

Simulation
3-rd and 4-th Year Undergraduate
Mid-Term Examination
2005-12-5 time: 90 minutes (score: each 10)

University of the Ryukyus
Faculty of Engineering
Department of Information Eng.
Prof. Mohammad Reza Asharif

1- What kind of problems are with simulation?

2- In a Bank, what is state of the system ?

3- Classify simulation models in to three different dimensions.

4- Name two approaches for the simulation clock advancing.

5- What are the three measures of the system performance in a single server queuing system?

6- Write the differential equations for predator-prey problem.

7- Explain about two simulation approaches

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

$$I = \int_1^2 x \log_{10}(x) dx$$

i	1	2	3	4	5	6	7	8	9	10
x_i	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
$g(x_i) = x_i \log_{10}(x_i)$	0.0	0.045	0.095	0.148	0.204	0.264	0.326	0.39	0.459	0.529

use the following calculations:

$$\log_{10}(e) = 0.4343, \quad \log_e(10) = 2.3026, \quad \log_e(2) = 0.6931$$

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

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

(i means i th arrival) ($n=9$) (i means i th departure)


