Assignment 4

Vishal Vijay Devadiga (CS21BTECH11061)

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:

(i) Red?
(ii) White?
(iii) Not Green?

Solution:

Colour	No. of Marbles
Red	5
White	8
Green	4
Total	**17**

TABLE I: Distribution of Ball wrt Colour

Let's denote the outcome of the experiment by a random variable X such that:

Event	Description
X = 0	Marble is Red
X = 1	Marble is White
X = 2	Marble is Green

TABLE II: Description of Events

(i) $X = 0$ denotes the marble is red.

$$\Pr(X = 0) = \frac{5}{17} \tag{1}$$

$$= \boxed{0.294} \tag{2}$$

(ii) $X = 1$ denotes the marble is white.

$$\Pr(X = 1) = \frac{8}{17} \tag{3}$$

$$= \boxed{0.471} \tag{4}$$

(iii) $X \neq 2$ denotes the marble is not green, that is, $X \in \{0, 1\}$. Thus, the marble is either white or red.

$$\Pr(X \neq 2) = \Pr(X \in \{0, 1\}) \tag{5}$$

$$= \Pr(X = 0) + \Pr(X = 1) \tag{6}$$

$$= \frac{5 + 8}{17} \tag{7}$$

$$= \boxed{0.765} \tag{8}$$

Output of the program used to verify whether the solution is correct:

```
vishal@WINDOWS-PC:/mnt/d/WSL/AI1110-Assignments/Assignment-4/code$ python3 main.py
Probability of Marble being Red is 0.294
Probability of Marble being White is 0.471
Probability of Marble being not Green is 0.765
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Fig. 1: Output of the Program