

Assignment #9 for CIS 3320-005

Chapter 14 – Simulation

Read pages 647 through 680 of the text book.

Learn the techniques associated with the Monte Carlo process.

Work these problems from Chapter 14:

1, 3, and 9. Do not use a random number table for these problems. Instead use your calculator's rand function to generate **random real number** values between 0.0 and 1.0.

The rand function is available in your calculator at:

MATH > PRB > rand

Each time you press the key, a new random number will be generated. Any value between 0.0 and 1.0 is equally likely as any other (a probability distribution of this type is called Uniform).

Work the following case problem as a Managerial Report for Exam Three.

Burlington Mills

Case Problem TWO for Exam THREE

Work the simulation shown below. This is a Managerial Report and must be completed following the instructions and format that are given in the course syllabus. Your instructor will indicate how it is to be delivered.

You can work this either manually or by setting up the simulation in Excel.

Case: “Burlington Mills” (worth 10 points)

Burlington Mills produces denim cloth that it sells to jeans manufacturers. It is negotiating a new contract to provide cloth on a weekly basis to BJ Jeans. The demand for cloth from BJ Jeans is expected to vary each week according the following discrete probability distribution:

Demand (yd)	Probability
0	0.05
100	0.15
200	0.40
300	0.30
400	0.10

Burlington’s plant capacity available for this new job will vary each week because of other commitments and occasional breakdowns. Burlington estimates that available capacity will vary from 100 to 500 yards and follow a Uniform probability distribution (see note below).

Simulate the performance of the Burlington plant for 20 weeks. You may manually write your results provided your work is clear, neat, and easy to read. Attach your simulation to the Managerial Report.

Using your simulation results, determine the following:

1. Average weekly demand for cloth from BJ Jeans.
2. Average weekly available capacity for this contract at the Burlington plant.
3. Number of weeks that demand exceeds available plant capacity. Based on this result, also calculate the probability that demand will exceed available capacity.

NOTE:

A Uniform probability distribution is one for which any value in a number interval is equally likely. In the Burlington example, then, available capacity will vary from 100 to 500 yards, with any value in this interval as probable as any other.

Since the calculator's rand function returns a random real number from a Uniform distribution between 0.0 and 1.0, we can use it to model any Uniform distribution:

$$\text{Low Value} + \text{rand} * (\text{High Value} - \text{Low Value})$$

For example, the weekly available capacity for the BJ Jeans contract varies uniformly from 100 to 500 yards. If in the simulation of some week, the rand function generates a value of 0.3486, then for that week the randomly selected available capacity will be:

$$100 + 0.3486 * (500 - 100) = 239.44 \text{ yards}$$