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

$$\Pr(E_1) = \frac{1}{3} \tag{2.0.1}$$

$$\Pr(E_2) = \frac{2}{3} \tag{2.0.2}$$

$$\Pr(A|E_1) = \frac{1}{5} \tag{2.0.3}$$

$$\Pr(A|E_2) = \frac{2}{5} \tag{2.0.4}$$

Hence by total probability rule,

$$\Pr(A) = \Pr(E_1) \times \Pr(A|E_1) + \Pr(E_2) \times \Pr(A|E_2) \tag{2.0.5}$$

$$= \frac{1}{3} \times \frac{1}{5} + \frac{2}{3} \times \frac{2}{5} \tag{2.0.6}$$

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