

CIS 445/545: Assignment 1

The purpose of this first programming assignment is to build a small DES simulator based on the program in Chapter 1.4 of the Law textbook.

Download the C program(s) as provided on Canvas.

Problem #1 (10 points): Problem 1.9 from the text. (See page 79.)

Problem #2 (60 points): Problem 1.14 from the text. (See page 79.) Perform 10 replications.

Problem #3 (30 points) Using problem 1.14 as the simulation, do the following:

#3.1 (10 points): Run the program for 2000 minutes with the mean interarrival time of customers decreasing from 1 minute to 0.425 minutes for server 1. The service time for server 1 will also decrease from mean 0.7 minutes to 0.425 minutes. The service time for server 2 will remain the same at mean 0.9 minutes. All times are IID exponential random variables. Perform 10 replications. Be creative in getting the program to run.

#3.2 (10 points): Discuss the differences in output of this simulation and that of the original 1.14 simulation.

#3.3 (10 points): Discuss how the behavior of the FIFO queue—which changes between this simulation and the original 1.14 simulation—affects the programming implementation of it.

Submission instructions:

Place all your files into a folder, make that folder a zipped file, and submit that zipped file via Canvas. Your files should have the following: (1) all the source codes; (2) a PDF file that is the output report summarizing output from each replication of the program; (3) any written responses requested in the problems; (4) the instructions and commands about how to compile your codes, run your program, and re-produce your results. Note that please use “gcc” as your compiler, and please compile your codes in command-line windows, instead of IDEs.

Grading:

You will be graded on (1) completing all the parts of the assignment, (2) correctly applying the methods and techniques, (3) having the content make sense, and (4) the quality of your writing—communicating ideas clearly, concisely, completely, and correctly (spelling and grammar). Programs and mathematical computations will be

graded according to their correctness. In addition, programs will be graded on the quality of the programming (documentation, modularity, etc.) If you cannot get your program to run perfectly, please turn it in for partial credits.