**Ramadan Buffet Simio Project Report**

**70-462: Uncertainty, Risk and Modelling**

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**Introduction**

Many people choose to eat at restaurants that offer buffets because they offer a variety of foods and let customers take as much or as little as they want. On the other hand, lengthy wait times can be a big cause of annoyance for both customers and restaurant owners. During peak dining hours, when many hungry customers crowd at the buffet line, the issue of lengthy wait times is most evident in these packed restaurants.

Excessive wait times can result in lost sales for the restaurant in addition to aggravating and dissatisfying customers. Consumers who are made to stand in line for a long time may choose to leave and dine somewhere else. Long wait times can also result in crowding and congestion in the buffet area, making it challenging for customers to move around and creating safety risks.

Understanding the causes of wait times and putting preventative measures into place is crucial for addressing the issue of lengthy wait times at restaurant buffets. This can entail refining the buffet area's design, modifying staffing levels to better meet consumer demand, and putting technology to use to speed up the ordering and serving procedures. Restaurant owners may boost customer happiness and income by strategically tackling the issue of lengthy wait times.

Our model specifically focuses on buffets during Ramadan. This month, we see a lot of restaurants facing these challenges and our aim is to address this issue through our model.

**Current System Overview**

The current system consists of a check-in desk for all the customers coming for a buffet. Next, they proceed to go to the 3 tables serving appetizers, main course, and deserts, after which they go search and occupy a seat on a table.

However, to demonstrate a system closer to the real-world, a certain customer goes for a second round at the buffet too; hence repeating the line process another time. Additionally, there is a Live Cooking station present, for items like Pasta, which are cooked on demand for customers who request it. The entire process of picking the food and returning to their own table consists of usage of a **Single Line** at each station(i.e appetizers, main course and dessert)

With the current setup, we can observe the average time spent by a customer waiting in line to be **18 minutes** respectively, that is from entering into the restaurant to their final round at buffet and sitting at their table.

**Observed Problems**

Upon running our simulation, we observed several concerning factors related to utilization percentages,and average times being spent in the line, waiting. In specific the following were observed:

1. Utilization percentage of Appetizer, Main Course and Dessert serving tables is quite high at **58%, 20%, 8%.**
2. High average waiting time in line i.e **18 minutes**

These are concerning as utilization must be as low as possible, preferable below the 30% mark in order to give time for refilling the food stations, and also at the same time reducing the waiting time in line for customers, so that they can have a better and smoother experience.

**Proposed solution**

Building up from the previous section, we decided we need to focus on mainly 2 things,

1. Reducing utilization of Food Stations
2. Reducing waiting time in line for customers

To achieve this we proposed the following change:

1. Creating Double line buffet system

The reasoning behind this will be explained in the next section

**Justification of Solution**

The creation of a Double line buffet system as compared to the previous single lined system is that this will allow for the following:

* Better **utilization of space** as buffet items can now be kept on both sides of the table
* **Streamlining** **of customers** by directing them into two separate lines, one for each side of the table. This splitting also directly impacts the utilization as now the customer load is being split over two separate lines.
* Better utilization and streamlining means lower utilization rates of each serving station, allowing for **ease of refilling**, as well as **decreasing waiting times**

The impact of these changes in magnitude will be explained in the next section

**Comparison of the two systems**

The before and after values can be observed in the following table:

| **Process** | **Before** | **After** | **% Reduced** |
| --- | --- | --- | --- |
| Time in System | 18 minutes | 15 minutes | 16.7% |
| Appetizers (Utilization) | 58% | 29% | 29% |
| Desserts (Utilization) | 8% | 4% | 4% |
| Main course (Utilization) | 20% | 10% | 10% |

**Risks of Solution**

As with all situations, our solution has risks. There are two main risks. The first risk is that people may finish getting food too quickly, meaning that there will be less space to sit. The second risk is that since food will be gotten quicker, we may run out quicker.

In order to deal with the first risk, we recommend the company to increase the limit on customers. Since we’ve reduced time in the system, we can actually accommodate more people for our buffet. This will allow us to make more money, so we can turn the risk of having too much free space into a positive and earn more revenue.

Secondly, the risk of running out of food is a more serious risk. Since people will take less time to collect food, the food will run out quicker, so we have two potential recommendations. We can either have our employees ready to go and put food in quickly, or we can make more food. We’ll only need more food if (as mentioned in risk 1) we increase capacity. If not, we’ll just have employees more aware and inform them that food will run out quicker so be ready.

**Conclusion**

In conclusion, the issue of lengthy wait times at restaurant buffets can result in lost sales and customer dissatisfaction. Our proposed solution of implementing a Double line buffet system can help reduce utilization rates and waiting times for customers, leading to a better overall experience. By splitting the customer load over two separate lines, better space utilization, and streamlining of customers, we can reduce the waiting time and improve the overall buffet experience for customers. Restaurant owners can use such changes to increase customer satisfaction, resulting in increased revenue and customer loyalty. It is important to continuously evaluate and make changes to the restaurant's buffet system to ensure optimal customer satisfaction and profitability.

**Case information**

6 dining tables

3 buffet tables serving appetizers, main courses, and desserts

1 reception desk with 2 workers to validate if they’re on the list

98% on list, 2% not on list are turned away

Processing time of 10,12,18 triangular seconds

Appetizers

Capacity is 1

Processing time is 50,60,80 seconds

Buffer is 5 capacity

Main Courses

Capacity is 1

Processing time is 70,80,100 seconds

Buffer is 5 capacity

Desserts

Capacity is 1

Processing time is 40,50,60 seconds

Buffer is capacity of 5

Pasta Live station

Capacity is 1

Processing time is 6,8,10 minutes

After finished getting food, they will go to search an open table

The restaurant operates from **6:00 pm** to **9:00 pm** during Ramadan.

The probability that a customer will go back for seconds at the buffet table is **60%**.

The time taken by a server to replenish the food items at the buffet table follows a triangular distribution with a **minimum** of 20 seconds, a **most** **likely** value of 30 seconds, and a maximum of 40 seconds.

People go to a buffet first and then they go to the live station.

One Waiter (Vehichle) serves drinks to customers, and follows a sequence to go to every table.