**EIT 4317 – SIMULATION AND MODELLING ASSIGNMENT**

**DUE ON 5TH APRIL**

**SUBMIT TO MY EMAIL**

[**aminabameda@gmail.com**](mailto:aminabameda@gmail.com)

**maximum number in a group is 7**

**Question ONE**

a) State and explain any two simulation models [4marks]

b) Business models usually consist of linked series of equations and formulae arranged so that they behave in a systematic manner to the real system being investigated. State four factors/variables that a simulation model should have. [4marks]

c) State four advantages of using simulation other than experimenting with real life systems[4marks]

d) The mean and standard deviation for the grade points of a random sample of 64 college students are calculated to be 3.6 and 0.4 respectively. Find the 95% and 99% confidence interval for the mean of the entire class. [6marks]

e) State two reasons why random numbers are used in simulation [2marks]

f) Excel bakery maintains sufficient stock of its ever delight cake and the daily demand is as given below

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Daily Demand | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| Probability | 0.0.2 | 0.16 | 0.23 | 0.15 | 0.13 | 0.12 | 0.10 | 0.06 | 0.03 |

(i) Using the following sequence of random numbers simulate the demand for

the next 10 days. 23,45,23,21,69,32,02,44,47,75 [5marks)

g) A company allows only 5% defective fuses in its production. A sample of 8 fuses is chosen. Calculate the probability of getting more than two defective fuses. [5marks]

**Question TWO**

1. List and explain the three components of a queuing system model (3 marks)
2. A telephone attendant receives 110 calls during the busy hour. Each call takes, on average, 30 seconds to process.
3. What percentage of the attendant's time is devoted to answering calls? (2 Marks)
4. How long must people wait, on average, before their call is processed? (2 Marks)
5. How many people are in the queue, on average? (2marks)
6. Discuss the steps involved in carrying out a simulation study [6marks]
7. Discuss the desirable features that simulation software should have. [5 Marks]

**Question FOUR**

a) State and explain any two commonly used random number generators [4marks]

b) Kodak photograph studios use an expensive grade of developing fluid when printing special colour portraits. Since the developed fluids cannot be stored for long periods, it is important to keep on hand only as much as is need to fill an anticipated demand. In the past few months, however demand for the product has been fluctuating. The owner has decided to simulate the demand for this source. A study Kodak photograph’s appointment book resulted in the following frequency distribution.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Daily demand | 0 | 1 | 2 | 3 | 4 | 5 |
| Number of days | 10 | 20 | 40 | 20 | 6 | 4 |

Using the following sequence of random numbers: 35,92,68,03,51,05,72,84,98,34 generate a ten-day daily demand (sequence of demand values) and estimate the expected daily demand. [10 marks]

c) Briefly explain the techniques that are used in verification and validation of simulation models [10 Marks]

**Question FIVE**

a) Define the following:

i. Entity (1 Marks)

ii. Attribute (1 Mark)

iii. Activity (1 Mark)

b) Consider a super market as a system, identify entities, attributes, activities, events and state variables. (5 marks)

c) Highlight the steps involved in monter Carlo simulation (4 marks)

d)Simulation models can be classified among three dimensions, state and explain them (6 Marks)

e) Why would an analyst ever prefer a general-purpose language such as BASIC in simulation when there are advantages of using special purpose languages such as GPSS, SIMSCRIPT, XCELL or SLAM (5 Marks)

f) State and briefly explain eight reasons that make simulation appropriate for many real-World problems (4 marks)

g) Define discrete event simulation and state five characteristics that it should posses [6marks]