

MAT540

Week 3 Homework

Chapter 14

1. The Hoylake Rescue Squad receives an emergency call every 1, 2, 3, 4, 5, or 6 hours, according to the following probability distribution. The squad is on duty 24 hours per day, 7 days per week:

Time Between Emergency Calls (hr.)	Probability
1	0.15
2	0.10
3	0.20
4	0.25
5	0.20
6	0.10
	1.00

- a. Simulate the emergency calls for 3 days (note that this will require a “running” , or cumulative, hourly clock), using the random number table.
- b. Compute the average time between calls and compare this value with the expected value of the time between calls from the probability distribution. Why are the result different?
2. The time between arrivals of cars at the Petroco Services Station is defined by the following probability distribution:

Time Between Emergency Calls (hr.)	Probability
1	0.35
2	0.25
3	0.20
4	0.20
	1.00

- a. Simulate the arrival of cars at the service station for 20 arrivals and compute the average time between arrivals.
 - b. Simulate the arrival of cars at the service station for 1 hour, using a different stream of random numbers from those used in (a) and compute the average time between arrivals.
 - c. Compare the results obtained in (a) and (b).
3. The Dynaco Manufacturing Company produces a product in a process consisting of operations of five machines. The probability distribution of the number of machines that will break down in a week follows:

Machine Breakdowns Per Week	Probability
0	0.10
1	0.20
2	0.15
3	0.30
4	0.15
5	0.10
	1.00

- a. Simulate the machine breakdowns per week for 20 weeks.
 - b. Compute the average number of machines that will break down per week.
4. Simulate the following decision situation for 20 weeks, and recommend the best decision.

A concessions manager at the Tech versus A&M football game must decide whether to have the vendors sell sun visors or umbrellas. There is a 30% chance of rain, a 15% chance of overcast skies, and a 55% chance of sunshine, according to the weather forecast in college junction, where the game is to be held. The manager estimates that the following profits will result from each decision, given each set of weather conditions:

Decision	Weather Conditions		
	Rain	Overcast	Sunshine
	0.35	0.25	0.40
Sun visors	\$-400	\$-200	\$1,500
Umbrellas	2,100	0	-800

5. Every time a machine breaks down at the Dynaco Manufacturing Company (Problem 3), either 1, 2, or 3 hours are required to fix it, according to the following probability distribution:

Repair Time (hr.)	Probability
1	0.20
2	0.50
3	0.30
	1.00

Simulate the repair time for 20 weeks and then compute the average weekly repair time.