

Assignment 3

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Download python code from

<https://github.com/v-samyuktha/AI1103/blob/Assignment-3/Assignment-3.py>

and latex-tikz code from

<https://github.com/v-samyuktha/AI1103/blob/Assignment-3/Assignment-3.tex>

1 QUESTION

There are two identical locks, with two identical keys, and the keys are among the six different ones which a person carries in his pocket. In a hurry he drops one key somewhere. Then the probability that the locks can still be opened by drawing one key at random is equal to?

2 SOLUTION

Let E_1 denote that he drops the needed key

E_2 denote that he drops an unwanted key

A denote the event of opening the locks

$$\begin{aligned} p(E_1) &= \frac{1}{3} \\ p(E_2) &= \frac{2}{3} \end{aligned} \quad (2.0.1)$$

$$\begin{aligned} p(A|E_1) &= \frac{1}{5} \\ p(A|E_2) &= \frac{2}{5} \end{aligned} \quad (2.0.2)$$

Hence by total probability rule,

$$\begin{aligned} p(A) &= p(E_1) \times p(A|E_1) + p(E_2) \times p(A|E_2) \\ &= \frac{1}{3} \times \frac{1}{5} + \frac{2}{3} \times \frac{2}{5} \end{aligned} \quad (2.0.3)$$

Hence, the probability that the locks can be opened is $\frac{1}{3}$