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 me	

nd and 2).

$$I = \int_{1}^{2} \log(x) dx$$

Table 1

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

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

Using Integral: I=

 $\boldsymbol{\mathit{U}}$

sing Monte-Carlo with 6 points: I=

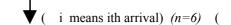
sing Monte-Carlo with 11 points: I=

Table 2

	i	1	2	}	3 4	5	6	7	8	9	10	11
	x_i	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
g((x_i)	0	0.04	0.08	0.114	0.146	0.176	0.204	0.23	0.255	0.279	03

9-In the following single server queuing MM1 system, find:

- a) Average delay in queue.
- b) Average number of customers in the queue.
- c) Efficiency of utilization of the server.



i means ith departure)

