Assignment-4

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Download all python codes from

https://github.com/spdanda/AI1103/blob/main/Assignment4/codes/Assignment4.py

and latex-tikz codes from

https://github.com/spdanda/AI1103/blob/main/Assignment4/Assignment4.tex

GATE 2021(ME-SET2) Q7 :

A box contains 15 blue balls and 45 black balls. If two balls are selected randomly, without replacement, the probability of an outcome in which the first ball selected is a blue ball and the second ball selected is a black ball, is .....

1. $\frac{3}{16}$
3. $\frac{1}{4}$
2. $\frac{45}{236}$
4. $\frac{3}{4}$

Solution :

Let X_1 and $X_2 \in \{0, 1\}$ where 0 represents a black and 1 represents a blue ball.

a) Probability of picking a blue ball

$$\Pr(X_1 = 1) = \frac{15}{60} = \frac{1}{4} \tag{0.0.1}$$

b) Probability of picking a black ball given a blue ball is picked

$$\Pr(X_2 = 0|X_1 = 1) = \frac{45}{59} \tag{0.0.2}$$

c) Probability that first ball is blue and second ball is black

$$\Pr(X_1 = 1, X_2 = 0) = \Pr(X_1 = 1) \times \Pr(X_2 = 0|X_1 = 1) \tag{0.0.3}$$

$$= \frac{1}{4} \times \frac{45}{59} \tag{0.0.4}$$

$$= \frac{45}{236} \tag{0.0.5}$$

$\therefore$ Option 2 is correct.