Assignment 1

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Download all python codes from

https://github.com/sujal100/

Probability_and_Random_variable/tree/main/exercise 1/codes

and latex codes from

https://github.com/https://github.com/sujal100/ Probability_and_Random_variable/blob/main /exercise_1/exercise_1_main_tex.tex

1 Problem

A die is thrown. If E is the event "the number appearing is a multiple of 3" and F be the event "the number appearing is even" then find whether E and F are independent?

2 Solution

Two event A and B are independent if

$$P(A \cap B) = P(A) \cdot P(B)$$

A die is thrown.

We know that the sample space is

$$S = (1, 2, 3, 4, 5, 6)$$

Let two events be

A: the number appear is a multiple of 3.

B: the number appearing is even.

A: (3, 6)

$$Pr(A) = \frac{2}{6} = \frac{1}{3}$$
B: (2, 4, 6)

$$Pr(B) = \frac{3}{6} = \frac{1}{2}$$

 $A \cap B$ = the number appearing is even multiple of 3 = (3)

So,
$$\mathbf{Pr}(\mathbf{A} \cap \mathbf{B}) = \frac{1}{6}$$

Now,

$$\mathbf{Pr}(\mathbf{A}) \cdot \mathbf{Pr}(\mathbf{B}) = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$$

Since,

$$Pr(A \cap B) = Pr(A) \cdot Pr(B)$$

Therefore A and B are independent events.