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 E and F are independent if

$$P(E \cap F) = P(E) \cdot P(F)$$

E die is thrown.
We know that the sample space is

$$\mathbf{S} = (1, 2, 3, 4, 5, 6)$$

Let two events be
E: the number appear is a multiple of 3 .
F: the number appearing is even.

$$\text{E} : (3, 6)$$

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

$$\text{F} : (2, 4, 6)$$

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

$E \cap F$ =the number appearing is even multiple of 3 = (3)
So,

$$\mathbf{Pr(E \cap F)} = \frac{1}{6}$$

Now,

$$\mathbf{Pr(E)} \cdot \mathbf{Pr(F)} = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$$

Since,

$$\mathbf{Pr(E \cap F)} = \mathbf{Pr(E)} \cdot \mathbf{Pr(F)}$$

Therefore E and F are independent events.