Homework 4 (ECE 313/317, Fall 2023):

Problem 1:
An urn contains 9 white and 5 black balls. We draw 5 balls **simultaneously** (i.e; without replacement and we do not take into consideration the order).

  a) What is the probability of getting 3 white and 2 black balls?

  b) What is the probability of getting 5 balls of the same color?

  c) What is the probability of getting 1 white ball and 4 black balls?

  d) What is the probability of getting 2 white and 3 black balls knowing that at least one of the 5 balls is black?

Problem 2:
In an urn, there are 2 white balls and 3 black balls. Two balls are drawn **successively without replacement.** Calculate the probabilities of the following two events:
1) "Draw two balls of the same color"
2) "Draw two balls of different colors".

Problem 3:
You want to order a pizza. If you have a choice of 5 different toppings, how many different pizzas can be ordered?

Problem 4:
- How many 5-digit numbers where 0 occurs once and only once?

- How many ways to order the letters of MISSISSIPPI?

- How many ways are there to permute the letters of the word FORMULA?

- How many ways are there to permute the letters of the word HAPPY?

- How many ways can the letters of the word TRIANGLE be arranged if the first three letters must be RAN (in any order)?

- How many different sets of four letters can be formed from the word TRIANGLE

Problem 5:
In a Christmas lottery, 300 tickets are sold; 4 tickets are winners. If I buy 10 tickets, what is the probability that I will win at least one prize?

Problem 6: (Hoosier Lottery)
When you buy a Powerball ticket, you select 5 different white numbers from among the numbers 1 through 59 (order of selection does not matter), and one

red number from among the numbers 1 through 35. How many different Power-ball tickets can you buy?

Problem 7:
One person is playing 10 times a game with only two possibilities success or failure. The probability that this person succeeds in the game is $p = 0.7$ and the probability of failure is $1 - p = 0.3$.

1) What is the probability that this person will succeed 6 times in the game?

2) If the probability of success is $p = 0.5$, compute in two different ways the probability that this person succeeds 6 times the game.