



Department of Computer Science

CS111/DA104: Probability Assignment 3

Batch: MSc CS/BDA 2019-21

Due Date: 24.07.2019

Semester: Jul-Dec 2019

Maximum Marks: 10

Assignments are due at 10:00 am on due date

1. 4 balls are randomly picked from a box contains 5 white balls, 3 red balls and 6 black balls. A person gets 10 points for picking a white ball, -10 points for picking a black one, and 0 points for picking a red one. Write down the probability mass function of X , the number of points obtained in the process. Tabulate the probabilities (as a fraction or a decimal number) for each possible value of X . (2)
2. A fair coin is flipped four times. If X is the random variable denoting the number of tails, plot the probability mass function for the random variable $Y = X - 1$ (i.e, calculate probability for each possible value a taken by Y and plot $P\{Y = a\}$ versus a). (2)
3. In a multiple choice exam with 120 questions, each question has 5 choices (1 correct). Students get 4 marks for correct choices and -1 for wrong choices. If a student comes without preparation and randomly marks choices for all the questions, what is the expected value of his score? What if there was no negative marking? (1)
4. A person randomly picks 4 pens from a box containing 6 blue and 6 red (identical sets of) pens. If he selects exactly 2 blue and 2 red pens, he is satisfied. If he picks any other combination, he replaces the pens and tries again until he gets a satisfactory pick. Find the expected value of the number of tries he makes before stopping. (1)
5. Two fair dice are rolled. X denotes the sum of the numbers obtained from the two dice. Find the mean and variance of X . (2)
6. X denotes a random variable that can take values -1, 0 and 1 with respective probabilities $P\{X = -1\} = 0.3$, $P\{X = 0\} = 0.3$ and $P\{X = 1\} = 0.4$. Compute $E[X^2]$. (2)