Daffodil International University
Department of Computer Science & Engineering
Faculty of Science & Information Technology

Mid Term Examination	Semester: Fall 2019
Course Code: CSE414	Course Title: Simulation and Modeling
Scetion: All	Course Teacher: All

Time: 1.5 hours   Full Marks: 25

Marks 04

1. The incidence of dengue has increased 30-fold over the last 50 years. Researchers estimated that 24% of the Bangladesh population has been infected by dengue in their lifetime. What will be the probability that out 8 peoples
   a) Four or more will not contact dengue fever?
   b) Exactly three will not contact dengue fever?

Marks 04

2. The application of simulation involves specific steps in order for the simulation study to be successful. Regardless of the type of problem and the objective of the study, the process by which the simulation is performed remains constant. Now, draw the flow diagram for the necessary steps required in a simulation study and try to differentiate between Model verification and validation with proper example.

Marks 12

3. The passport of Bangladesh is an ICAO compliant, machine readable issued for the purpose of international travel of the passport holder. The passport booklet is manufactured, printed and issued by the Department of Immigration and Passports of the Ministry of Home Affairs. One important process for getting the passport is to give biometric data (finger print, digital photo, digital signature etc.) to complete your MRP process. Assume that there are two administrative officers - **Mr. ICC** and **Mr. BCC** who usually do the needful. The applicant's arrival at the office to complete this process is a random phenomenon and the time between arrivals varies from two minutes to six minutes (shown in the table 1.a). Based on previous applicant's feedbacks, Mr. ICC was always at bottom position in terms of processing time preferred list. Distribution of processing time of each consultant is shown in table 1.b and in 1.c. The process begins at Clock time 9.00 am.

1.a: Inter Arrival Time distribution of patients

Time between arrivals	Probability	Random digit assignment
2	.25	01-25
3	.15	26-40
4	.20	41-60
5	.35	61-95
6	.05	96-00

1.b: Processing Time distribution of Mr. BCC (minutes)

Service Time	Probability	Random digit assignment
6	.29	01-29
8	.06	30-35
9	.25	36-60
10	.18	61-78
12	.22	79-00

1.c: Processing Time distribution of Mr. ICC (minutes)

Service Time	Probability	Random digit assignment
6	.35	01-35
9	.22	36-57
10	.20	58-77
11	.05	78-82
12	.17	83-00

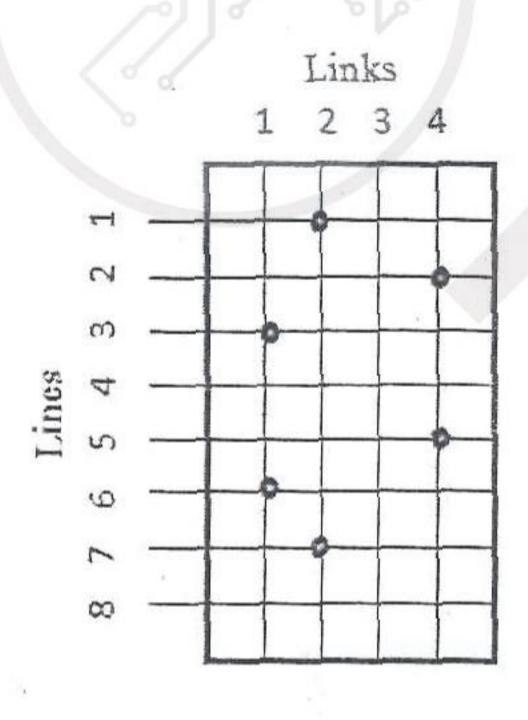Random numbers generated for inter-arrival time are: 61, 29, 95, 40, 05, 98, 82, 34, 26

Random numbers generated for processing time are: 29, 61, 77, 82, 35, 57, 18, 79, 42, 90

Now answer the following questions:
a) Construct a simulation table using the given random numbers for one cycle.   8
b) Calculate the average service time of the applicants and verify results with expected output.   2
c) Calculate the average time between arrivals of the applicants and verify results with expected   2
output.

Marks 05

4. You are intended to simulate the following telephone problem, where there is four link and eight lines. And the simulation will started at the clock time 500.

Links

	1	2	3	4

Next call to arrive

From	To	Length	A.Time
4	5	9	506

Next Call

From	To	Length
2	8	06

Arrival Time

501

Lines

1	1
2	1
3	1
4	0
5	1
6	1
7	1
8	0

Links

Max

4

Used

3

Clock

500

Call in progress

From	To	End
7	1	512
5	2	501
6	3	520

Process	Complete	Blocked	Busy
12	7	1	4