Assignment 3
AI1110 Probability and Random Variables

K.Rithika

AI22BTECH11010

Question 12.13.4.2: An urn contains 5 red and 2 black balls. Two balls are randomly drawn. Let X represent the number of black balls. What are the possible values of X? Is X a random variable ?

Solution:

E be the event of choosing two balls.

The sample space of the *E* is {RR,RB,BR,BB}.

Table 0
DESCRIPTION OF RANDOM VARIABLE X

Random Variable	Description	Outcome of Event	Value
X	Number of black balls drawn	RR	0
		RB or BR	1
		BB	2

X is a number whose values are defined on the outcomes of a random experiment.Therefore, X is a random variable.

The distribution of X is

$$\Pr(X = 0) = \frac{(^{2}C_0)(^{5}C_2)}{^{7}C_2} = \frac{10}{21} \tag{1}$$

$$\Pr(X = 1) = \frac{(^{2}C_1)(^{5}C_1)}{^{7}C_2} = \frac{10}{21} \tag{2}$$

$$\Pr(X = 2) = \frac{(^{2}C_2)(^{5}C_0)}{^{7}C_2} = \frac{1}{21} \tag{3}$$

$$\Pr(X = 0) + \Pr(X = 1) + \Pr(X = 2) = 1 \tag{4}$$

Therefore X={0,1,2}