Lab 6 – 5%

Solve the following probability questions. You can use Python or solve them on paper (Or you can solve some using Python and some on paper). If you are using Python to solve, please make sure to attach the output in your submissions. Like the other labs, please hand in PDF and/or Python code with output.

1) A standard deck of 52 playing cards contains 12 face cards (J, Q, K), out of which 4 are Kings. Write a Python function to calculate P (King| FaceCard).
2) Write a Python function to simulate rolling two six-sided dice and compute: P(Sum=8)
3) A standard deck has 4 Aces out of 52 cards. If one card is drawn and not replaced, what is the probability of drawing two Aces in a row?
4) Write a function to calculate how many ways 4 books can be arranged on a shelf.
5) Write a function to compute the number of ways to choose 3 people from 10 for a committee.
6) Write a function to compute the number of possible 5-letter passwords using 26 letters if i) Repetition is allowed and ii) Repetition is not allowed.
7) Simulate 3 fair coin tosses and compute the probability of getting at least one Heads.
8) A bag contains 5 red, 4 blue, and 3 green balls. Write a function to compute the probability of randomly selecting 2 red balls (without replacement) in two picks.
9) A school has 200 students: 120 are male (80% pass) and 80 are female (90% pass). If a student is randomly selected and has passed, what is the probability that they are male?
10) At a university, 60% of students are in science, and 40% are in Arts. The passing rate is: 90% for science and 70% for Arts. If a randomly selected student has passed, what is the probability they are from science? Use Bayes' theorem.