

Assignment 7

Probability and Random Variables

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I. PROBLEM

A box contain 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 second removed ball is red is ?

II. SOLUTION

Let X_1 and X_2 denote the random variables of drawing a red ball and white ball respectively.

(1)

$$P(X_1) = \frac{3}{7} \quad (2)$$

$$P(X_2) = \frac{4}{7} \quad (3)$$

$$P(X_2|X_1) = P(X_2) = \frac{4}{7} \quad (4)$$

Since the second ball is drawn without replacement,
By conditional probability,

$$P(X_1|X_2) = \frac{P(X_2|X_1) \times P(X_1)}{P(X_2)} \quad (5)$$

$$P(X_1|X_2) = \frac{\frac{4}{7} \times \frac{3}{6}}{\frac{4}{7}} = \frac{1}{2} \quad (6)$$

$$P(X_1|X_2) = 0.5 \quad (7)$$

Download python code from here

https://github.com/Swati-Mohanty/AI5002/blob/main/Assignment_8/codes/gate_19.py

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https://github.com/Swati-Mohanty/AI5002/blob/main/Assignment_8/codes/assignment8.tex