AI 1103 - Assignment 3

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Download all python codes from

https://github.com/rohanthota/Assignment_3/codes/Assignment_3.py

and latex codes from

https://github.com/rohanthota/Assignment_3/Assignment 3.tex

Question

You have gone to a cyber-cafe with a friend. You found that the cyber-café has only three terminals. All terminals are unoccupied. You and your friend have to make a random choice of selecting a terminal. What is the probability that both of you will NOT select the same terminal?

Solution

There are three terminals, each with an equal probability of $\frac{1}{3}$ to be picked.
Defining random variables $X_1, X_2 \in \{0, 1, 2\}$
Where,
$X_i = 0$ when ith man picks first terminal.
$X_i = 1$ when ith man picks second terminal.
$X_i = 2$ when ith man picks third terminal.

$$\Pr(X_1 \neq X_2) = 1 - \Pr(X_1 = X_2). \quad (0.0.1)$$

$$\implies \Pr(X_1 = X_2) = \sum_{j=1}^{3} \Pr(X_1 = X_2 = j) \quad (0.0.2)$$

$$\implies \Pr(X_1 = X_2) = \sum_{j=1}^{3} \left(\frac{1}{3} \times \frac{1}{3}\right) = \frac{1}{3} \quad (0.0.3)$$

$$\therefore \Pr(X_1 \neq X_2) = \frac{2}{3}. \quad (0.0.4)$$