

AI1103 Assignment-3

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Download all python codes from

<https://github.com/vrahul02/AI1103-Probability-and-Random-Variables/tree/main/Assignment-3/Codes>

and latex-tikz codes from

<https://github.com/vrahul02/AI1103-Probability-and-Random-Variables/tree/main/Assignment-3/Assignment-3.tex>

PROBLEM GATE 2011 (IN), Q.28

The box 1 contains chips numbered 3, 6, 9, 12 and 15. The box 2 contains chips numbered 6, 11, 16, 21 and 26. Two chips, one from each box are drawn at random. The numbers written on these chips are multiplied. The probability for the product to be an even number is

- 1) $\frac{6}{25}$
- 2) $\frac{3}{5}$
- 3) $\frac{12}{25}$
- 4) $\frac{19}{25}$

SOLUTION

Consider two independent random variables X and Y which denotes the number on the chip drawn from box 1 and box 2 respectively.

X can take the values 3, 6, 9, 12, 15

Y can take the values 6, 11, 16, 21, 26

$$\Pr(X \times Y = \text{even})$$

$$\begin{aligned} &= \Pr(X = \text{even}, Y = \text{odd}) \\ &\quad + \Pr(X = \text{odd}, Y = \text{even}) \\ &\quad + \Pr(X = \text{even}, Y = \text{even}) \end{aligned} \quad (0.0.1)$$

$$= \frac{2}{5} \times \frac{2}{5} + \frac{3}{5} \times \frac{3}{5} + \frac{2}{5} \times \frac{3}{5} \quad (0.0.2)$$

$$= \frac{19}{25} \quad (0.0.3)$$

Thus option 4) is correct

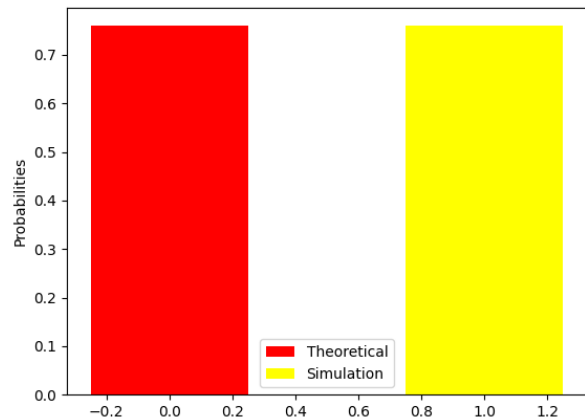


Fig. 4: Theoretical Vs Simulation