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10CS82

Eighth Semester B.E. Degree Examination, June/July 2017
System Modeling and Simulation

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. What is simulation? List and explain the steps in simulation study. (10 Marks)
 b. Define the following :
 (i) System (ii) Entity (iii) Activity (iv) Endogenous event (v) Exogenous event
 (vi) State. Identify them for any one system. (10 Marks)
- 2 a. Explain event scheduling / time advance algorithm using this algorithm generate the system snapshot for the following.
 Consider a single server queuing system with interarrival and service time details as shown below:
- | | | | | | | |
|-----|---|---|---|---|---|---|
| IAT | 3 | 2 | 6 | 2 | 4 | 5 |
| ST | 2 | 5 | 5 | 8 | 4 | 5 |
- Stop simulation when simulation clock reaches 20. (14 Marks)
- b. Write short notes on :
 (i) List processing (ii) Simulation in GPSS. (06 Marks)
- 3 a. Explain the following discrete distributions:
 (i) Binomial distribution (ii) Poisson distribution (08 Marks)
 b. Explain the following continuous distributions:
 (i) Uniform distribution (ii) Exponential distribution
 (iii) Triangular distribution (iv) Normal distribution (12 Marks)
- 4 a. List and explain characteristics of queuing system. Briefly explain queuing notations. (14 Marks)
 b. Explain the steady-state behavior of $M | G | 1$ queue. (06 Marks)

PART – B

- 5 a. What are pseudo random numbers? What are the problems that occur while generating pseudo random numbers? Also list the important considerations during generation of random numbers. (10 Marks)
 b. Briefly explain different techniques for generating random number. (05 Marks)
 c. Consider the following sequence of five numbers: 0.44, 0.81, 0.14, 0.05, 0.93 are generated. Use the Kolmogorov-Smirnov test with $\alpha = 0.05$ to test the uniformity property of random number generated. (05 Marks)
- 6 a. Mention the different steps in the development of a useful model of input data. (04 Marks)
 b. List and briefly explain the different ways to obtain information about process even if data are not available. (06 Marks)
 c. Explain in detail goodness-of-fit tests in details. (10 Marks)

Important Note : 1. On completing your answer, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



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- 7 a. Discuss output analysis for steady state simulation in detail. (10 Marks)
b. Discuss output analysis for terminating simulation in detail. (10 Marks)
- 8 a. With a neat diagram, explain the concept of model building, verification and validation. (10 Marks)
b. Describe the three step approach formulated by Naylor and Finger in the validation process. (10 Marks)

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