AI1103-Assignment 3

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Download latex-tikz codes from

https://github.com/Umesh−k26/AI−1103/blob/main/Assignment3/assignment3.tex

and python codes from

https://github.com/Umesh−k26/AI−1103/tree/main/Assignment3/codes

GATE 1996, CS : 32

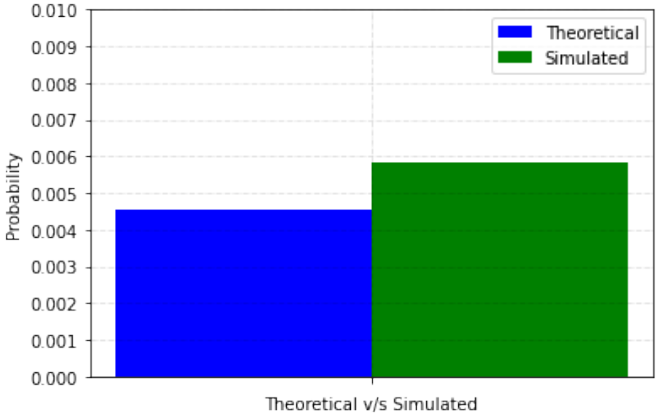
The probability that the top and bottom cards of a randomly shuffled deck are both aces is

(A) $\frac{4}{52} \times \frac{4}{52}$

(B) $\frac{4}{52} \times \frac{3}{52}$

(C) $\frac{4}{52} \times \frac{3}{51}$

(D) $\frac{4}{52} \times \frac{4}{51}$



SOLUTION

Let the following random variables and their values denote:

A : Top card is an ace = 1

B : Bottom card is an ace = 1

$$\Pr(A = 1) = \frac{4}{52} \tag{0.0.1}$$

$$\Pr(B = 1|A = 1) = \frac{3}{51} \tag{0.0.2}$$

Applying Bayes Theorem,

$$\Pr(B = 1, A = 1) = \Pr(B = 1|A = 1)\Pr(A = 1) \tag{0.0.3}$$

from (0.0.1) and (0.0.2),

$$\Pr(B = 1, A = 1) = \frac{4}{52} \times \frac{3}{51} \tag{0.0.4}$$

The correct option is **Option (C)**.