Assignment 2

AI1110: Probability and Random Variables

INDIAN INSTITUTE OF TECHNOLOGY, HYDERABAD

SUVEDH
CS22BTECH11016

10.15.2.3: A bag contains 5 red balls and some blue balls.If the probability of drawing a blue ball is double that if a red ball,determine the number of blue balls in the bag.

Solution:
Let's assume that there are x blue balls in the bag
Since there are 5 red balls in the bag and a total of $5 + x$ balls.
Let $\Pr(R)$ and $\Pr(B)$ be the probabilities of drawing a red and blue ball.

(a) The probability of drawing a red ball is

$$\Pr(R) = \frac{5}{5+x} \tag{1}$$

(b) The probability of drawing a blue ball is:

$$\Pr(B) = \frac{5}{5+x} \tag{2}$$

(c) given the probability of drawing a blue ball is double that of drawing a red ball.
We know that the sum of the probabilities of drawing a red ball and drawing a blue ball is equal to 1

$$\left(\frac{5}{5+x}\right) + 2\left(\frac{5}{5+x}\right) = 1 \tag{3}$$

(4)

$$\frac{5}{5+x} + \frac{10}{5+x} = 1 \tag{5}$$

(6)

$$\frac{15}{5+x} = 1 \tag{7}$$

(8)

$$5 + x = 15 \tag{9}$$

(10)

$$x = 10 \tag{11}$$

Therefore, there are 10 blue balls in the bag.