

IE-231 In-Class Activity - Week 4

Mar 13, 2018

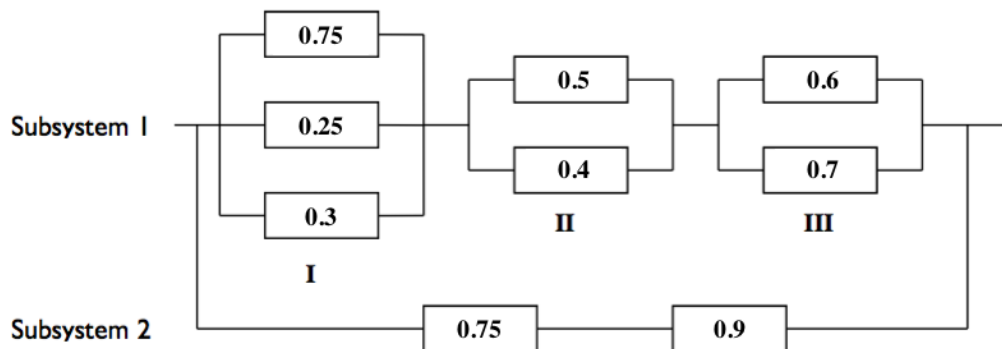
This is a graded in-class assignment with peer review. **One submission per group on paper.** Do a clean work, your style will be evaluated too. Take a snapshot of your work after peer review. Check the details of peer review guidelines on Bilgi Learn.

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.

- What is the probability that at least three customers among first 10 customers order Cappuccino or Macchiato?
- What is the probability that the first Latte is ordered by the fourth customer or before?
- 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?
- 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 $P(\text{Loss})$? (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)