AI1103-Assignment 1

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Download all python codes from

https://github.com/Vikhyath−vec/AI1103/tree/main/Assignment−1/codes

and latex-tikz codes from

https://github.com/Vikhyath−vec/AI1103/blob/main/Assignment−1/Assignment−1.tex

Question

A box contains 5 red marbles, 8 white marbles, and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be

1) red?
2) white?
3) not green?

Solution

Total number of marbles = 5 + 8 + 4 = 17 marbles. Let $X \in \{0, 1, 2\}$ represent the random variable, where 0 represents a red marble, 1 represents a white marble, and 2 represents a green marble. From the given information,

1) Probability that the marble taken out will be red = Pr(X=0)

$$Pr(X = 0) = \frac{\text{number of red marbles}}{\text{total number of marbles}} \tag{0.0.1}$$

$$Pr(X = 0) = \frac{5}{17} = 0.294117647 \tag{0.0.2}$$

2) Probability that the marble taken out will be white = Pr(X=1)

$$Pr(X = 1) = \frac{\text{number of white marbles}}{\text{total number of marbles}} \tag{0.0.3}$$

$$Pr(X = 1) = \frac{8}{17} = 0.4705882353 \tag{0.0.4}$$

3) Probability that the marble taken out will not be green = Pr(X≠2)
Pr(X≠2) + Pr(X=2) = 1 (since complementary events are mutually exclusive)
$\implies$ Pr(X≠2) = 1 - Pr(X=2)

$$Pr(X = 2) = \frac{\text{number of green marbles}}{\text{total number of marbles}} \tag{0.0.5}$$

$$Pr(X = 2) = \frac{4}{17} \tag{0.0.6}$$

$$\implies Pr(\text{X}\neq 2) = 1 - \frac{4}{17} = \frac{13}{17} = 0.764705883 \tag{0.0.7}$$