WallyBrew 2.0®

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1 Goal

Our team proposes a new operating structure designed to streamline service delivery and significantly reduce wait times. By adopting a dual-section approach, we aim to accommodate customer preferences, increase efficiency, and ultimately foster a more satisfying and engaging customer experience. Our proposal includes the design of a simulation to evaluate the benefits of our suggested queuing system.

Proposed Approach

Our approach introduces a two-section operating system, strategically designed to optimize customer flow and service efficiency.

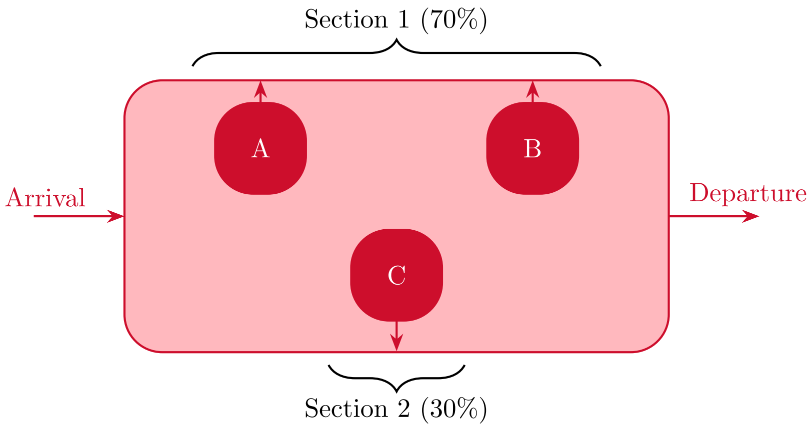

Figure 1.1: Proposed Setup

Section 1: Efficient Drive-Through Like Model

This section adopts a high-efficiency, drive-through style service, catering to approximately 70% of our customer base. It is divided into two primary stations:

- **Station A (Payment Collection):** Customers are greeted and payments are processed here. With an average processing time of 1 minute, this station ensures a smooth flow into the service queue.
- **Station B (Order Fulfillment):** Following payment, customers proceed to this station where their orders are promptly fulfilled. The average service time at this station is approximately 30 seconds, significantly speeding up the overall service duration.

Section 2: Self-Serve App Integration

Targeting the remaining 30% of our clientele, this section uses technology to enhance convenience through a self-serve application. Customers can place their orders online and pick them up at the store. This model substantially reduces the average service time to about 30 seconds from the traditional 2-minute service window, despite requiring customers to queue for their orders.

Since each section can now have a maximum queue of 5 people each, (compared to the maximum limit of 5 in the previous iteration), and further optimizations are made in regards to waiting time, this approach aims to highly improve the customer experience and delivery speed.

2 Methodology

The simulation operates over a 10-hour day (600 minutes), simulating customer arrivals with varying arrival rates throughout the day and directing them to one of two service sections. Customers are allocated to sections based on a predefined probability(as defined above), reflecting the varying popularity or necessity of each section. It incorporates the concept of handling capacity, where each section can serve a maximum of five customers at a time, and any additional customers are turned away, simulating a realistic scenario of customer loss due to overcrowding.

It moves forward by tracking specific events such as customer served, wait times, and turn-aways when capacity is reached. Data on the number of customers served, turned away, overtime hours, and waiting times are collected for analysis. After the simulation concludes, we calculate the averages and their corresponding 95% confidence intervals.

3 Results

WallyBrew 2.0® marks a significant upgrade from its predecessor, with a 57.41% reduction in waiting time and a 14.80% increase in customers served, showing its enhanced efficiency and appeal. The drop in customer loss by 80.81% and the reduction of overtime by 22.13%% further highlight its improved service and operational effectiveness, making ***WallyBrew 2.0***® a considerable improvement in overall performance.

Table 3.1. Performance Improvement

	WallyBrew 1.0	WallyBrew 2.0	Improvement(%)
Average Waiting Time	5.66733 ± 0.2526	2.41387 ± 0.07808	57.41%
Average Customers Served	236.587 ± 0.5871	271.596 ± 0.902547	14.80%
Average Customers Lost	42.698 ± 0.7507	8.194 ± 0.3326	80.81%
Instances of Overtime	0.3570 ± 0.0296	0.2780 ± 0.02778	22.13%

4 Conclusion

In the comparison of ***WallyBrew 1.0***® and ***2.0***® through queue length data over time, the graphs clearly illustrate the enhancements made in our latest version. With ***WallyBrew 1.0***®, the queue length frequently reaches up to 5 and has several pronounced spikes, indicating irregular and extended wait times. This could reflect less efficient queue management or slower service speeds in the past.

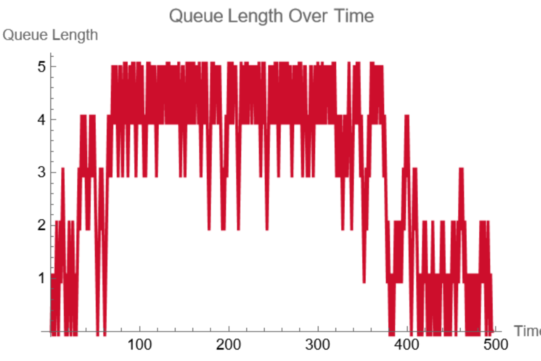

Figure 4.1: ***WallyBrew 1.0***®

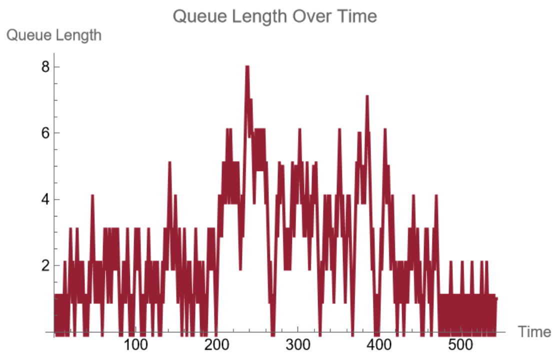

Figure 4.2: ***WallyBrew 2.0***®

Transitioning to ***WallyBrew 2.0***®, there's a noticeable improvement in queue stability and overall management. The graph for 2.0 demonstrates that the queue length never reaches its maximum capacity. The lower queue peaks suggest a system that is not only faster at processing customers but also more consistent in managing the customer flow.

On simulating for lost customers over a span of 10 days, we can see a similar improvement in ***WallyBrew 2.0***®. From this certain case, we observe that the plot for ***WallyBrew 2.0***® always stays below the one for ***WallyBrew 1.0***®, showing its efficiency and consistency even for longer periods of time.

Figure 4.3: Number od Lost Customers over 10 days

This data is a strong indicator of the progress we've made with ***WallyBrew 2.0***®, where enhanced service speed and more efficient queue management have culminated in reduced wait times and a streamlined customer experience. By using ***WallyBrew 2.0***® and its multiple order queues, a self-service app and a drive-through like model, we can drastically improve customer satisfaction, lower lost customers and help make WallyBrew the number one coffee company in the world!