18 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 500 | 4 | 21-11-2019 | 14:18 | 14:20 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 501 | 4 | 21-11-2019 | 14:20 | 14:22 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 502 | 4 | 21-11-2019 | 14:22 | 14:24 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 503 | 4 | 21-11-2019 | 14:24 | 14:26 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 504 | 4 | 21-11-2019 | 14:26 | 14:28 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 505 | 4 | 21-11-2019 | 14:28 | 14:30 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 506 | 4 | 21-11-2019 | 14:30 | 14:32 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 507 | 4 | 21-11-2019 | 12:48 | 12:50 | 2 | 2 | 1 | 1.000 | 5 | 2.5 | 0.400 |
| 508 | 4 | 21-11-2019 | 12:54 | 12:56 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 509 | 4 | 21-11-2019 | 12:56 | 12:58 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 510 | 4 | 21-11-2019 | 12:58 | 12:40 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 511 | 4 | 21-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 512 | 4 | 21-11-2019 | 12:42 | 12:44 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 513 | 4 | 21-11-2019 | 12:44 | 12:46 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 514 | 4 | 21-11-2019 | 12:46 | 12:48 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 515 | 4 | 21-11-2019 | 12:50 | 12:52 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 516 | 4 | 21-11-2019 | 12:52 | 12:54 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 517 | 4 | 21-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 518 | 4 | 21-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 519 | 4 | 21-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 520 | 4 | 21-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 521 | 4 | 21-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 522 | 4 | 21-11-2019 | 13:04 | 13:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 523 | 4 | 21-11-2019 | 13:06 | 13:08 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 524 | 4 | 21-11-2019 | 13:08 | 13:10 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 525 | 4 | 21-11-2019 | 13:10 | 13:12 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 526 | 4 | 21-11-2019 | 13:12 | 13:14 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 527 | 4 | 21-11-2019 | 13:14 | 13:16 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 528 | 4 | 21-11-2019 | 13:16 | 13:18 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 529 | 4 | 21-11-2019 | 13:18 | 13:20 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 530 | 4 | 21-11-2019 | 13:20 | 13:22 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 531 | 4 | 21-11-2019 | 13:22 | 13:24 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 532 | 4 | 21-11-2019 | 13:24 | 13:26 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 533 | 4 | 21-11-2019 | 13:30 | 13:32 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 538 | 4 | 21-11-2019 | 14:04 | 14:06 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 539 | 4 | 21-11-2019 | 14:06 | 14:08 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 540 | 4 | 21-11-2019 | 14:08 | 14:10 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 534 | 4 | 21-11-2019 | 13:56 | 13:58 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 535 | 4 | 21-11-2019 | 13:58 | 14:00 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 536 | 4 | 21-11-2019 | 14:00 | 14:02 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 537 | 4 | 21-11-2019 | 14:02 | 14:04 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 569 | 5 | 22-11-2019 | 13:48 | 13:50 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 570 | 5 | 22-11-2019 | 13:50 | 13:52 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 571 | 5 | 22-11-2019 | 13:52 | 13:54 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 572 | 5 | 22-11-2019 | 13:54 | 13:56 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 541 | 5 | 22-11-2019 | 11:58 | 12:00 | 2 | 7 | 3.5 | 0.286 | 0 | 0 | - |
| 542 | 5 | 22-11-2019 | 12:00 | 12:02 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 543 | 5 | 22-11-2019 | 12:02 | 12:04 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 544 | 5 | 22-11-2019 | 12:04 | 12:06 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 545 | 5 | 22-11-2019 | 12:06 | 12:08 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 546 | 5 | 22-11-2019 | 12:08 | 12:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |

Work Project: Nova SBE’s canteen: case study on queuing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 547 | 5 | 22-11-2019 | 12:10 | 12:12 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 548 | 5 | 22-11-2019 | 12:12 | 12:14 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 549 | 5 | 22-11-2019 | 12:14 | 12:16 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 550 | 5 | 22-11-2019 | 12:16 | 12:18 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 551 | 5 | 22-11-2019 | 12:18 | 12:20 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 552 | 5 | 22-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 553 | 5 | 22-11-2019 | 12:22 | 12:24 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 554 | 5 | 22-11-2019 | 12:24 | 12:26 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 555 | 5 | 22-11-2019 | 12:26 | 12:28 | 2 | 6 | 3 | 0.333 | 2 | 1 | 1.000 |
| 556 | 5 | 22-11-2019 | 12:28 | 12:30 | 2 | 8 | 4 | 0.250 | 2 | 1 | 1.000 |
| 557 | 5 | 22-11-2019 | 12:30 | 12:32 | 2 | 5 | 2.5 | 0.400 | 1 | 0.5 | 2.000 |
| 558 | 5 | 22-11-2019 | 12:32 | 12:34 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 559 | 5 | 22-11-2019 | 13:26 | 13:28 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 560 | 5 | 22-11-2019 | 13:28 | 13:30 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 561 | 5 | 22-11-2019 | 13:32 | 13:34 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 562 | 5 | 22-11-2019 | 13:34 | 13:36 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 563 | 5 | 22-11-2019 | 13:36 | 13:38 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 564 | 5 | 22-11-2019 | 13:38 | 13:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 565 | 5 | 22-11-2019 | 13:40 | 13:42 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 566 | 5 | 22-11-2019 | 13:42 | 13:44 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 567 | 5 | 22-11-2019 | 13:44 | 13:46 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 568 | 5 | 22-11-2019 | 13:46 | 13:48 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 573 | 5 | 22-11-2019 | 14:16 | 14:18 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 574 | 5 | 22-11-2019 | 14:18 | 14:20 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 575 | 5 | 22-11-2019 | 14:20 | 14:22 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 576 | 5 | 22-11-2019 | 14:22 | 14:24 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 577 | 5 | 22-11-2019 | 12:34 | 12:36 | 2 | 9 | 4.5 | 0.222 | 3 | 1.5 | 0.667 |
| 578 | 5 | 22-11-2019 | 12:36 | 12:38 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 579 | 5 | 22-11-2019 | 12:38 | 12:40 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 580 | 5 | 22-11-2019 | 12:40 | 12:42 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 581 | 5 | 22-11-2019 | 12:42 | 12:44 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 582 | 5 | 22-11-2019 | 12:44 | 12:46 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 583 | 5 | 22-11-2019 | 12:46 | 12:48 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 584 | 5 | 22-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 585 | 5 | 22-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 586 | 5 | 22-11-2019 | 14:10 | 14:12 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 587 | 5 | 22-11-2019 | 14:12 | 14:14 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 588 | 5 | 22-11-2019 | 14:14 | 14:16 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 589 | 5 | 22-11-2019 | 12:54 | 12:56 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 590 | 5 | 22-11-2019 | 12:56 | 12:58 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 591 | 5 | 22-11-2019 | 12:58 | 13:00 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 592 | 5 | 22-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 593 | 5 | 22-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 594 | 5 | 22-11-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 595 | 5 | 22-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 596 | 5 | 22-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 597 | 5 | 22-11-2019 | 13:10 | 13:12 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 598 | 5 | 22-11-2019 | 13:12 | 13:14 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 599 | 5 | 22-11-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 600 | 5 | 22-11-2019 | 13:16 | 13:18 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 601 | 5 | 22-11-2019 | 13:18 | 13:20 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 602 | 5 | 22-11-2019 | 13:20 | 13:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 603 | 5 | 22-11-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 604 | 5 | 22-11-2019 | 13:24 | 13:26 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 605 | 5 | 22-11-2019 | 13:30 | 13:32 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 610 | 5 | 22-11-2019 | 14:04 | 14:06 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 611 | 5 | 22-11-2019 | 14:06 | 14:08 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 612 | 5 | 22-11-2019 | 14:08 | 14:10 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 613 | 5 | 22-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 606 | 5 | 22-11-2019 | 13:56 | 13:58 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 607 | 5 | 22-11-2019 | 13:58 | 14:00 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 608 | 5 | 22-11-2019 | 14:00 | 14:02 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 609 | 5 | 22-11-2019 | 14:02 | 14:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 674 | 1 | 25-11-2019 | 13:48 | 13:50 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 675 | 1 | 25-11-2019 | 13:50 | 13:52 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 676 | 1 | 25-11-2019 | 13:52 | 13:54 | 2 | 6 | 3 | 0.333 | 1 | 0.5 | 2.000 |
| 677 | 1 | 25-11-2019 | 13:54 | 13:56 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 630 | 1 | 25-11-2019 | 13:56 | 13:58 | 2 | 8 | 4 | 0.250 | 3 | 1.5 | 0.667 |
| 614 | 1 | 25-11-2019 | 12:54 | 12:56 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 615 | 1 | 25-11-2019 | 12:56 | 12:58 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 616 | 1 | 25-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 617 | 1 | 25-11-2019 | 13:00 | 13:02 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 618 | 1 | 25-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 619 | 1 | 25-11-2019 | 13:04 | 13:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 620 | 1 | 25-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 621 | 1 | 25-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 622 | 1 | 25-11-2019 | 13:10 | 13:12 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 623 | 1 | 25-11-2019 | 13:12 | 13:14 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 624 | 1 | 25-11-2019 | 13:14 | 13:16 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 625 | 1 | 25-11-2019 | 13:16 | 13:18 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 626 | 1 | 25-11-2019 | 13:18 | 13:20 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 627 | 1 | 25-11-2019 | 13:22 | 13:24 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 628 | 1 | 25-11-2019 | 13:24 | 13:26 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 629 | 1 | 25-11-2019 | 13:30 | 13:32 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 634 | 1 | 25-11-2019 | 14:04 | 14:06 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 635 | 1 | 25-11-2019 | 14:06 | 14:08 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 636 | 1 | 25-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 637 | 1 | 25-11-2019 | 13:20 | 13:22 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 638 | 1 | 25-11-2019 | 12:34 | 12:36 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 639 | 1 | 25-11-2019 | 12:36 | 12:38 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 640 | 1 | 25-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 641 | 1 | 25-11-2019 | 12:40 | 12:42 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 642 | 1 | 25-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 643 | 1 | 25-11-2019 | 12:44 | 12:46 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 644 | 1 | 25-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 645 | 1 | 25-11-2019 | 12:48 | 12:50 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 646 | 1 | 25-11-2019 | 12:50 | 12:52 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 647 | 1 | 25-11-2019 | 12:00 | 12:02 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 648 | 1 | 25-11-2019 | 12:02 | 12:04 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 649 | 1 | 25-11-2019 | 12:04 | 12:06 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 650 | 1 | 25-11-2019 | 12:06 | 12:08 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 651 | 1 | 25-11-2019 | 12:08 | 12:10 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 652 | 1 | 25-11-2019 | 12:10 | 12:12 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 653 | 1 | 25-11-2019 | 12:12 | 12:14 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 654 | 1 | 25-11-2019 | 12:14 | 12:16 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 655 | 1 | 25-11-2019 | 12:16 | 12:18 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 656 | 1 | 25-11-2019 | 12:18 | 12:20 | 2 | 8 | 4 | 0.250 | 2 | 1 | 1.000 |
| 657 | 1 | 25-11-2019 | 12:20 | 12:22 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 658 | 1 | 25-11-2019 | 12:22 | 12:24 | 2 | 11 | 5.5 | 0.182 | 4 | 2 | 0.500 |
| 659 | 1 | 25-11-2019 | 12:24 | 12:26 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 660 | 1 | 25-11-2019 | 12:26 | 12:28 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |

Work Project: Nova SBE's canteen: case study on queueing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 661 | 1 | 25-11-2019 | 12:28 | 12:30 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 662 | 1 | 25-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 663 | 1 | 25-11-2019 | 12:32 | 12:34 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 664 | 1 | 25-11-2019 | 13:26 | 13:28 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 665 | 1 | 25-11-2019 | 13:28 | 13:30 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 666 | 1 | 25-11-2019 | 13:32 | 13:34 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 667 | 1 | 25-11-2019 | 13:34 | 13:36 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 668 | 1 | 25-11-2019 | 13:36 | 13:38 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 669 | 1 | 25-11-2019 | 13:38 | 13:40 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 670 | 1 | 25-11-2019 | 13:40 | 13:42 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 671 | 1 | 25-11-2019 | 13:42 | 13:44 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 672 | 1 | 25-11-2019 | 13:44 | 13:46 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 673 | 1 | 25-11-2019 | 13:46 | 13:48 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 631 | 1 | 25-11-2019 | 13:58 | 14:00 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 632 | 1 | 25-11-2019 | 14:00 | 14:02 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 633 | 1 | 25-11-2019 | 14:02 | 14:04 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 744 | 2 | 26-11-2019 | 13:48 | 13:50 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 745 | 2 | 26-11-2019 | 13:50 | 13:52 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 746 | 2 | 26-11-2019 | 13:52 | 13:54 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 747 | 2 | 26-11-2019 | 13:54 | 13:56 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 698 | 2 | 26-11-2019 | 13:56 | 13:58 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 699 | 2 | 26-11-2019 | 13:58 | 14:00 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 678 | 2 | 26-11-2019 | 14:10 | 14:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 679 | 2 | 26-11-2019 | 14:08 | 14:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 680 | 2 | 26-11-2019 | 14:12 | 14:14 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 681 | 2 | 26-11-2019 | 12:52 | 12:54 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 682 | 2 | 26-11-2019 | 12:54 | 12:56 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 683 | 2 | 26-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 684 | 2 | 26-11-2019 | 12:58 | 13:00 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 685 | 2 | 26-11-2019 | 13:00 | 13:02 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 686 | 2 | 26-11-2019 | 13:02 | 13:04 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 687 | 2 | 26-11-2019 | 13:04 | 13:06 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 688 | 2 | 26-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 689 | 2 | 26-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 690 | 2 | 26-11-2019 | 13:10 | 13:12 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 691 | 2 | 26-11-2019 | 13:12 | 13:14 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 692 | 2 | 26-11-2019 | 13:14 | 13:16 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 693 | 2 | 26-11-2019 | 13:16 | 13:18 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 694 | 2 | 26-11-2019 | 13:18 | 13:20 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 695 | 2 | 26-11-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 696 | 2 | 26-11-2019 | 13:24 | 13:26 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 697 | 2 | 26-11-2019 | 13:30 | 13:32 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 702 | 2 | 26-11-2019 | 14:04 | 14:06 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 703 | 2 | 26-11-2019 | 14:06 | 14:08 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 704 | 2 | 26-11-2019 | 13:20 | 13:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 705 | 2 | 26-11-2019 | 11:54 | 11:56 | 2 | 6 | 3 | 0.333 | 0 | 0 | - |
| 706 | 2 | 26-11-2019 | 11:56 | 11:58 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |
| 707 | 2 | 26-11-2019 | 11:58 | 12:00 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |
| 708 | 2 | 26-11-2019 | 12:00 | 12:02 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 709 | 2 | 26-11-2019 | 12:02 | 12:04 | 2 | 6 | 3 | 0.333 | 2 | 1 | 1.000 |
| 710 | 2 | 26-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 711 | 2 | 26-11-2019 | 12:06 | 12:08 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 712 | 2 | 26-11-2019 | 12:08 | 12:10 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 713 | 2 | 26-11-2019 | 12:10 | 12:12 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 714 | 2 | 26-11-2019 | 12:12 | 12:14 | 2 | 4 | 2 | 0.500 | 4 | 2 | 0.500 |
| 715 | 2 | 26-11-2019 | 12:14 | 12:16 | 2 | 15 | 7.5 | 0.133 | 3 | 1.5 | 0.667 |
| 716 | 2 | 26-11-2019 | 12:16 | 12:18 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 717 | 2 | 26-11-2019 | 12:18 | 12:20 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 718 | 2 | 26-11-2019 | 12:20 | 12:22 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 719 | 2 | 26-11-2019 | 12:22 | 12:24 | 2 | 9 | 4.5 | 0.222 | 2 | 1 | 1.000 |
| 720 | 2 | 26-11-2019 | 12:24 | 12:26 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 721 | 2 | 26-11-2019 | 12:26 | 12:28 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 722 | 2 | 26-11-2019 | 12:28 | 12:30 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 723 | 2 | 26-11-2019 | 12:30 | 12:32 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 724 | 2 | 26-11-2019 | 12:32 | 12:34 | 2 | 4 | 2 | 0.500 | 5 | 2.5 | 0.400 |
| 725 | 2 | 26-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 726 | 2 | 26-11-2019 | 12:36 | 12:38 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 727 | 2 | 26-11-2019 | 12:38 | 12:40 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 728 | 2 | 26-11-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 729 | 2 | 26-11-2019 | 12:42 | 12:44 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 730 | 2 | 26-11-2019 | 12:44 | 12:46 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 731 | 2 | 26-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 732 | 2 | 26-11-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 733 | 2 | 26-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 734 | 2 | 26-11-2019 | 13:26 | 13:28 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 735 | 2 | 26-11-2019 | 13:28 | 13:30 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 736 | 2 | 26-11-2019 | 13:32 | 13:34 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 737 | 2 | 26-11-2019 | 13:34 | 13:36 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 738 | 2 | 26-11-2019 | 13:36 | 13:38 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 739 | 2 | 26-11-2019 | 13:38 | 13:40 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 740 | 2 | 26-11-2019 | 13:40 | 13:42 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 741 | 2 | 26-11-2019 | 13:42 | 13:44 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 742 | 2 | 26-11-2019 | 13:44 | 13:46 | 2 | 6 | 3 | 0.333 | 2 | 1 | 1.000 |
| 743 | 2 | 26-11-2019 | 13:46 | 13:48 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 700 | 2 | 26-11-2019 | 14:00 | 14:02 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 701 | 2 | 26-11-2019 | 14:02 | 14:04 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 812 | 3 | 27-11-2019 | 13:48 | 13:50 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 813 | 3 | 27-11-2019 | 13:50 | 13:52 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 814 | 3 | 27-11-2019 | 13:52 | 13:54 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 815 | 3 | 27-11-2019 | 13:54 | 13:56 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 766 | 3 | 27-11-2019 | 13:56 | 13:58 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 767 | 3 | 27-11-2019 | 13:58 | 14:00 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 748 | 3 | 27-11-2019 | 14:08 | 14:10 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 749 | 3 | 27-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 750 | 3 | 27-11-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 751 | 3 | 27-11-2019 | 12:58 | 13:00 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 752 | 3 | 27-11-2019 | 13:00 | 13:02 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 753 | 3 | 27-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 754 | 3 | 27-11-2019 | 13:04 | 13:06 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 755 | 3 | 27-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 756 | 3 | 27-11-2019 | 13:08 | 13:10 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 757 | 3 | 27-11-2019 | 13:10 | 13:12 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 758 | 3 | 27-11-2019 | 13:12 | 13:14 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 759 | 3 | 27-11-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 760 | 3 | 27-11-2019 | 13:16 | 13:18 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 761 | 3 | 27-11-2019 | 13:18 | 13:20 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 762 | 3 | 27-11-2019 | 13:20 | 13:22 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 763 | 3 | 27-11-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 764 | 3 | 27-11-2019 | 13:24 | 13:26 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 765 | 3 | 27-11-2019 | 13:30 | 13:32 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 770 | 3 | 27-11-2019 | 14:04 | 14:06 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |

Work Project: Nova SBE's canteen: case study on queuing theory

| | | | | | | | | | | | |
|-----|---|------------|-------|-------|---|----|-----|-------|---|-----|-------|
| 771 | 3 | 27-11-2019 | 14:06 | 14:08 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 772 | 3 | 27-11-2019 | 12:52 | 12:54 | 2 | 3 | 1.5 | 0.667 | 5 | 2.5 | 0.400 |
| 773 | 3 | 27-11-2019 | 12:48 | 12:50 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 774 | 3 | 27-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 775 | 3 | 27-11-2019 | 12:36 | 12:38 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 776 | 3 | 27-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 777 | 3 | 27-11-2019 | 12:40 | 12:42 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 778 | 3 | 27-11-2019 | 12:42 | 12:44 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 779 | 3 | 27-11-2019 | 12:44 | 12:46 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 780 | 3 | 27-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 781 | 3 | 27-11-2019 | 12:50 | 12:52 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 782 | 3 | 27-11-2019 | 11:54 | 11:56 | 2 | 5 | 2.5 | 0.400 | 0 | 0 | - |
| 783 | 3 | 27-11-2019 | 11:56 | 11:58 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 784 | 3 | 27-11-2019 | 11:58 | 12:00 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 785 | 3 | 27-11-2019 | 12:00 | 12:02 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 786 | 3 | 27-11-2019 | 12:02 | 12:04 | 2 | 8 | 4 | 0.250 | 5 | 2.5 | 0.400 |
| 787 | 3 | 27-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 788 | 3 | 27-11-2019 | 12:06 | 12:08 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 789 | 3 | 27-11-2019 | 12:08 | 12:10 | 2 | 8 | 4 | 0.250 | 2 | 1 | 1.000 |
| 790 | 3 | 27-11-2019 | 12:10 | 12:12 | 2 | 7 | 3.5 | 0.286 | 2 | 1 | 1.000 |
| 791 | 3 | 27-11-2019 | 12:12 | 12:14 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 792 | 3 | 27-11-2019 | 12:14 | 12:16 | 2 | 7 | 3.5 | 0.286 | 3 | 1.5 | 0.667 |
| 793 | 3 | 27-11-2019 | 12:16 | 12:18 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 794 | 3 | 27-11-2019 | 12:18 | 12:20 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 795 | 3 | 27-11-2019 | 12:20 | 12:22 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 796 | 3 | 27-11-2019 | 12:22 | 12:24 | 2 | 11 | 5.5 | 0.182 | 4 | 2 | 0.500 |
| 797 | 3 | 27-11-2019 | 12:24 | 12:26 | 2 | 17 | 8.5 | 0.118 | 3 | 1.5 | 0.667 |
| 798 | 3 | 27-11-2019 | 12:26 | 12:28 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 799 | 3 | 27-11-2019 | 12:28 | 12:30 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 800 | 3 | 27-11-2019 | 12:30 | 12:32 | 2 | 1 | 0.5 | 2.000 | 5 | 2.5 | 0.400 |
| 801 | 3 | 27-11-2019 | 12:32 | 12:34 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 802 | 3 | 27-11-2019 | 13:26 | 13:28 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 803 | 3 | 27-11-2019 | 13:28 | 13:30 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 804 | 3 | 27-11-2019 | 13:32 | 13:34 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 805 | 3 | 27-11-2019 | 13:34 | 13:36 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 806 | 3 | 27-11-2019 | 13:36 | 13:38 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 807 | 3 | 27-11-2019 | 13:38 | 13:40 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 808 | 3 | 27-11-2019 | 13:40 | 13:42 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 809 | 3 | 27-11-2019 | 13:42 | 13:44 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 810 | 3 | 27-11-2019 | 13:44 | 13:46 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 811 | 3 | 27-11-2019 | 13:46 | 13:48 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 768 | 3 | 27-11-2019 | 14:00 | 14:02 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 769 | 3 | 27-11-2019 | 14:02 | 14:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 880 | 4 | 28-11-2019 | 13:48 | 13:50 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 881 | 4 | 28-11-2019 | 13:50 | 13:52 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 882 | 4 | 28-11-2019 | 13:52 | 13:54 | 2 | 3 | 1.5 | 0.667 | 1 | 0.5 | 2.000 |
| 883 | 4 | 28-11-2019 | 13:54 | 13:56 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 837 | 4 | 28-11-2019 | 13:56 | 13:58 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 838 | 4 | 28-11-2019 | 13:58 | 14:00 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 839 | 4 | 28-11-2019 | 14:00 | 14:02 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 816 | 4 | 28-11-2019 | 14:14 | 14:16 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 817 | 4 | 28-11-2019 | 14:10 | 14:12 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 818 | 4 | 28-11-2019 | 14:12 | 14:14 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 819 | 4 | 28-11-2019 | 12:52 | 12:54 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 820 | 4 | 28-11-2019 | 12:54 | 12:56 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 821 | 4 | 28-11-2019 | 12:56 | 12:58 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 822 | 4 | 28-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 823 | 4 | 28-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 824 | 4 | 28-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 825 | 4 | 28-11-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 826 | 4 | 28-11-2019 | 13:06 | 13:08 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 827 | 4 | 28-11-2019 | 13:08 | 13:10 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 828 | 4 | 28-11-2019 | 13:10 | 13:12 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 829 | 4 | 28-11-2019 | 13:12 | 13:14 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 830 | 4 | 28-11-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 831 | 4 | 28-11-2019 | 13:16 | 13:18 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 832 | 4 | 28-11-2019 | 13:18 | 13:20 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 833 | 4 | 28-11-2019 | 13:20 | 13:22 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 834 | 4 | 28-11-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 835 | 4 | 28-11-2019 | 13:24 | 13:26 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 836 | 4 | 28-11-2019 | 13:30 | 13:32 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 841 | 4 | 28-11-2019 | 14:04 | 14:06 | 2 | 5 | 2.5 | 0.400 | 4 | 2 | 0.500 |
| 842 | 4 | 28-11-2019 | 14:06 | 14:08 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 843 | 4 | 28-11-2019 | 14:08 | 14:10 | 2 | 6 | 3 | 0.333 | 3 | 1.5 | 0.667 |
| 844 | 4 | 28-11-2019 | 12:48 | 12:50 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 845 | 4 | 28-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 846 | 4 | 28-11-2019 | 12:36 | 12:38 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 847 | 4 | 28-11-2019 | 12:44 | 12:46 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 848 | 4 | 28-11-2019 | 12:46 | 12:48 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 849 | 4 | 28-11-2019 | 12:50 | 12:52 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 850 | 4 | 28-11-2019 | 11:54 | 11:56 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 851 | 4 | 28-11-2019 | 11:56 | 11:58 | 2 | 1 | 0.5 | 2.000 | 0 | 0 | - |
| 852 | 4 | 28-11-2019 | 11:58 | 12:00 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 853 | 4 | 28-11-2019 | 12:00 | 12:02 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 854 | 4 | 28-11-2019 | 12:02 | 12:04 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 855 | 4 | 28-11-2019 | 12:04 | 12:06 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 856 | 4 | 28-11-2019 | 12:06 | 12:08 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 857 | 4 | 28-11-2019 | 12:08 | 12:10 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 858 | 4 | 28-11-2019 | 12:10 | 12:12 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 859 | 4 | 28-11-2019 | 12:12 | 12:14 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 860 | 4 | 28-11-2019 | 12:14 | 12:16 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 861 | 4 | 28-11-2019 | 12:16 | 12:18 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 862 | 4 | 28-11-2019 | 12:18 | 12:20 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 863 | 4 | 28-11-2019 | 12:20 | 12:22 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 864 | 4 | 28-11-2019 | 12:22 | 12:24 | 2 | 8 | 4 | 0.250 | 2 | 1 | 1.000 |
| 865 | 4 | 28-11-2019 | 12:24 | 12:26 | 2 | 14 | 7 | 0.143 | 2 | 1 | 1.000 |
| 866 | 4 | 28-11-2019 | 12:26 | 12:28 | 2 | 11 | 5.5 | 0.182 | 5 | 2.5 | 0.400 |
| 867 | 4 | 28-11-2019 | 12:28 | 12:30 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 868 | 4 | 28-11-2019 | 12:30 | 12:32 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 869 | 4 | 28-11-2019 | 12:32 | 12:34 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 870 | 4 | 28-11-2019 | 13:26 | 13:28 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 871 | 4 | 28-11-2019 | 13:28 | 13:30 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 872 | 4 | 28-11-2019 | 13:32 | 13:34 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 873 | 4 | 28-11-2019 | 13:34 | 13:36 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 874 | 4 | 28-11-2019 | 13:36 | 13:38 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 875 | 4 | 28-11-2019 | 13:38 | 13:40 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 876 | 4 | 28-11-2019 | 13:40 | 13:42 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 877 | 4 | 28-11-2019 | 13:42 | 13:44 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 878 | 4 | 28-11-2019 | 13:44 | 13:46 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 879 | 4 | 28-11-2019 | 13:46 | 13:48 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 840 | 4 | 28-11-2019 | 14:02 | 14:04 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |

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| | | | | | | | | | | | |
|------|---|------------|-------|-------|---|---|-----|-------|---|-----|-------|
| 914 | 5 | 29-11-2019 | 13:48 | 13:50 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 915 | 5 | 29-11-2019 | 13:50 | 13:52 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 916 | 5 | 29-11-2019 | 13:52 | 13:54 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 917 | 5 | 29-11-2019 | 13:54 | 13:56 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 947 | 5 | 29-11-2019 | 13:56 | 13:58 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 948 | 5 | 29-11-2019 | 13:58 | 14:00 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 884 | 5 | 29-11-2019 | 11:54 | 11:56 | 2 | 3 | 1.5 | 0.667 | 0 | 0 | - |
| 885 | 5 | 29-11-2019 | 11:56 | 11:58 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 886 | 5 | 29-11-2019 | 11:58 | 12:00 | 2 | 0 | 0 | - | 0 | 0 | - |
| 887 | 5 | 29-11-2019 | 12:00 | 12:02 | 2 | 8 | 4 | 0.250 | 2 | 1 | 1.000 |
| 888 | 5 | 29-11-2019 | 12:02 | 12:04 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 889 | 5 | 29-11-2019 | 12:04 | 12:06 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 890 | 5 | 29-11-2019 | 12:06 | 12:08 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 891 | 5 | 29-11-2019 | 12:08 | 12:10 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 892 | 5 | 29-11-2019 | 12:10 | 12:12 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 893 | 5 | 29-11-2019 | 12:12 | 12:14 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 894 | 5 | 29-11-2019 | 12:14 | 12:16 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 895 | 5 | 29-11-2019 | 12:16 | 12:18 | 2 | 0 | 0 | - | 0 | 0 | - |
| 896 | 5 | 29-11-2019 | 12:18 | 12:20 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 897 | 5 | 29-11-2019 | 12:20 | 12:22 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 898 | 5 | 29-11-2019 | 12:22 | 12:24 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 899 | 5 | 29-11-2019 | 12:24 | 12:26 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 900 | 5 | 29-11-2019 | 12:26 | 12:28 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 901 | 5 | 29-11-2019 | 12:28 | 12:30 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 902 | 5 | 29-11-2019 | 12:30 | 12:32 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 903 | 5 | 29-11-2019 | 12:32 | 12:34 | 2 | 3 | 1.5 | 0.667 | 2 | 1 | 1.000 |
| 904 | 5 | 29-11-2019 | 13:26 | 13:28 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 905 | 5 | 29-11-2019 | 13:28 | 13:30 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 906 | 5 | 29-11-2019 | 13:32 | 13:34 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 907 | 5 | 29-11-2019 | 13:34 | 13:36 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 908 | 5 | 29-11-2019 | 13:36 | 13:38 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 909 | 5 | 29-11-2019 | 13:38 | 13:40 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 910 | 5 | 29-11-2019 | 13:40 | 13:42 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 911 | 5 | 29-11-2019 | 13:42 | 13:44 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 912 | 5 | 29-11-2019 | 13:44 | 13:46 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 913 | 5 | 29-11-2019 | 13:46 | 13:48 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 949 | 5 | 29-11-2019 | 14:00 | 14:02 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 918 | 5 | 29-11-2019 | 14:10 | 14:12 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 919 | 5 | 29-11-2019 | 14:12 | 14:14 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 920 | 5 | 29-11-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 921 | 5 | 29-11-2019 | 12:36 | 12:38 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 922 | 5 | 29-11-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 923 | 5 | 29-11-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 924 | 5 | 29-11-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 925 | 5 | 29-11-2019 | 12:44 | 12:46 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 926 | 5 | 29-11-2019 | 12:46 | 12:48 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 927 | 5 | 29-11-2019 | 12:48 | 12:50 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 928 | 5 | 29-11-2019 | 12:50 | 12:52 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 929 | 5 | 29-11-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 930 | 5 | 29-11-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 931 | 5 | 29-11-2019 | 12:56 | 12:58 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 932 | 5 | 29-11-2019 | 12:58 | 13:00 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 933 | 5 | 29-11-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 934 | 5 | 29-11-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 935 | 5 | 29-11-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 936 | 5 | 29-11-2019 | 13:06 | 13:08 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 937 | 5 | 29-11-2019 | 13:08 | 13:10 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 938 | 5 | 29-11-2019 | 13:10 | 13:12 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 939 | 5 | 29-11-2019 | 13:12 | 13:14 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 940 | 5 | 29-11-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 941 | 5 | 29-11-2019 | 13:16 | 13:18 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 942 | 5 | 29-11-2019 | 13:18 | 13:20 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 943 | 5 | 29-11-2019 | 13:20 | 13:22 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 944 | 5 | 29-11-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 945 | 5 | 29-11-2019 | 13:24 | 13:26 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 946 | 5 | 29-11-2019 | 13:30 | 13:32 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 951 | 5 | 29-11-2019 | 14:04 | 14:06 | 2 | 2 | 1 | 1.000 | 1 | 0.5 | 2.000 |
| 952 | 5 | 29-11-2019 | 14:06 | 14:08 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 953 | 5 | 29-11-2019 | 14:08 | 14:10 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 950 | 5 | 29-11-2019 | 14:02 | 14:04 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 1018 | 1 | 02-12-2019 | 13:48 | 13:50 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 1019 | 1 | 02-12-2019 | 13:50 | 13:52 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 1020 | 1 | 02-12-2019 | 13:52 | 13:54 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 1021 | 1 | 02-12-2019 | 13:54 | 13:56 | 2 | 9 | 4.5 | 0.222 | 2 | 1 | 1.000 |
| 971 | 1 | 02-12-2019 | 13:56 | 13:58 | 2 | 3 | 1.5 | 0.667 | 4 | 2 | 0.500 |
| 972 | 1 | 02-12-2019 | 13:58 | 14:00 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 973 | 1 | 02-12-2019 | 14:00 | 14:02 | 2 | 7 | 3.5 | 0.286 | 4 | 2 | 0.500 |
| 974 | 1 | 02-12-2019 | 14:02 | 14:04 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 954 | 1 | 02-12-2019 | 14:08 | 14:10 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 955 | 1 | 02-12-2019 | 12:54 | 12:56 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 956 | 1 | 02-12-2019 | 12:56 | 12:58 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 957 | 1 | 02-12-2019 | 12:58 | 13:00 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 958 | 1 | 02-12-2019 | 13:00 | 13:02 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 959 | 1 | 02-12-2019 | 13:02 | 13:04 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 960 | 1 | 02-12-2019 | 13:04 | 13:06 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 961 | 1 | 02-12-2019 | 13:06 | 13:08 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 962 | 1 | 02-12-2019 | 13:08 | 13:10 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 963 | 1 | 02-12-2019 | 13:10 | 13:12 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 964 | 1 | 02-12-2019 | 13:12 | 13:14 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 965 | 1 | 02-12-2019 | 13:14 | 13:16 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 966 | 1 | 02-12-2019 | 13:16 | 13:18 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 967 | 1 | 02-12-2019 | 13:18 | 13:20 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 968 | 1 | 02-12-2019 | 13:22 | 13:24 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 969 | 1 | 02-12-2019 | 13:24 | 13:26 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 970 | 1 | 02-12-2019 | 13:30 | 13:32 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 975 | 1 | 02-12-2019 | 14:04 | 14:06 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 976 | 1 | 02-12-2019 | 14:06 | 14:08 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 977 | 1 | 02-12-2019 | 12:52 | 12:54 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 978 | 1 | 02-12-2019 | 13:20 | 13:22 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 979 | 1 | 02-12-2019 | 12:34 | 12:36 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 980 | 1 | 02-12-2019 | 12:36 | 12:38 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 981 | 1 | 02-12-2019 | 12:38 | 12:40 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 982 | 1 | 02-12-2019 | 12:40 | 12:42 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 983 | 1 | 02-12-2019 | 12:42 | 12:44 | 2 | 0 | 0 | - | 4 | 2 | 0.500 |
| 984 | 1 | 02-12-2019 | 12:44 | 12:46 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 985 | 1 | 02-12-2019 | 12:46 | 12:48 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 986 | 1 | 02-12-2019 | 12:48 | 12:50 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 987 | 1 | 02-12-2019 | 12:50 | 12:52 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 988 | 1 | 02-12-2019 | 11:54 | 11:56 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 989 | 1 | 02-12-2019 | 11:56 | 11:58 | 2 | 2 | 1 | 1.000 | 0 | 0 | - |
| 990 | 1 | 02-12-2019 | 11:58 | 12:00 | 2 | 4 | 2 | 0.500 | 0 | 0 | - |

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| | | | | | | | | | | | |
|------|---|------------|-------|-------|---|---|-----|-------|---|-----|-------|
| 991 | 1 | 02-12-2019 | 12:00 | 12:02 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 992 | 1 | 02-12-2019 | 12:02 | 12:04 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 993 | 1 | 02-12-2019 | 12:04 | 12:06 | 2 | 6 | 3 | 0.333 | 4 | 2 | 0.500 |
| 994 | 1 | 02-12-2019 | 12:06 | 12:08 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 995 | 1 | 02-12-2019 | 12:08 | 12:10 | 2 | 1 | 0.5 | 2.000 | 4 | 2 | 0.500 |
| 996 | 1 | 02-12-2019 | 12:10 | 12:12 | 2 | 8 | 4 | 0.250 | 1 | 0.5 | 2.000 |
| 997 | 1 | 02-12-2019 | 12:12 | 12:14 | 2 | 4 | 2 | 0.500 | 2 | 1 | 1.000 |
| 998 | 1 | 02-12-2019 | 12:14 | 12:16 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 999 | 1 | 02-12-2019 | 12:16 | 12:18 | 2 | 5 | 2.5 | 0.400 | 2 | 1 | 1.000 |
| 1000 | 1 | 02-12-2019 | 12:18 | 12:20 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 1001 | 1 | 02-12-2019 | 12:20 | 12:22 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 1002 | 1 | 02-12-2019 | 12:22 | 12:24 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 1003 | 1 | 02-12-2019 | 12:24 | 12:26 | 2 | 5 | 2.5 | 0.400 | 3 | 1.5 | 0.667 |
| 1004 | 1 | 02-12-2019 | 12:26 | 12:28 | 2 | 2 | 1 | 1.000 | 4 | 2 | 0.500 |
| 1005 | 1 | 02-12-2019 | 12:28 | 12:30 | 2 | 2 | 1 | 1.000 | 3 | 1.5 | 0.667 |
| 1006 | 1 | 02-12-2019 | 12:30 | 12:32 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 1007 | 1 | 02-12-2019 | 12:32 | 12:34 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 1008 | 1 | 02-12-2019 | 13:26 | 13:28 | 2 | 1 | 0.5 | 2.000 | 1 | 0.5 | 2.000 |
| 1009 | 1 | 02-12-2019 | 13:28 | 13:30 | 2 | 0 | 0 | - | 3 | 1.5 | 0.667 |
| 1010 | 1 | 02-12-2019 | 13:32 | 13:34 | 2 | 0 | 0 | - | 2 | 1 | 1.000 |
| 1011 | 1 | 02-12-2019 | 13:34 | 13:36 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |
| 1012 | 1 | 02-12-2019 | 13:36 | 13:38 | 2 | 0 | 0 | - | 1 | 0.5 | 2.000 |
| 1013 | 1 | 02-12-2019 | 13:38 | 13:40 | 2 | 1 | 0.5 | 2.000 | 2 | 1 | 1.000 |
| 1014 | 1 | 02-12-2019 | 13:40 | 13:42 | 2 | 4 | 2 | 0.500 | 3 | 1.5 | 0.667 |
| 1015 | 1 | 02-12-2019 | 13:42 | 13:44 | 2 | 3 | 1.5 | 0.667 | 3 | 1.5 | 0.667 |
| 1016 | 1 | 02-12-2019 | 13:44 | 13:46 | 2 | 1 | 0.5 | 2.000 | 3 | 1.5 | 0.667 |
| 1017 | 1 | 02-12-2019 | 13:46 | 13:48 | 2 | 2 | 1 | 1.000 | 2 | 1 | 1.000 |

Appendix B: Aggregated data with averages of arrivals and services per minute and per weekday. General note about weekdays: 1 – Monday and so on until 5 – Friday.

Appendix B1: Aggregated data for line 1.

| | 1 | | 2 | | 3 | | 4 | | 5 | | Total Average of Arrivals | Total Average of Services |
|--------------------|-------------|---------------|----------------|----------------|-------------|---------------|-------------|----------------|----------------|----------------|---------------------------|---------------------------|
| Row Labels | AvgArrivals | AvgServices | AvgArrivals | AvgServices | AvgArrivals | AvgServices | AvgArrivals | AvgServices | AvgArrivals | AvgServices | | |
| 11 | | | | | | | | | | | | |
| :56 | 6.000 | 0.000 | 1.000 | 0.000 | 3.000 | 0.000 | 0.000 | 0.000 | | | 2.500 | 0.000 |
| :58 | 6.000 | 0.000 | 4.000 | 0.000 | 2.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 2.600 | 0.000 |
| 12 | | | | | | | | | | | | |
| :00 | 3.000 | 0.000 | 1.000 | 0.000 | 3.000 | 1.000 | 3.000 | 1.000 | 2.333 | 0.000 | 2.250 | 0.250 |
| :02 | 2.000 | 0.000 | 0.500 | 0.500 | 3.667 | 2.667 | 1.333 | 2.000 | 1.667 | 1.000 | 1.923 | 1.385 |
| :04 | 1.500 | 4.000 | 2.000 | 3.500 | 4.000 | 2.333 | 2.000 | 1.667 | 2.667 | 1.667 | 2.538 | 2.462 |
| :06 | 3.500 | 4.500 | 3.000 | 2.500 | 2.333 | 3.333 | 2.667 | 2.333 | 3.000 | 2.000 | 2.846 | 2.846 |
| :08 | 4.000 | 3.000 | 1.500 | 4.500 | 5.000 | 3.667 | 3.000 | 1.667 | 1.333 | 3.000 | 3.000 | 3.077 |
| :10 | 1.500 | 4.500 | 3.500 | 4.500 | 2.333 | 5.333 | 2.000 | 3.333 | 0.000 | 1.333 | 1.769 | 3.692 |
| :12 | 1.667 | 3.333 | 6.500 | 3.000 | 5.000 | 3.333 | 4.000 | 2.667 | 0.667 | 1.333 | 3.357 | 2.714 |
| :14 | 4.000 | 3.000 | 2.500 | 6.500 | 4.000 | 4.000 | 2.000 | 3.000 | 1.333 | 0.667 | 2.786 | 3.214 |
| :16 | 8.000 | 3.000 | 11.500 | 4.000 | 3.333 | 3.333 | 3.000 | 2.000 | 1.000 | 0.667 | 4.929 | 2.500 |
| :18 | 5.667 | 3.667 | 5.333 | 3.667 | 5.667 | 3.333 | 3.667 | 4.333 | 1.000 | 1.333 | 4.267 | 3.267 |
| :20 | 3.000 | 4.000 | 10.667 | 6.000 | 5.500 | 4.500 | 6.000 | 2.750 | 0.000 | 0.667 | 5.067 | 3.467 |
| :22 | 5.667 | 2.333 | 5.000 | 5.250 | 6.500 | 3.000 | 4.333 | 3.333 | 0.667 | 0.000 | 4.333 | 2.933 |
| :24 | 13.000 | 4.333 | 10.000 | 4.250 | 11.500 | 5.000 | 4.667 | 4.000 | 0.667 | 1.000 | 7.867 | 3.667 |
| :26 | 7.000 | 3.000 | 3.000 | 3.500 | 8.000 | 4.500 | 6.000 | 3.667 | 1.333 | 0.667 | 4.733 | 3.000 |
| :28 | 5.000 | 4.000 | 4.000 | 4.667 | 4.000 | 4.000 | 2.333 | 2.667 | 1.667 | 1.667 | 3.400 | 3.400 |
| :30 | 1.667 | 5.000 | 2.667 | 4.667 | 3.333 | 4.667 | 5.000 | 2.667 | 1.667 | 1.000 | 2.867 | 3.600 |
| :32 | 1.667 | 4.333 | 3.000 | 4.500 | 2.000 | 4.667 | 2.667 | 4.667 | 1.000 | 0.667 | 2.000 | 3.714 |
| :34 | 1.333 | 3.333 | 3.000 | 5.333 | 1.333 | 4.000 | 1.667 | 3.667 | 2.333 | 2.667 | 1.933 | 3.800 |
| :36 | 1.500 | 5.000 | 1.667 | 5.667 | 1.000 | 3.333 | 1.000 | 4.000 | 1.333 | 2.000 | 1.286 | 3.929 |
| :38 | 0.000 | 3.500 | 1.333 | 3.000 | 2.333 | 4.333 | 0.667 | 3.667 | 2.333 | 1.333 | 1.429 | 3.143 |
| :40 | 0.500 | 5.000 | 1.667 | 4.333 | 0.000 | 3.000 | 2.500 | 2.000 | 1.667 | 2.333 | 1.231 | 3.308 |
| :42 | 3.000 | 4.500 | 1.000 | 3.667 | 1.333 | 3.667 | 3.000 | 4.500 | 1.000 | 2.000 | 1.692 | 3.538 |
| :44 | 1.000 | 4.500 | 1.000 | 3.000 | 1.333 | 4.000 | 2.500 | 2.500 | 1.000 | 1.000 | 1.333 | 3.083 |
| :46 | 0.000 | 4.000 | 0.000 | 4.333 | 1.333 | 4.000 | 2.333 | 2.667 | 0.500 | 0.500 | 0.923 | 3.231 |
| :48 | 2.000 | 3.000 | 0.667 | 2.333 | 0.333 | 3.667 | 2.000 | 3.667 | 0.000 | 0.500 | 1.000 | 2.769 |
| :50 | 1.500 | 3.500 | 0.333 | 2.333 | 0.000 | 4.333 | 1.000 | 3.667 | 0.000 | 0.000 | 0.538 | 2.923 |
| :52 | 0.000 | 4.500 | 0.000 | 3.500 | 0.000 | 3.333 | 0.333 | 5.000 | 0.000 | 0.000 | 0.083 | 3.417 |
| :54 | 0.000 | 4.000 | 0.000 | 2.000 | 0.000 | 3.500 | 1.000 | 3.000 | 0.000 | 0.000 | 0.125 | 2.500 |
| :56 | 0.000 | 4.000 | 0.000 | 3.000 | 0.000 | 2.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.857 |
| :58 | 0.000 | 4.500 | 0.000 | 3.000 | | | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 2.167 |
| 13 | | | | | | | | | | | | |
| :00 | 0.000 | 3.000 | 0.000 | 4.000 | | | 3.000 | 0.000 | 0.000 | 0.000 | 0.500 | 1.667 |
| :02 | 0.000 | 5.000 | 0.000 | 5.000 | | | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 2.75 |
| :04 | 0.000 | 2.000 | 0.000 | 4.000 | | | 0.000 | 2.000 | 0.000 | 0.000 | 0.000 | 2 |
| :06 | 0.000 | 4.000 | | | | | | | | | 0.000 | 4 |
| :08 | 0.000 | 1.000 | | | | | | | | | 0.000 | 1 |
| :10 | 0.000 | 3.000 | | | | | | | | | 0.000 | 3 |
| Grand Total | 2.9 | 3.5375 | 3.04938 | 3.77777 | 2.9 | 3.6375 | 2.6 | 2.91764 | 1.09195 | 1.04597 | 2.486682809 | 2.95157385 |
| | | | 2716 | 7778 | | | | 7059 | 4023 | 7011 | | |

Appendix B2: Aggregated data for line 2.

| | 1 | | 2 | | 3 | | 4 | | 5 | | Total Average of Arrivals | Total Average of Services |
|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------------------|---------------------------|
| Row Labels | AvgArrivals | AvgServices | AvgArrivals | AvgServices | AvgArrivals | AvgServices | AvgArrivals | AvgServices | AvgArrivals | AvgServices | | |
| 11 | | | | | | | | | | | | |
| :56 | 2.000 | 0.000 | 6.000 | 0.000 | 5.000 | 0.000 | 2.000 | 0.000 | 3.000 | 0.000 | 3.600 | 0.000 |
| :58 | 2.000 | 0.000 | 4.000 | 0.000 | 2.000 | 0.000 | 1.000 | 0.000 | 2.000 | 0.000 | 2.200 | 0.000 |
| 12 | | | | | | | | | | | | |
| :00 | 4.000 | 0.000 | 3.000 | 0.000 | 2.000 | 0.000 | 3.000 | 0.000 | 3.500 | 0.000 | 3.143 | 0.000 |
| :02 | 2.000 | 1.500 | 3.333 | 1.000 | 3.000 | 1.000 | 2.500 | 2.500 | 5.333 | 1.000 | 3.417 | 1.333 |
| :04 | 4.000 | 2.500 | 4.333 | 1.000 | 9.000 | 3.000 | 4.500 | 2.500 | 3.333 | 1.000 | 4.833 | 1.833 |
| :06 | 5.000 | 3.500 | 2.333 | 2.333 | 2.667 | 1.667 | 4.333 | 3.000 | 2.667 | 1.667 | 3.286 | 2.357 |
| :08 | 4.500 | 2.500 | 2.000 | 3.000 | 2.000 | 3.000 | 7.333 | 2.333 | 0.333 | 2.000 | 3.143 | 2.571 |
| :10 | 1.500 | 3.500 | 5.000 | 2.000 | 3.667 | 2.000 | 2.333 | 2.333 | 2.000 | 2.000 | 3.000 | 2.286 |
| :12 | 5.000 | 2.333 | 4.000 | 3.333 | 4.000 | 2.000 | 4.000 | 3.000 | 1.667 | 2.667 | 3.733 | 2.667 |
| :14 | 4.000 | 2.333 | 2.667 | 3.667 | 3.667 | 2.333 | 2.667 | 2.667 | 0.333 | 2.667 | 2.667 | 2.733 |
| :16 | 3.333 | 2.333 | 6.667 | 2.667 | 3.667 | 3.333 | 3.000 | 2.667 | 1.000 | 2.333 | 3.533 | 2.667 |
| :18 | 3.333 | 2.667 | 3.667 | 2.667 | 2.333 | 2.667 | 2.333 | 2.333 | 2.667 | 1.667 | 2.867 | 2.400 |
| :20 | 6.667 | 2.000 | 7.333 | 3.667 | 1.667 | 2.333 | 3.667 | 2.000 | 1.000 | 2.333 | 4.067 | 2.467 |

Work Project: Nova SBE's canteen: case study on queueing theory

| | | | | | | | | | | | | |
|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| :22 | 3.667 | 2.667 | 4.667 | 3.000 | 2.000 | 2.750 | 2.000 | 2.667 | 2.667 | 3.000 | 2.938 | 2.813 |
| :24 | 10.000 | 3.000 | 5.667 | 2.333 | 5.667 | 4.000 | 4.333 | 3.000 | 1.333 | 2.333 | 5.400 | 2.933 |
| :26 | 7.667 | 3.333 | 4.333 | 3.000 | 7.667 | 2.667 | 6.667 | 2.667 | 2.333 | 3.333 | 5.733 | 3.000 |
| :28 | 6.000 | 3.000 | 3.333 | 3.333 | 1.000 | 3.667 | 6.000 | 4.333 | 4.333 | 2.333 | 4.133 | 3.333 |
| :30 | 1.667 | 2.667 | 3.000 | 2.000 | 2.333 | 2.000 | 4.000 | 1.667 | 4.667 | 2.333 | 3.133 | 2.133 |
| :32 | 1.333 | 2.667 | 3.333 | 3.000 | 1.333 | 3.333 | 2.667 | 2.667 | 3.333 | 1.333 | 2.400 | 2.600 |
| :34 | 3.000 | 4.000 | 3.333 | 3.667 | 2.667 | 2.333 | 2.000 | 3.000 | 3.333 | 2.333 | 2.867 | 3.067 |
| :36 | 1.000 | 2.667 | 1.667 | 2.333 | 3.333 | 3.000 | 3.000 | 2.333 | 5.333 | 2.333 | 2.867 | 2.533 |
| :38 | 1.667 | 2.000 | 2.000 | 2.000 | 1.667 | 4.000 | 2.667 | 2.667 | 1.333 | 1.667 | 1.867 | 2.467 |
| :40 | 1.333 | 2.333 | 1.000 | 2.667 | 1.333 | 2.000 | 2.000 | 2.500 | 1.333 | 3.000 | 1.357 | 2.500 |
| :42 | 1.667 | 3.000 | 1.000 | 2.333 | 0.000 | 2.000 | 3.000 | 3.000 | 2.333 | 2.667 | 1.500 | 2.571 |
| :44 | 0.000 | 3.000 | 2.333 | 3.000 | 0.333 | 4.333 | 1.000 | 1.500 | 0.333 | 1.667 | 0.786 | 2.786 |
| :46 | 1.667 | 2.333 | 1.667 | 1.667 | 0.333 | 3.000 | 2.000 | 2.333 | 0.667 | 2.000 | 1.267 | 2.267 |
| :48 | 0.667 | 2.333 | 1.000 | 2.333 | 0.667 | 2.333 | 2.667 | 2.667 | 1.000 | 2.333 | 1.200 | 2.400 |
| :50 | 2.000 | 2.333 | 1.333 | 1.667 | 0.667 | 2.667 | 1.000 | 3.333 | 0.667 | 2.000 | 1.133 | 2.400 |
| :52 | 1.333 | 2.333 | 0.667 | 3.333 | 2.500 | 1.500 | 3.000 | 2.667 | 0.333 | 2.000 | 1.500 | 2.429 |
| :54 | 0.333 | 1.333 | 1.250 | 2.250 | 1.333 | 3.667 | 1.667 | 2.333 | 0.333 | 1.667 | 1.000 | 2.250 |
| :56 | 1.000 | 2.667 | 0.667 | 2.667 | 1.333 | 2.000 | 1.000 | 2.333 | 0.333 | 1.333 | 0.867 | 2.200 |
| :58 | 0.333 | 2.333 | 0.333 | 1.333 | 0.333 | 2.000 | 1.333 | 2.333 | 0.667 | 1.333 | 0.600 | 1.867 |
| 13 | | | | | | | | | | | | |
| :00 | 0.667 | 1.667 | 1.000 | 2.333 | 1.000 | 3.000 | 0.333 | 2.333 | 0.333 | 2.000 | 0.667 | 2.267 |
| :02 | 1.000 | 1.333 | 0.667 | 1.667 | 0.333 | 1.333 | 0.333 | 1.333 | 0.000 | 1.000 | 0.467 | 1.333 |
| :04 | 0.333 | 1.333 | 0.333 | 2.000 | 0.000 | 3.667 | 0.333 | 2.333 | 0.000 | 1.000 | 0.200 | 2.067 |
| :06 | 1.667 | 2.000 | 0.667 | 1.667 | 0.333 | 3.333 | 1.000 | 2.667 | 0.333 | 2.000 | 0.800 | 2.333 |
| :08 | 1.000 | 2.333 | 1.000 | 2.667 | 0.000 | 3.000 | 0.667 | 2.333 | 0.333 | 1.333 | 0.600 | 2.333 |
| :10 | 1.000 | 2.000 | 1.333 | 2.667 | 0.667 | 2.667 | 1.000 | 2.333 | 0.667 | 2.333 | 0.933 | 2.400 |
| :12 | 1.667 | 2.000 | 3.000 | 2.333 | 0.667 | 2.333 | 1.000 | 2.000 | 1.000 | 2.333 | 1.467 | 2.200 |
| :14 | 0.667 | 1.667 | 1.667 | 2.333 | 0.667 | 2.333 | 2.000 | 2.333 | 0.333 | 1.667 | 1.067 | 2.067 |
| :16 | 0.333 | 2.333 | 1.667 | 2.333 | 0.667 | 2.000 | 1.000 | 1.667 | 0.333 | 2.667 | 0.800 | 2.200 |
| :18 | 1.000 | 1.667 | 2.667 | 2.000 | 1.000 | 3.000 | 1.333 | 2.000 | 1.000 | 1.333 | 1.400 | 2.000 |
| :20 | 1.000 | 2.000 | 1.500 | 2.500 | 0.500 | 1.500 | 2.000 | 2.000 | 0.333 | 2.000 | 1.077 | 2.000 |
| :22 | 1.333 | 2.000 | 0.000 | 2.000 | 1.000 | 1.333 | 0.667 | 2.333 | 0.667 | 1.333 | 0.733 | 1.800 |
| :24 | 0.667 | 1.667 | 1.000 | 2.333 | 0.333 | 2.000 | 0.333 | 2.333 | 0.333 | 1.667 | 0.533 | 2.000 |
| :26 | 1.000 | 2.333 | 1.333 | 3.000 | 2.000 | 2.667 | 1.333 | 2.000 | 1.000 | 2.000 | 1.333 | 2.400 |
| :28 | 1.333 | 1.67 | 1.333 | 2.333 | 0.667 | 1.000 | 1.000 | 2.333 | 0.667 | 2.667 | 1.000 | 2.000 |
| :30 | 0.667 | 2.333 | 2.000 | 1.667 | 0.667 | 2.000 | 0.333 | 2.000 | 1.000 | 2.000 | 0.933 | 2.000 |
| :32 | 2.000 | 2.333 | 0.667 | 1.333 | 1.000 | 2.333 | 1.000 | 3.000 | 1.667 | 2.000 | 1.267 | 2.200 |
| :34 | 1.000 | 2.000 | 1.000 | 1.667 | 1.000 | 3.000 | 0.333 | 2.667 | 1.333 | 2.667 | 0.933 | 2.400 |
| :36 | 3.000 | 2.667 | 1.667 | 2.667 | 1.667 | 3.000 | 3.000 | 2.000 | 1.667 | 3.333 | 2.200 | 2.733 |
| :38 | 1.500 | 2.333 | 1.667 | 2.667 | 1.000 | 2.333 | 1.667 | 2.667 | 2.333 | 2.333 | 1.643 | 2.467 |
| :40 | 2.333 | 2.667 | 1.667 | 2.000 | 3.000 | 3.333 | 2.000 | 2.667 | 1.667 | 2.667 | 2.133 | 2.667 |
| :42 | 3.000 | 3.000 | 1.667 | 2.333 | 2.000 | 2.000 | 3.333 | 2.667 | 2.667 | 2.667 | 2.533 | 2.533 |
| :44 | 2.333 | 3.000 | 2.000 | 2.333 | 2.333 | 2.333 | 2.667 | 2.667 | 2.000 | 2.000 | 2.267 | 2.467 |
| :46 | 2.000 | 2.333 | 2.667 | 2.333 | 2.333 | 2.667 | 3.667 | 2.333 | 1.667 | 2.000 | 2.467 | 2.333 |
| :48 | 3.000 | 3.000 | 2.000 | 2.500 | 1.667 | 2.333 | 2.250 | 2.250 | 3.000 | 2.000 | 2.353 | 2.412 |
| :50 | 3.667 | 2.667 | 2.000 | 1.500 | 2.333 | 2.333 | 2.667 | 1.000 | 2.667 | 2.667 | 2.714 | 2.071 |
| :52 | 2.000 | 1.333 | 2.333 | 2.000 | 2.333 | 2.000 | 3.000 | 1.333 | 1.667 | 1.667 | 2.267 | 1.667 |
| :54 | 3.000 | 1.667 | 4.667 | 1.667 | 2.333 | 2.000 | 4.000 | 1.333 | 4.333 | 2.000 | 3.667 | 1.733 |
| :56 | 5.667 | 2.333 | 4.667 | 1.667 | 4.667 | 3.667 | 8.000 | 2.667 | 6.000 | 2.000 | 5.800 | 2.467 |
| :58 | 4.333 | 2.667 | 5.000 | 2.667 | 4.333 | 2.333 | 3.333 | 2.333 | 3.333 | 2.333 | 4.067 | 2.467 |
| 14 | | | | | | | | | | | | |
| :00 | 2.333 | 2.333 | 1.667 | 2.000 | 4.000 | 3.000 | 2.000 | 2.333 | 1.000 | 2.000 | 2.200 | 2.333 |
| :02 | 4.667 | 3.000 | 2.000 | 2.000 | 3.000 | 2.333 | 1.667 | 3.000 | 2.000 | 2.000 | 2.667 | 2.467 |
| :04 | 1.000 | 2.667 | 1.333 | 3.000 | 1.333 | 2.333 | 2.667 | 2.667 | 1.000 | 2.000 | 1.467 | 2.533 |
| :06 | 1.333 | 2.000 | 3.333 | 2.333 | 2.000 | 2.000 | 2.000 | 3.000 | 2.333 | 2.000 | 2.200 | 2.267 |
| :08 | 1.000 | 2.000 | 1.500 | 2.000 | 2.500 | 3.000 | 2.000 | 2.667 | 1.000 | 2.000 | 1.538 | 2.308 |
| :10 | 1.500 | 2.500 | 1.000 | 1.667 | 1.000 | 1.500 | 3.000 | 2.667 | 0.667 | 2.000 | 1.462 | 2.077 |
| :12 | 1.000 | 2.000 | 1.333 | 2.333 | 0.000 | 2.000 | 1.667 | 2.000 | 1.000 | 2.333 | 1.182 | 2.182 |
| :14 | 1.000 | 2.000 | 0.333 | 2.000 | 1.000 | 1.000 | 0.000 | 2.000 | 0.333 | 1.667 | 0.400 | 1.800 |
| :16 | 0.000 | 2.000 | 1.000 | 3.000 | | | 1.000 | 3.000 | 0.500 | 1.500 | 0.667 | 2.333 |
| :18 | 1.000 | 2.000 | 0.000 | 1.000 | | | 2.000 | 3.000 | 0.000 | 2.000 | 0.750 | 2.000 |
| :20 | 1.000 | 2.000 | 0.000 | 1.000 | | | 2.000 | 3.000 | 1.000 | 2.000 | 1.000 | 2.000 |
| :22 | 0.000 | 2.000 | 1.000 | 1.000 | | | 1.000 | 4.000 | 2.000 | 3.000 | 1.000 | 2.500 |
| :24 | | | | | | | 0.000 | 3.000 | 1.000 | 2.000 | 0.500 | 2.500 |
| :26 | | | | | | | 0.000 | 3.000 | | | 0.000 | 3.000 |
| :28 | | | | | | | 0.000 | 3.000 | | | 0.000 | 3.000 |
| :30 | | | | | | | 0.000 | 3.000 | | | 0.000 | 3.000 |
| :32 | | | | | | | 0.000 | 3.000 | | | 0.000 | 3.000 |
| Grand Total | 2.269 | 2.313 | 2.260 | 2.269 | 1.944 | 2.487 | 2.297 | 2.411 | 1.654 | 2.019 | 2.083 | 2.297 |

Appendix C: Data on cumulative sum of average of arrivals and services and theoretical number of people in the system, at a given point in time.

Appendix C1: Aggregated data for line 1.

| Column1 | Arrivals | Services | Sum avg arrivals | Sum avg services | Arrivals-services |
|---------|----------|----------|------------------|------------------|-------------------|
| 11:56 | 2.500 | 0.000 | 2.500 | 0.000 | 2.500 |
| 11:58 | 2.600 | 0.000 | 5.100 | 0.000 | 5.100 |
| 12:00 | 2.250 | 0.250 | 7.350 | 0.250 | 7.100 |
| 12:02 | 1.923 | 1.385 | 9.273 | 1.635 | 7.638 |
| 12:04 | 2.538 | 2.462 | 11.812 | 4.096 | 7.715 |
| 12:06 | 2.846 | 2.846 | 14.658 | 6.942 | 7.715 |
| 12:08 | 3.000 | 3.077 | 17.658 | 10.019 | 7.638 |
| 12:10 | 1.769 | 3.692 | 19.427 | 13.712 | 5.715 |
| 12:12 | 3.357 | 2.714 | 22.784 | 16.426 | 6.358 |
| 12:14 | 2.786 | 3.214 | 25.570 | 19.640 | 5.930 |
| 12:16 | 4.929 | 2.500 | 30.498 | 22.140 | 8.358 |
| 12:18 | 4.267 | 3.267 | 34.765 | 25.407 | 9.358 |
| 12:20 | 5.067 | 3.467 | 39.832 | 28.873 | 10.958 |
| 12:22 | 4.333 | 2.933 | 44.165 | 31.807 | 12.358 |
| 12:24 | 7.867 | 3.667 | 52.032 | 35.473 | 16.558 |
| 12:26 | 4.733 | 3.000 | 56.765 | 38.473 | 18.292 |
| 12:28 | 3.400 | 3.400 | 60.165 | 41.873 | 18.292 |
| 12:30 | 2.867 | 3.600 | 63.032 | 45.473 | 17.558 |
| 12:32 | 2.000 | 3.714 | 65.032 | 49.188 | 15.844 |
| 12:34 | 1.933 | 3.800 | 66.965 | 52.988 | 13.977 |
| 12:36 | 1.286 | 3.929 | 68.251 | 56.916 | 11.334 |
| 12:38 | 1.429 | 3.143 | 69.679 | 60.059 | 9.620 |
| 12:40 | 1.231 | 3.308 | 70.910 | 63.367 | 7.543 |
| 12:42 | 1.692 | 3.538 | 72.602 | 66.905 | 5.697 |
| 12:44 | 1.333 | 3.083 | 73.936 | 69.989 | 3.947 |
| 12:46 | 0.923 | 3.231 | 74.859 | 73.219 | 1.639 |
| 12:48 | 1.000 | 2.769 | 75.859 | 75.989 | -0.130 |
| 12:50 | 0.538 | 2.923 | 76.397 | 78.912 | -2.514 |
| 12:52 | 0.083 | 3.417 | 76.481 | 82.328 | -5.848 |
| 12:54 | 0.125 | 2.500 | 76.606 | 84.828 | -8.223 |
| 12:56 | 0.000 | 1.857 | 76.606 | 86.686 | -10.080 |
| 12:58 | 0.000 | 2.167 | 76.606 | 88.852 | -12.247 |
| 13:00 | 0.500 | 1.667 | 77.106 | 90.519 | -13.413 |
| 13:02 | 0.000 | 2.750 | 77.106 | 93.269 | -16.163 |
| 13:04 | 0.000 | 2.000 | 77.106 | 95.269 | -18.163 |
| 13:06 | 0.000 | 4.000 | 77.106 | 99.269 | -22.163 |
| 13:08 | 0.000 | 1.000 | 77.106 | 100.269 | -23.163 |
| 13:10 | 0.000 | 3.000 | 77.106 | 103.269 | -26.163 |

Appendix C2: Aggregated data for line 2.

| Column1 | Arrivals | Services | Sum avg arrivals | Sum avg services | Arrivals-services |
|---------|----------|----------|------------------|------------------|-------------------|
| 11:56 | 3.600 | 0.000 | 3.600 | 0.000 | 3.600 |
| 11:58 | 2.200 | 0.000 | 5.800 | 0.000 | 5.800 |
| 12:00 | 3.143 | 0.000 | 8.943 | 0.000 | 8.943 |
| 12:02 | 3.417 | 1.333 | 12.360 | 1.333 | 11.026 |
| 12:04 | 4.833 | 1.833 | 17.193 | 3.167 | 14.026 |
| 12:06 | 3.286 | 2.357 | 20.479 | 5.524 | 14.955 |
| 12:08 | 3.143 | 2.571 | 23.621 | 8.095 | 15.526 |
| 12:10 | 3.000 | 2.286 | 26.621 | 10.381 | 16.240 |
| 12:12 | 3.733 | 2.667 | 30.355 | 13.048 | 17.307 |
| 12:14 | 2.667 | 2.733 | 33.021 | 15.781 | 17.240 |
| 12:16 | 3.533 | 2.667 | 36.555 | 18.448 | 18.107 |
| 12:18 | 2.867 | 2.400 | 39.421 | 20.848 | 18.574 |
| 12:20 | 4.067 | 2.467 | 43.488 | 23.314 | 20.174 |
| 12:22 | 2.938 | 2.813 | 46.426 | 26.127 | 20.299 |
| 12:24 | 5.400 | 2.933 | 51.826 | 29.060 | 22.765 |
| 12:26 | 5.733 | 3.000 | 57.559 | 32.060 | 25.499 |
| 12:28 | 4.133 | 3.333 | 61.692 | 35.393 | 26.299 |
| 12:30 | 3.133 | 2.133 | 64.826 | 37.527 | 27.299 |
| 12:32 | 2.400 | 2.600 | 67.226 | 40.127 | 27.099 |
| 12:34 | 2.867 | 3.067 | 70.092 | 43.193 | 26.899 |
| 12:36 | 2.867 | 2.533 | 72.959 | 45.727 | 27.232 |
| 12:38 | 1.867 | 2.467 | 74.826 | 48.193 | 26.632 |
| 12:40 | 1.357 | 2.500 | 76.183 | 50.693 | 25.489 |
| 12:42 | 1.500 | 2.571 | 77.683 | 53.265 | 24.418 |
| 12:44 | 0.786 | 2.786 | 78.468 | 56.051 | 22.418 |

| | | | | | |
|-------|-------|-------|---------|---------|---------|
| 12:46 | 1.267 | 2.267 | 79.735 | 58.317 | 21.418 |
| 12:48 | 1.200 | 2.400 | 80.935 | 60.717 | 20.218 |
| 12:50 | 1.133 | 2.400 | 82.068 | 63.117 | 18.951 |
| 12:52 | 1.500 | 2.429 | 83.568 | 65.546 | 18.023 |
| 12:54 | 1.000 | 2.250 | 84.568 | 67.796 | 16.773 |
| 12:56 | 0.867 | 2.200 | 85.435 | 69.996 | 15.439 |
| 12:58 | 0.600 | 1.867 | 86.035 | 71.863 | 14.173 |
| 13:00 | 0.667 | 2.267 | 86.702 | 74.129 | 12.573 |
| 13:02 | 0.467 | 1.333 | 87.168 | 75.463 | 11.706 |
| 13:04 | 0.200 | 2.067 | 87.368 | 77.529 | 9.839 |
| 13:06 | 0.800 | 2.333 | 88.168 | 79.863 | 8.306 |
| 13:08 | 0.600 | 2.333 | 88.768 | 82.196 | 6.573 |
| 13:10 | 0.933 | 2.400 | 89.702 | 84.596 | 5.106 |
| 13:12 | 1.467 | 2.200 | 91.168 | 86.796 | 4.373 |
| 13:14 | 1.067 | 2.067 | 92.235 | 88.863 | 3.373 |
| 13:16 | 0.800 | 2.200 | 93.035 | 91.063 | 1.973 |
| 13:18 | 1.400 | 2.000 | 94.435 | 93.063 | 1.373 |
| 13:20 | 1.077 | 2.000 | 95.512 | 95.063 | 0.450 |
| 13:22 | 0.733 | 1.800 | 96.245 | 96.863 | -0.617 |
| 13:24 | 0.533 | 2.000 | 96.779 | 98.863 | -2.084 |
| 13:26 | 1.333 | 2.400 | 98.112 | 101.263 | -3.150 |
| 13:28 | 1.000 | 2.000 | 99.112 | 103.263 | -4.150 |
| 13:30 | 0.933 | 2.000 | 100.045 | 105.263 | -5.217 |
| 13:32 | 1.267 | 2.200 | 101.312 | 107.463 | -6.150 |
| 13:34 | 0.933 | 2.400 | 102.245 | 109.863 | -7.617 |
| 13:36 | 2.200 | 2.733 | 104.445 | 112.596 | -8.150 |
| 13:38 | 1.643 | 2.467 | 106.088 | 115.063 | -8.974 |
| 13:40 | 2.133 | 2.667 | 108.222 | 117.729 | -9.508 |
| 13:42 | 2.533 | 2.533 | 110.755 | 120.263 | -9.508 |
| 13:44 | 2.267 | 2.467 | 113.022 | 122.729 | -9.708 |
| 13:46 | 2.467 | 2.333 | 115.488 | 125.063 | -9.574 |
| 13:48 | 2.353 | 2.412 | 117.841 | 127.474 | -9.633 |
| 13:50 | 2.714 | 2.071 | 120.555 | 129.546 | -8.990 |
| 13:52 | 2.267 | 1.667 | 122.822 | 131.212 | -8.390 |
| 13:54 | 3.667 | 1.733 | 126.489 | 132.946 | -6.457 |
| 13:56 | 5.800 | 2.467 | 132.289 | 135.412 | -3.124 |
| 13:58 | 4.067 | 2.467 | 136.355 | 137.879 | -1.524 |
| 14:00 | 2.200 | 2.333 | 138.555 | 140.212 | -1.657 |
| 14:02 | 2.667 | 2.467 | 141.222 | 142.679 | -1.457 |
| 14:04 | 1.467 | 2.533 | 142.689 | 145.212 | -2.524 |
| 14:06 | 2.200 | 2.267 | 144.889 | 147.479 | -2.590 |
| 14:08 | 1.538 | 2.308 | 146.427 | 149.787 | -3.359 |
| 14:10 | 1.462 | 2.077 | 147.889 | 151.864 | -3.975 |
| 14:12 | 1.182 | 2.182 | 149.071 | 154.045 | -4.975 |
| 14:14 | 0.400 | 1.800 | 149.471 | 155.845 | -6.375 |
| 14:16 | 0.667 | 2.333 | 150.137 | 158.179 | -8.042 |
| 14:18 | 0.750 | 2.000 | 150.887 | 160.179 | -9.292 |
| 14:20 | 1.000 | 2.000 | 151.887 | 162.179 | -10.292 |
| 14:22 | 1.000 | 2.500 | 152.887 | 164.679 | -11.792 |
| 14:24 | 0.500 | 2.500 | 153.387 | 167.179 | -13.792 |
| 14:26 | 0.000 | 3.000 | 153.387 | 170.179 | -16.792 |
| 14:28 | 0.000 | 3.000 | 153.387 | 173.179 | -19.792 |
| 14:30 | 0.000 | 3.000 | 153.387 | 176.179 | -22.792 |
| 14:32 | 0.000 | 3.000 | 153.387 | 179.179 | -25.792 |

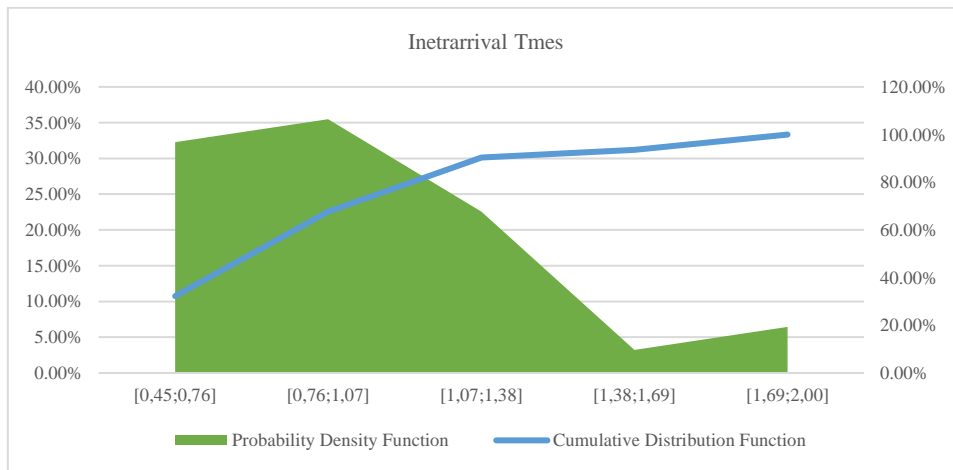
Appendix D: Basis for assuming Poisson arrivals. After plotting the inter-arrival times both in density and cumulative distribution functions they seem pretty close to the reference ones for the exponential distribution.

Appendix D1: Assumption basis for line 1.

Table D1.1: Absolute, relative and cumulative frequencies of inter-arrival times separated by classes.

| Inter-arrival times | Absolute | Relative frequency | Cumulative |
|---------------------|----------|--------------------|-------------|
| [0,45;0,76] | 10 | 0.322580645 | 0.322580645 |
| [0,76;1,07] | 11 | 0.35483871 | 0.677419355 |
| [1,07;1,38] | 7 | 0.225806452 | 0.903225806 |
| [1,38;1,69] | 1 | 0.032258065 | 0.935483871 |
| [1,69;2,00] | 2 | 0.064516129 | 1 |
| | 31 | 1 | |

Graph D1.2: Probability density function and cumulative distribution function for inter-arrival times.

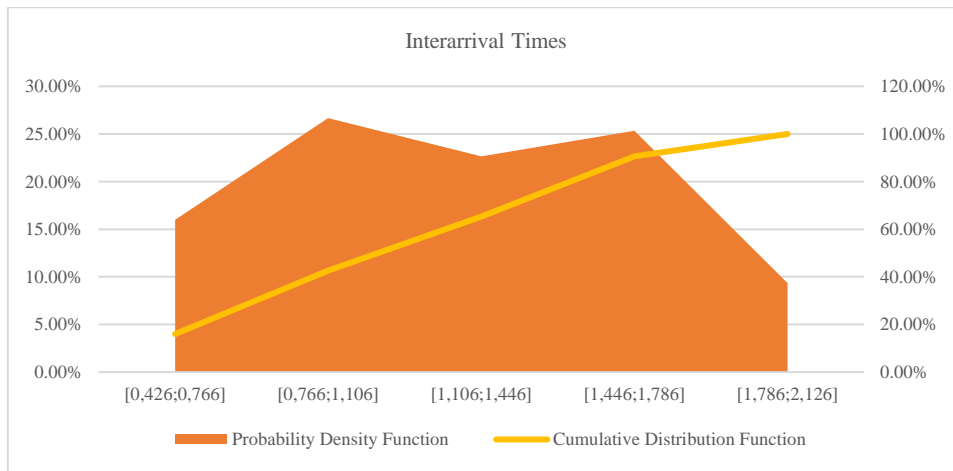


Appendix D2: Assumption basis for line 2.

Table D2.1: Absolute, relative and cumulative frequencies of inter-arrival times separated by classes.

| Inter-arrival times | Absolute | Relative | Cumulative |
|---------------------|----------|-----------|------------|
| [0,426;0,766] | 12 | 0.16 | 0.16 |
| [0,766;1,106] | 20 | 0.2666667 | 0.4266667 |
| [1,106;1,446] | 17 | 0.2266667 | 0.6533333 |
| [1,446;1,786] | 19 | 0.2533333 | 0.9066667 |
| [1,786;2,126] | 7 | 0.0933333 | 1 |
| | 75 | 1 | |

Graph D2.2: Probability density function and cumulative distribution function for inter-arrival times.



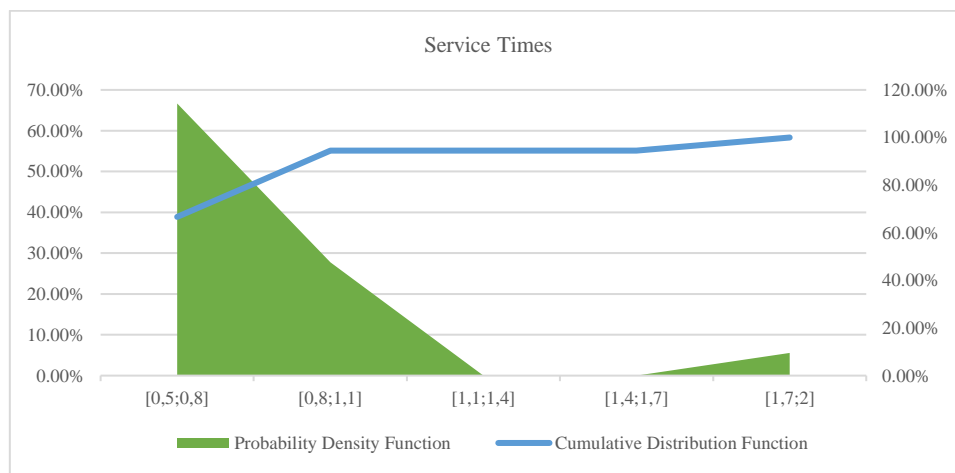
Appendix E: Basis for assuming exponential services. After plotting the service times both in density and cumulative distribution functions they seem pretty close to the reference ones for the exponential distribution.

Appendix E1: Assumption basis for line 1.

Table E1.1: Absolute, relative and cumulative frequencies of service times separated by classes.

| Service Times | Absolute | Relative frequency | Cumulative |
|---------------|----------|--------------------|-------------|
| [0,5;0,8] | 24 | 0.666666667 | 0.666666667 |
| [0,8;1,1] | 10 | 0.277777778 | 0.944444444 |
| [1,1;1,4] | 0 | 0 | 0.944444444 |
| [1,4;1,7] | 0 | 0 | 0.944444444 |
| [1,7;2] | 2 | 0.055555556 | 1 |
| | 36 | 1 | |

Graph E1.2: Probability density function and cumulative distribution function for service times.

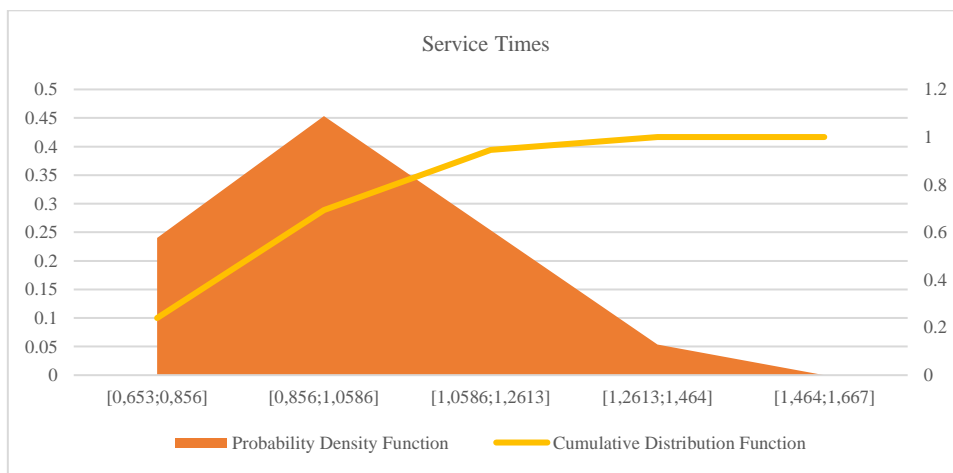


Appendix E2: Assumption basis for line 2.

Table E2.1: Absolute, relative and cumulative frequencies of service times separated by classes.

| Service Times | Absolute | Relative | Cumulative |
|-----------------|----------|-----------|------------|
| [0,653;0,856] | 18 | 0.24 | 0.24 |
| [0,856;1,0586] | 34 | 0.4533333 | 0.6933333 |
| [1,0586;1,2613] | 19 | 0.2533333 | 0.9466667 |
| [1,2613;1,464] | 4 | 0.0533333 | 1 |
| [1,464;1,667] | 0 | 0 | 1 |
| | 75 | 1 | |

Graph E2.2: Probability density function and cumulative distribution function for service times.

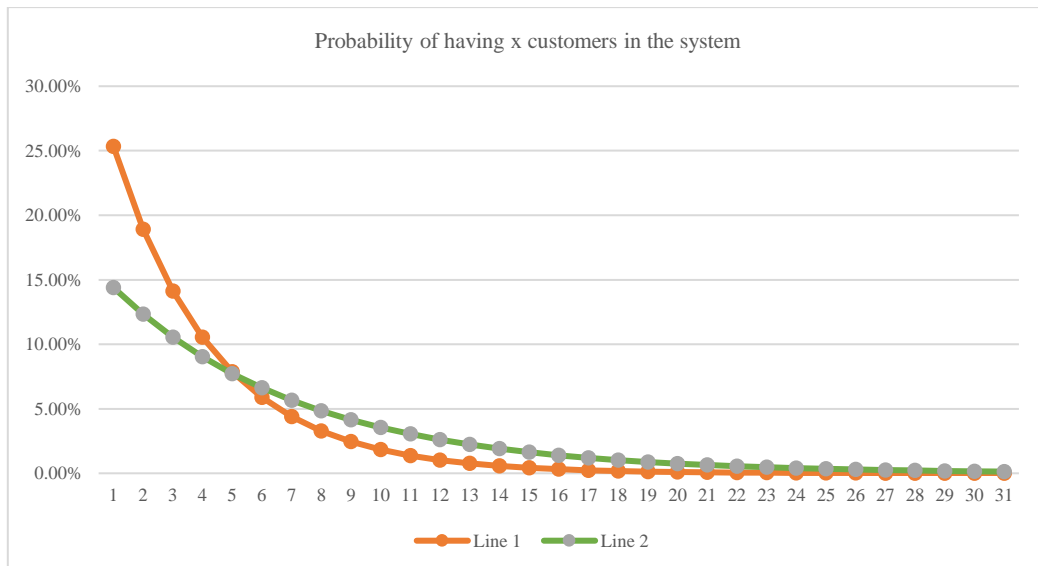


Appendix F: Probability of having x customers in system.

Table F1: Probabilities and cumulative frequencies of having x customers in the system.

| x | Line 1 | Cumulative 1 | Line 2 | Cumulative 2 |
|----|--------|--------------|--------|--------------|
| 0 | 25.34% | 25.34% | 14.39% | 14.39% |
| 1 | 18.92% | 44.25% | 12.32% | 26.72% |
| 2 | 14.12% | 58.38% | 10.55% | 37.27% |
| 3 | 10.55% | 68.92% | 9.03% | 46.30% |
| 4 | 7.87% | 76.79% | 7.73% | 54.03% |
| 5 | 5.88% | 82.67% | 6.62% | 60.64% |
| 6 | 4.39% | 87.06% | 5.67% | 66.31% |
| 7 | 3.28% | 90.34% | 4.85% | 71.16% |
| 8 | 2.45% | 92.79% | 4.15% | 75.31% |
| 9 | 1.83% | 94.62% | 3.55% | 78.86% |
| 10 | 1.36% | 95.98% | 3.04% | 81.91% |
| 11 | 1.02% | 97.00% | 2.60% | 84.51% |
| 12 | 0.76% | 97.76% | 2.23% | 86.74% |
| 13 | 0.57% | 98.33% | 1.91% | 88.65% |
| 14 | 0.42% | 98.75% | 1.63% | 90.28% |
| 15 | 0.32% | 99.07% | 1.40% | 91.68% |
| 16 | 0.24% | 99.30% | 1.20% | 92.88% |
| 17 | 0.18% | 99.48% | 1.03% | 93.90% |
| 18 | 0.13% | 99.61% | 0.88% | 94.78% |
| 19 | 0.10% | 99.71% | 0.75% | 95.53% |
| 20 | 0.07% | 99.78% | 0.64% | 96.18% |
| 21 | 0.05% | 99.84% | 0.55% | 96.73% |
| 22 | 0.04% | 99.88% | 0.47% | 97.20% |
| 23 | 0.03% | 99.91% | 0.40% | 97.60% |
| 24 | 0.02% | 99.93% | 0.35% | 97.95% |
| 25 | 0.02% | 99.95% | 0.30% | 98.24% |
| 26 | 0.01% | 99.96% | 0.25% | 98.49% |
| 27 | 0.01% | 99.97% | 0.22% | 98.71% |
| 28 | 0.01% | 99.98% | 0.19% | 98.90% |
| 29 | 0.01% | 99.98% | 0.16% | 99.06% |
| 30 | 0.00% | 0.00% | 0.14% | 99.19% |

Graph F2: Probabilities and cumulative frequencies of having x customers in the system



Appendix G: Arrival rate of the new model was computed as a sum of the average arrivals per time period of both current lines.

| Row Labels | Average of Arrivals line 2 | Average of Arrivals line 1 | Sum |
|------------|----------------------------|----------------------------|--------|
| 11 | 2.900 | 2.556 | |
| :56 | 3.600 | 2.500 | 6.100 |
| :58 | 2.200 | 2.600 | 4.800 |
| 12 | 2.652 | 2.587 | |
| :00 | 3.143 | 2.250 | 5.393 |
| :02 | 3.417 | 1.923 | 5.340 |
| :04 | 4.833 | 2.538 | 7.372 |
| :06 | 3.286 | 2.846 | 6.132 |
| :08 | 3.143 | 3.000 | 6.143 |
| :10 | 3.000 | 1.769 | 4.769 |
| :12 | 3.733 | 3.357 | 7.090 |
| :14 | 2.667 | 2.786 | 5.452 |
| :16 | 3.533 | 4.929 | 8.462 |
| :18 | 2.867 | 4.267 | 7.133 |
| :20 | 4.067 | 5.067 | 9.133 |
| :22 | 2.938 | 4.333 | 7.271 |
| :24 | 5.400 | 7.867 | 13.267 |
| :26 | 5.733 | 4.733 | 10.467 |
| :28 | 4.133 | 3.400 | 7.533 |
| :30 | 3.133 | 2.867 | 6.000 |
| :32 | 2.400 | 2.000 | 4.400 |
| :34 | 2.867 | 1.933 | 4.800 |
| :36 | 2.867 | 1.286 | 4.152 |
| :38 | 1.867 | 1.429 | 3.295 |
| :40 | 1.357 | 1.231 | 2.588 |
| :42 | 1.500 | 1.692 | 3.192 |
| :44 | 0.786 | 1.333 | 2.119 |
| :46 | 1.267 | 0.923 | 2.190 |
| :48 | 1.200 | 1.000 | 2.200 |
| :50 | 1.133 | 0.538 | 1.672 |
| :52 | 1.500 | 0.083 | 1.583 |
| :54 | 1.000 | 0.125 | 1.125 |
| :56 | 0.867 | 0.000 | 0.867 |
| :58 | 0.600 | 0.000 | 0.600 |
| 13 | 1.681 | 0.176 | |
| :00 | 0.667 | 0.500 | 1.167 |
| :02 | 0.467 | 0.000 | 0.467 |
| :04 | 0.200 | 0.000 | 0.200 |
| :06 | 0.800 | 0.000 | 0.800 |
| :08 | 0.600 | 0.000 | 0.600 |
| :10 | 0.933 | 0.000 | 0.933 |
| :12 | 1.467 | | 1.467 |
| :14 | 1.067 | | 1.067 |
| :16 | 0.800 | | 0.800 |
| :18 | 1.400 | | 1.400 |
| :20 | 1.077 | | 1.077 |
| :22 | 0.733 | | 0.733 |
| :24 | 0.533 | | 0.533 |
| :26 | 1.333 | | 1.333 |
| :28 | 1.000 | | 1.000 |
| :30 | 0.933 | | 0.933 |
| :32 | 1.267 | | 1.267 |
| :34 | 0.933 | | 0.933 |
| :36 | 2.200 | | 2.200 |
| :38 | 1.643 | | 1.643 |
| :40 | 2.133 | | 2.133 |
| :42 | 2.533 | | 2.533 |
| :44 | 2.267 | | 2.267 |
| :46 | 2.467 | | 2.467 |
| :48 | 2.353 | | 2.353 |
| :50 | 2.714 | | 2.714 |
| :52 | 2.267 | | 2.267 |
| :54 | 3.667 | | 3.667 |
| :56 | 5.800 | | 5.800 |
| :58 | 4.067 | | 4.067 |
| 14 | 1.527 | | 1.527 |
| :00 | 2.200 | | 2.200 |
| :02 | 2.667 | | 2.667 |
| :04 | 1.467 | | 1.467 |
| :06 | 2.200 | | 2.200 |
| :08 | 1.538 | | 1.538 |

| | | |
|--------------------|--------------|-------|
| :10 | 1.462 | 1.462 |
| :12 | 1.182 | 1.182 |
| :14 | 0.400 | 0.400 |
| :16 | 0.667 | 0.667 |
| :18 | 0.750 | 0.750 |
| :20 | 1.000 | 1.000 |
| :22 | 1.000 | 1.000 |
| :24 | 0.500 | 0.500 |
| :26 | 0.000 | 0.000 |
| :28 | 0.000 | 0.000 |
| :30 | 0.000 | 0.000 |
| :32 | 0.000 | 0.000 |
| Grand Total | 2.083 | |