

SIE 431/531 Simulation modeling and analysis

Agustin Espinoza

Homework 6

4/6/2023

Problem 1

After adding a ReadWrite module to Model 10-1 and writing the data to a file named arrivaldata.txt, Model 10-2 was updated to read the arrival times from the text file and write to a new file named arrivaldata2.txt. The average waiting time for both systems was then analyzed and, based on the two output reports, it is concluded that the average waiting times are not the same. Model 10-1 has an average wait time of 0.6782 minutes and Model 10-2 an average wait time of 0.1712 minutes.

Problem 2

To answer this problem, the Handle The Call module was updated to a Constant delay type with a value of 0.75 minutes. After this change, the steps detailed in Problem 1 were repeated and the new average waiting times were recorded as follows in the two separate output reports: Model 10-1 average waiting time was equal to 0.7966 minutes, and Model 10-2 average waiting time was equal to 0 minutes. Therefore, the average waiting times remained unequal after updating the service time distribution into constant.

Problem 3

For this problem, Book Example Model 5-3 was updated using the Process Analyzer in Arena. As shown in figure 1, the base trunk quantity (26) results in a total cost of \$21,879.42 with a percent rejection rate of 11.75%. Whereas the updated scenario, figure 2, adds 39 trunk lines to the base model resulting in a total of 65 trunk lines that meet the minimum requirement of a percent call rejection rate that is below 3%, i.e., 2.7%. However, this reduction and significant increase in trunk lines adds \$22,395.67 to the total cost of the system. Therefore, for the system to maintain a rejection rate below 3%, the total cost must increase to approximately \$44,275.09.


	Scenario Properties				Control	Responses	
	S	Name	Program File	Reps	Trunk Line	Percent Rejected	Total Cost
1		Scenario 1	4 : Model 05-03.p	100	26.0000	11.751	21879.423

Figure 1. Process Analyzer Scenario for base Trunk Line quantity


	Scenario Properties				Control	Responses	
	S	Name	Program File	Reps	Trunk Line	Percent Rejected	Total Cost
1		Scenario 1	4 : Model 05-03.p	100	65.0000	2.701	44275.090

Figure 2. Process Analyzer Scenario for updated Trunk Line quantity