IE-231 In-Class Activity - Week 4

Oct 17, 2017, Due Date 12:50

This is a graded in-class assignment with peer review. **One submission per group on paper.** Do a clean work, your style will be evaluated too. Take a snapshot of your work after peer review. Check the details of peer review guidelines on Bilgi Learn.

Question 1

The local coffee shop has three kinds of coffee, Latte, Cappuccino and Macchiato. A customer orders Cappuccino with probability 0.6, Latte 0.25 and Macchiato 0.15.

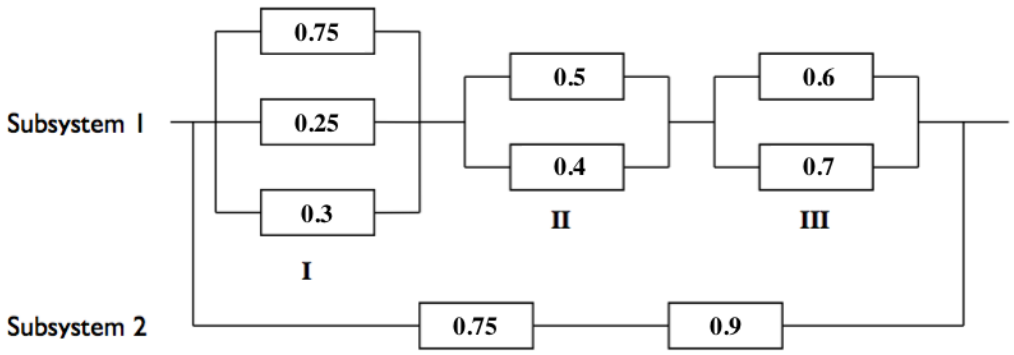
a. What is the probability that at least three customers among first 10 customers order Cappuccino or Macchiato?

b. What is the probability that the first Latte is ordered by the fourth customer or before?

c. The first 5 customers get a free cookie each day. What is the probability that at least 2 cookies are given to customers who order Macchiato?

d. If any type of coffee runs out, the remaining coffee types will be preferred proportionally (e.g. if Macchiato runs out Latte's probability will be 0.25/0.85). Suppose, the coffee shop has only 1 cup of Latte left. What is the probability that 3 out of the first 5 customers will order Cappuccino?

Question 2



Consider the system above. Suppose the system works if either subsystem 1 or subsystem 2 works. Calculate the probability of the system not working?

Question 3

A machine produces 25 items, 20 of which is non-defective. The items are randomly selected without replacement. The 7th selected item is found to be non-defective. What is the probability that this is the 2nd non-defective one?

Question 4

A dice player rolls two dice.

- He wins if the sum is either 7 or 11.
- He loses if the sum is 2, 3 or 12.
- He repeats the roll if the sum is 4, 5, 6, 8, 9 or 10
  - Then repeats the roll until the initial sum is repeated, then wins.
  - Loses if the sum is 7

What is $P(Loss)$? (Hint: $\sum_{i=0}^{\infty} a^i = \frac{1}{1-a}$ if $0 < a < 1$)

Question 5

In a classroom of 30 students, what is the probability that none of them are born on the same day of the year? (ignore February 29)