AI1103: Assignment 5

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Problem GATE 2004 (ME), Q.32:

From a pack of regular playing cards, two cards are drawn at random. What is the probability that both cards will be Kings, if the first card is NOT replaced?

1) $\frac{1}{26}$ 2) $\frac{1}{52}$ 3) $\frac{1}{169}$ 4) $\frac{1}{221}$

Solution:

Let $A, B \in \{0, 1\}$, where 1 denotes that card is a King, and 0 denotes that card is not a King. A denotes the first card is picked, B denotes second card is picked.

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

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

Applying Bayes Theorem, we need to find the value of $\Pr(A = 1, B = 1)$:

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

$$= \frac{4}{52} \cdot \frac{3}{51} \tag{0.0.4}$$

$$= \frac{1}{221} \tag{0.0.5}$$

The Probability that both cards are king is $\frac{1}{221}$, Hence **Option 4** is correct