

Assignment 2

Sujal - AI20BTECH11020

Ball colour	Red	White	Random variable	Probability refer to	Result
No. of Ball before remove	3	4	$Pr(X_1 = 1)$	probability of First remove ball is White	$\frac{4}{7}$
			$Pr(X_1 = 0)$	probability of First remove ball is Red	$\frac{3}{7}$
No. of Ball after remove(if removed ball is white)	3	3	$Pr(X_1 = 1, X_2 = 1)$	Probability of First ball is White and Second ball is White	$\frac{4}{7} \times \frac{3}{6} = \frac{2}{7}$
			$Pr(X_1 = 1, X_2 = 0)$	Probability of First ball is White and Second ball is Red	$\frac{4}{7} \times \frac{3}{6} = \frac{2}{7}$
No. of Ball after remove(if removed ball is red)	2	4	$Pr(X_1 = 0, X_2 = 1)$	Probability of First ball is Red and Second ball is White	$\frac{3}{7} \times \frac{4}{6} = \frac{2}{7}$
			$Pr(X_1 = 0, X_2 = 0)$	Probability of First ball is Red and Second ball is Red	$\frac{3}{7} \times \frac{3}{6} = \frac{1}{7}$

TABLE 0: probability of random variables.

Download all python codes from

https://github.com/sujal100/Probability_and_Random_variable/tree/main/exercise_2/codes

and latex codes from

https://github.com/sujal100/Probability_and_Random_variable/blob/main/exercise_2/exercise_2_main_tex.tex

1 PROBLEM [GATE-19]

A box contains 4 white balls and 3 red balls. In succession, two balls are randomly selected and removed from the box. Given that the first removed ball is white, the probability that the First removed ball is red is

(A) $\frac{1}{3}$ (B) $\frac{3}{7}$ (C) $\frac{1}{2}$ (D) $\frac{4}{7}$

2 SOLUTION

Consider, Bernoulli random variables Say X_1 and X_2 . Required probability is

$$Pr(X_2 = 0 | X_1 = 1) = \frac{Pr(X_1 = 1, X_2 = 0)}{Pr(X_1 = 1)} \quad (2.0.1)$$

$$= \frac{\frac{2}{7}}{\frac{4}{7}} = \frac{1}{2} = \frac{1}{2} \quad (2.0.2)$$

Hence (C) is correct option.