Game Day Load (sec/passenger)	Time (hr)	Max Profit	Stats	Min Waiting	Stats	Max Profit and Min Waiting	Stats
15	1.5	Amount of Small Buses	6	Amount of Small Buses	4	Amount of Small Buses	6
		Amount of Large Buses	0	Amount of Large Buses	14	Amount of Large Buses	4
		Average Time in Line (min)	13.4	Average Time in Line (min)	8.5	Average Time in Line (min)	10.0
		Revenue from Tickets ($)	795.00	Revenue from Tickets ($)	987.00	Revenue from Tickets ($)	909.00
		Cost of Buses ($)	180.00	Cost of Buses ($)	678.75	Cost of Buses ($)	337.50
		Total Profit ($)	**615.00**	**Total Profit ($)**	**308.25**	**Total Profit ($)**	**571.50**

Rush Hour Load (sec/passenger)	Time (hr)	Max Profit	Stats	Min Waiting	Stats	Max Profit and Min Waiting	Stats
30	1.5	Amount of Small Buses	6	Amount of Small Buses	16	Amount of Small Buses	6
		Amount of Large Buses	0	Amount of Large Buses	1	Amount of Large Buses	0
		Average Time in Line (min)	11.6	Average Time in Line (min)	8.0	Average Time in Line (min)	11.6
		Revenue from Tickets ($)	429.00	Revenue from Tickets ($)	504.00	Revenue from Tickets ($)	429.00
		Cost of Buses ($)	180.00	Cost of Buses ($)	481.88	Cost of Buses ($)	180.00
		Total Profit ($)	**249.00**	**Total Profit ($)**	**22.12**	**Total Profit ($)**	**249.00**

Normal Load (sec/passenger)	Time (hr)	Max Profit	Stats	Min Waiting	Stats	Max Profit and Min Waiting	Stats
90	1.5	Amount of Small Buses	2	Amount of Small Buses	1	Amount of Small Buses	1
		Amount of Large Buses	0	Amount of Large Buses	0	Amount of Large Buses	0
		Average Time in Line (min)	16.8	Average Time in Line (min)	11.5	Average Time in Line (min)	11.5
		Revenue from Tickets ($)	123.00	Revenue from Tickets ($)	84.00	Revenue from Tickets ($)	84.00
		Cost of Buses ($)	75.00	Cost of Buses ($)	48.75	Cost of Buses ($)	48.75
		Total Profit ($)	**48.00**	**Total Profit ($)**	**35.25**	**Total Profit ($)**	**35.25**

Figure 1.

Project 4 Bus Simulation Write Up

CSCI 1933

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Prof: Dovolis

Introduction

A discrete event simulation was used to determine different outcomes of different combinations of buses along the route from Union Depot to University Avenue and 27th Street SE. The simulation would take in a load which was the average time interval between when passengers would arrive at a stop. The lower the load the more people there would be in line at the stops. The simulation would also take in a time for the simulation to run. This process was repeated for each combination of small and large buses possible keeping track of the best-case scenarios. These best-case scenarios included the maximum profit, minimum wait time at bus stops, and the scenario with maximum and profit and minimum wait time. The results of the simulations can be found in figure 1.

Analysis

In the cases that the profit was maximized, and the waiting time was minimized, the amount of the small buses was larger than the large buses. This shows that buying larger buses will not help to maximize the profit and lower the waiting time. As the time of the simulation increased the waiting times would go up regardless of the number of buses. The simulation was never able to reach equilibrium. Once the load was above 170, there no combination of buses that would result in a positive profit.

Conclusion

To maximize the profit of the bus company, smaller buses will be better in most cases. During a very high demand time, such as a game day, large buses should be brought in to lower the wait time and help maximize the profit of the company.