

2002 SCHEME

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CS65

Sixth Semester B.E. Degree Examination, December 2010 System Simulation and Modeling

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions.
2. Statistical tables may be used.
3. Missing data may be suitable assumed.**

- 1 a. Define simulation. What are the advantages and disadvantages of simulation? Explain. (10 Marks)
- b. With a neat flow diagram, explain different steps in a simulation study. (10 Marks)
- 2 a. Consider the following five inter-arrival times used to compute the arrival times of six customers in a single channel queuing system.

Customers	1	2	3	4	5	6
Inter-arrival times	-	2	4	1	2	6
Service-times	2	1	3	2	1	4

- Develop : i) A simulation table emphasizing the clock-times.
ii) Chronological ordering of all events.
- Draw a graph for chronological ordering of events. (12 Marks)
- b. Explain the concepts in discrete-event simulation. (08 Marks)
 - 3 a. Explain the event-scheduling/time-advance algorithm, with an example. (10 Marks)
 - b. Explain the linear congruential method. Using the linear congruential method, generate a sequence of random numbers with $x_0 = 27$, $a = 17$, $c = 43$ and $m = 100$. (10 Marks)
 - 4 a. Based on runs-up and runs-down, determine whether the following sequence of 40 numbers is such that, the hypothesis of independence can be rejected, where the critical value is $Z_{0.025} = 1.96$.

0.41	0.68	0.89	0.94	0.74	0.91	0.55	0.62	0.36	0.27
0.19	0.72	0.75	0.08	0.54	0.02	0.01	0.36	0.16	0.28
0.18	0.01	0.95	0.69	0.18	0.47	0.23	0.32	0.82	0.53
0.31	0.42	0.73	0.04	0.83	0.45	0.13	0.57	0.63	0.29

(10 Marks)
 - b. What are the properties of random numbers? Briefly discuss. (04 Marks)
 - c. Briefly explain the uniform-distribution technique. (06 Marks)
 - 5 a. Generate three Poisson variates with mean $\alpha = 0.2$. (06 Marks)
 - b. Briefly explain different steps in the development of a useful model of input data. (08 Marks)
 - c. What are the different steps for designing a histogram? (06 Marks)
 - 6 a. With a neat diagram, explain model building, verification and validation. (10 Marks)
 - b. Explain iterative process of calibrating a model. (10 Marks)
 - 7 a. Briefly explain the types of simulations, with respect to output analysis. (10 Marks)
 - b. Explain the architecture of a web-site server system. (10 Marks)
 - 8 Write short notes on: (20 Marks)
 - a. Queuing systems
 - b. Acceptance-rejection technique
 - c. CPU-simulation
 - d. Poker test

Important Note : 1. On completing your answers, 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.

