Assignment 4

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Abstract—**This document contains the solution for Assignment 4 (CBSE Class 9 Probability Section 15.2 Example 9)**

Example 9: Harpreet tosses two different coins simultaneously (say, one is of ₹1 and other of ₹2). What is the probability that she gets at least one head?

Solution: Considering getting heads as success and tails as failure, let random variable $X \in \{0, 1, 2\}$ represent the number of successes. Assuming a fair coin, the probability of success in a single trial is $p = \frac{1}{2}$.

The probability that $X = i$ is given by

$$P(X = i) = {}^nC_i \times p^i \times (1-p)^{n-i} \qquad (1)$$

Also, cumulative probability $P(X \leq i)$ is given by

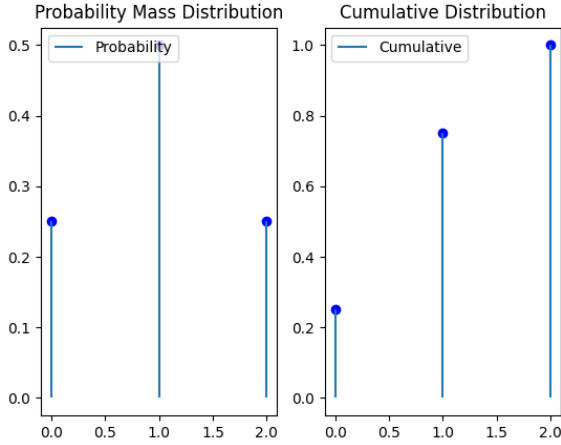$$P(X \leq i) = \sum_{r=i}^{n} {}^nC_i \times p^i \times q^{n-i} \qquad (2)$$

Fig. 1. Binomial Distribution

Let Y be a random variable such that $Y = 0$ when $X < 1$ and $Y = 1$ when $X \geq 1$.

$$P(Y = 0) + P(Y = 1) = 1 \qquad (3)$$

$$P(Y = 0) = P(X < 1) = P(X = 0) \qquad (4)$$

$$P(Y = 0) = P(X = 0) = {}^nC_0 \times p^0 \times (1-p)^n \qquad (5)$$

For $n = 2$ and $p = \frac{1}{2}$,

$$P(Y = 0) = 0.25 \Rightarrow P(Y = 1) = 0.75 \qquad (6)$$