Assignment

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Question : A single letter is selected at random from the word ‘PROBABILITY’. The probability that it is a vowel is

Solution: Let X be an rv defined as in Table I,

RV	Value	Description
X	0	Selection of P
	1	Selection of R
	2	Selection of O
	3	Selection of B
	4	Selection of A
	5	Selection of I
	6	Selection of L
	7	Selection of T
	8	Selection of Y

TABLE I
RANDOM VARIABLE X DECLARATION.

The probabilities are as follows:

$$p_X(k) = \begin{cases} 1/11 & \text{if } k \in \{0,1,2,4,6,7,8\} \\ 2/11 & \text{if } k \in \{3,5\} \end{cases} \tag{1}$$

Let Y be an rv defined as in Table II,

RV	Value	Description
Y	0	Selection of non-vowels
	1	Selection of vowels

TABLE II
RANDOM VARIABLE Y DECLARATION.

From Table I and Table II, The probability that the selected letter is a vowel is given by:

$$p_Y(1) = p_X(2) + p_X(4) + p_X(5) \tag{2}$$

$$= \frac{1}{11} + \frac{1}{11} + \frac{2}{11} \tag{3}$$

$$= \frac{4}{11} \tag{4}$$

Therefore, the probability that the selected letter is a vowel is $\frac{4}{11}$.

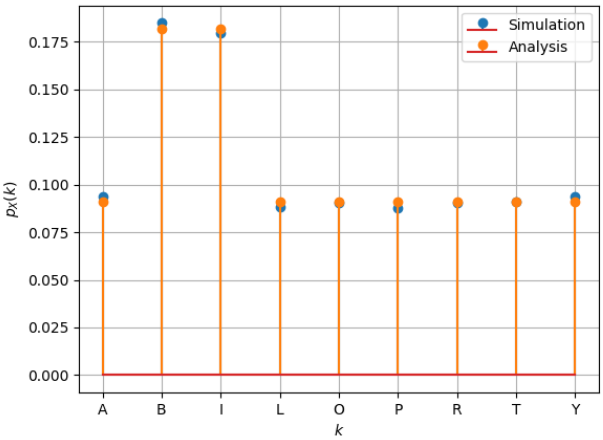

Fig. 1. Probability of choosing every letter in ”PROBABILITY”