

2054

B.E. (Computer Science and Engineering)

Sixth Semester

CS-603: Modeling and Simulation

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1Q. Attempt the following:-

- i) Briefly explain any two limitations of MATLAB JIT (Just in Time) Compiler. (1)
- ii) Briefly explain the difference between deterministic and stochastic simulation models. (1)
- iii) Generate one random variate from an exponential distribution having mean value 8. Take 0.513 as random number. (1)
- iv) Briefly explain the purpose of SIM mode of Transfer block in GPSS. (1)
- v) What is significance of strongly connected component in event graph for event initialization rule? (1)
- vi) Give the names of simulation packages having both discrete and continuous simulation capabilities. (1)
- vii) Give names of any two network simulators. (1)
- viii) Briefly explain difference between Arithmetic and Floating point variables of GPSS. (1)
- ix) Give the names of three basic components of queuing systems. (1)
- x) Give the name and syntax of function which is used for reading ASCII files that are formatted into columns of data with different data types in MATLAB. (1)

Part-A

2Q. A service facility consists of two servers in series (tandem), each with its own FIFO queue (see Figure). A customer completing service at server 1 proceeds to server 2, while a customer completing service at server 2 leaves the facility. Assume that the inter-arrival times of customers to server 1 are IID exponential random variables with mean 1 minute. Service times of customers at server 1 are IID exponential random variables with mean 0.7 minute, and at server 2 are IID exponential random variables with mean 0.9 minute.

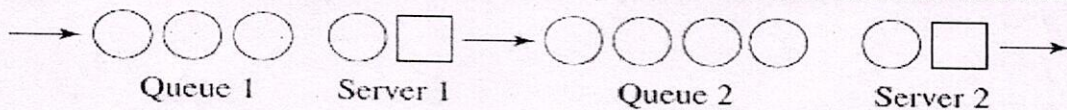


Figure: A tandem queueing system.

Simulate the above problem using event diagram. Identify system state variables entities and events by giving proper reasons. Draw and explain an event graph for the problem, Draw flow chart diagrams for events identified. Simulation ends after running 1000 minutes exactly. Also estimate for each server the expected average delay in queue of a customer, the expected time average number of customers in queue, and the expected utilization. (10)

P.T.O.

(2)

- 3Q a) Explain different steps in sound simulation study. (5)
3Q. b) Explain how the value of Π can be calculated using Monte Carlo Simulation. (5)
- 4Q a) Explain simulation of an Inventory system with event diagram and flowcharts by taking your assumptions. (5)
4Q b) Explain the difference between next-event time advance approach and fixed increment time advance approach with diagrams. (5)

Part-B

- 5Q. a) Write a function in MATLAB for generation of random variates following Normal distribution. (5)
5Q.b) Explain different Transaction Oriented blocks of GPSS with examples. (5)
- 6Q. a) Write a MATLAB program that gets an output file name from the user and checks to see whether it exists. If it exists, the program checks to see whether the user wants to delete the existing file or to append the new data to it. If the file does not exist, then the program simply opens the output file. (5)
6 Q. b) Explain the differences between facilities and storages in GPSS with examples. What are different ways of defining storages in GPSS? (5)
- 7Q. a) The Theory predicts the proportion of beans, in the four groups A, B, C and D should be 9 : 3 : 3 : 1 In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experiment result support the theory that there is no difference between experimental values and theoretical values? (The table value of Chi-Square for 3 degree of freedom at 5% level of significance is 7.81). (5)
7Q. b) Generate random numbers using Mid-Square Random number generator for seed 1379 by assuming formation of cycle as stopping condition. (5)

x-x-x