

Simulation
3-rd and 4-th Year Undergraduate
Mid-Term Examination
2007-12-3 time: 90 minutes (score: each 10)

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1- What is simulation?

2- Classify simulation models into three different dimensions.

3- What is simulation clock?

4- What is Monte Carlo simulation?

5- What is iconic model?

6- What are the events in a single server model?

7- What is a model?

8- Find the value of the following integral by using the Monte-Carlo method and compare with the true value of the integral (use 6 and 11 points as shown in the table 1 and 2).

$$I = \int_1^2 \log(x) dx$$

Table 1

<i>i</i>	1	2	3	4	5	6
<i>x_i</i>	1	1.2	1.5	1.6	1.8	2
<i>g(x_i)</i>	0	0.08	0.176	0.204	0.255	0.3

where: $g(x_i) = \log(x_i)$

Using Integral: $I =$

U

sing Monte-Carlo with 6 points: $I =$

sing Monte-Carlo with 11 points: $I =$

U

Table 2

<i>i</i>	1	2	3	4	5	6	7	8	9	10	11
<i>x_i</i>	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
<i>g(x_i)</i>	0	0.04	0.08	0.114	0.146	0.176	0.204	0.23	0.255	0.279	0.3

9-In the following single server queuing M/M/1 system, find:

- Average delay in queue.
- Average number of customers in the queue.
- Efficiency of utilization of the server.

↑
↓
(i means ith arrival) (n=6)
(i means ith departure)


