Chapter 14
Simulation Models - Prof. Dr. Samir Safi

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

1) Simulation of a business or process is generally performed by building a mathematical model to represent the process or system.
   1) _____

2) A major advantage of using simulation techniques is to be able to study the interactive effect of individual components/variables.
   2) _____

3) To "simulate" is to try to duplicate the features, appearance, and characteristics of a real system.
   3) _____

4) While it is powerful, simulation is not considered to be a flexible quantitative analysis tool.
   4) _____

5) One disadvantage of simulation is that it does not allow for "what-if?" types of questions.
   5) _____

6) Simulation models are limited to using standard probability distributions such as Poisson, exponential, normal, etc.
   6) _____

7) When using a random number generator, one should never start in the middle of the table of random numbers.
   7) _____

8) If we are using a Monte Carlo simulation model, we should expect the model to produce the same results for each set of random numbers used.
   8) _____

9) The wider the variation among results produced by using different sets of random numbers, the longer we need to run the simulation to obtain reliable results.
   9) _____

10) Simulation is very flexible. Thus, its solutions and inferences are usually transferable to other problems.
    10) _____

11) If, for a simple queuing or waiting line problem, we compare the solution from an analytical model with that from a simulation, we will typically find them to be exactly the same.
    11) _____

12) Simulation of maintenance problems can help management analyze various staffing strategies based on machine downtime and labor cost.
    12) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The following is not an advantage of simulation:
   A) It allows the study of interaction of components or variables to determine which are important.
   B) It allows for the study of what-if questions.
   C) Each simulation model is unique.
   D) It allows time compression.
   E) None of the above
   1) _____
2) In assigning random numbers in a Monte Carlo simulation,
   A) it is not important to assign probabilities to an exact range of random number intervals.
   B) it is important to develop a cumulative probability distribution.
   C) it is important to use a normal distribution for all variables simulated.
   D) All of the above
   E) None of the above

Table 14-1
A new young mother has opened a cloth diaper service. She is interested in simulating the number of diapers required for a one-year-old. She hopes to use this data to show the cost effectiveness of cloth diapers. The table below shows the number of diapers demanded daily and the probabilities associated with each level of demand.

<table>
<thead>
<tr>
<th>Daily Demand</th>
<th>Probability</th>
<th>Interval of Random Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.30</td>
<td>01-30</td>
</tr>
<tr>
<td>6</td>
<td>0.50</td>
<td>31-80</td>
</tr>
<tr>
<td>7</td>
<td>0.05</td>
<td>81-85</td>
</tr>
<tr>
<td>8</td>
<td>0.15</td>
<td>86-00</td>
</tr>
</tbody>
</table>

3) According to Table 14-1, if the random number 40 were generated for a particular day, what would the simulated demand be for that day?
   A) 7
   B) 20
   C) 5
   D) 6
   E) None of the above

4) According to Table 14-1, if the random number 96 were generated for a particular day, what would the simulated demand be for that day?
   A) 5
   B) 7
   C) 8
   D) 6
   E) None of the above

5) According to Table 14-1, what is the cumulative probability that demand is less than or equal to 7?
   A) 0.85
   B) 0.15
   C) 0.95
   D) 0.80
   E) None of the above

6) Which of the following is not considered one of the 5 steps of Monte Carlo Simulation?
   A) simulating a series of trials
   B) building a cumulative probability distribution for each input variable
   C) generating random number
   D) establishing an objective function
   E) establishing probability distributions for important input variables
Answer Key
Testname: CHAPTER 14

1) TRUE
2) TRUE
3) TRUE
4) FALSE
5) FALSE
6) FALSE
7) FALSE
8) FALSE
9) TRUE
10) FALSE
11) FALSE
12) TRUE

1) C
2) B
3) D
4) C
5) A
6) D