

Exam.Code:0918
Sub. Code: 6794

1058

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:
- Briefly Explain SIM mode of Transfer Block in GPSS. (1)
 - Generate one random variate from an exponential distribution having mean value 8. Take 0.513 as random number. (1)
 - What is purpose of Library routine and Timing routine in next event time advance approach? (1)
 - Briefly explain how logical arrays can serve as mask for arithmetic operations in MATLAB. (1)
 - Give the names of simulation packages having both discrete and continuous simulation capabilities. (1)
 - List different equipment oriented blocks of GPSS. (1)
 - Briefly explain the difference between deterministic and stochastic simulation models. (1)
 - Briefly explain the usage of nargchk function in MATLAB. (1)
 - Customers arrive at random to a license bureau at a rate of 50 customers/hour. Presently there are 20 clerks, each serving 5 Customers/hour on average. Calculate the average utilization of a server. (1)
 - Briefly justify the statement that in Chi-Square test, uniformity test of random numbers is only a necessary test for randomness but not sufficient one. (1)

Part-A

- a) Explain advantages, disadvantages and applications of simulation in detail. (7)
 - b) Explain the basic components of queuing systems with examples. (3)
- 3Q. A simple telephone system has two external lines. Calls, which originates externally, arrive every 100 ± 60 seconds. When the lines are occupied, the caller tries a redial once after 5 ± 1 minutes have elapsed. No more redials are attempted. Call duration is 3 ± 1 minutes. Identify entities, state variables and events in the system giving reasons. Draw and explain event graph for the discrete event model of above telephone system. Also develop flow chart diagrams for the event routines identified by you. (10)
- 4Q. A bank with four tellers opens at 9 A.M. and closes doors at 5 P.M. but operates until all customers in bank have been served. The customer arrival and service processes are random. Each teller has a separate queue. An arriving customer joins the shortest queue. Let n_i be total number of customers in front of teller i (in Service plus in queue) at a particular time. If the completion of customer's service at a teller i causes the number n_j at teller j to be greater than teller i then the customer from tail of queue j shifts to tail of queue i . If the teller i is idle, then shifting customer begins service at teller i . Draw and explain an event graph for this bank model and events flowcharts. (10)
- Design and specify your own rules for resolving ties in queue shifting.

Part-B

5Q.a) Number of automobiles accidents per week in a certain community were as follows:

Week	1	2	3	4	5	6	7	8	9	10	Total	Total
Number of accidents	12	08	20	2	14	10	15	6	9	4	100	10,000

Are these frequencies in agreement with the belief that accident conditions were uniform during the 10 week period, using Chi-Square Test. (The table value of Chi-Square for 9 degree of freedom at 95% confidence level is 16.919).

5Q.b) Briefly explain the function of TABULATE block in GPSS.

6Q.a) Generate five random variates following the uniform distribution from 15 to 60. Take five random numbers as 0.526, 0.659, 0.136, 0.712, 0.348

6Q.b) Explain features and usage of any Network Simulator.

7. Q a) Write a MATLAB program for plotting $y = x^2 - 10x + 15$ from 0 to 10.

7 Q. b) Explain different Control statements of GPSS with examples.

x-x-x