

# Assignment 1

Sushma - CS20BTECH11051

Download all python codes from

[https://github.com/Sushma-AI1103/Assignment-1/blob/main/assingment\\_1code.py](https://github.com/Sushma-AI1103/Assignment-1/blob/main/assingment_1code.py)

Now , Probability of E and F would be

$$\Pr(EF) = \Pr(X_1 = 6, X_2 = 5, X_3 = 4) \quad (2.0.6)$$

$$= \Pr(X_1 = 6) \Pr(X_2 = 5) \Pr(X_3 = 4) \quad (2.0.7)$$

$$= p \cdot p \cdot p \quad (2.0.8)$$

$$= p^3 \quad (2.0.9)$$

## 1 PROBLEM

( 4.12) Determine  $P(E|F)$ , if a die is thrown three times,

E : 4 appears on third toss

F : 6 and 5 appears on respectively on first and second toss.

Probability  $P(E|F)$  ,

$$P(E | F) = P(X_3 = 4 | X_1 = 6, X_2 = 5) \quad (2.0.10)$$

$$= \frac{\Pr(EF)}{\Pr(F)} \quad (2.0.11)$$

$$= \frac{\Pr(X_1 = 6, X_2 = 5, X_3 = 4)}{\Pr(X_1 = 6, X_2 = 5)} \quad (2.0.12)$$

$$= \frac{p^3}{p^2} = p \quad (2.0.13)$$

$$= \frac{1}{6} \quad (2.0.14)$$

## 2 SOLUTION

Throwing a die three times is similar to throw three die simultaneously as every trial is independent.

Let  $X_i = \{1, 2, 3, 4, 5, 6\}$  where  $i = 1, 2, 3$

Now , for a fair die , all events are equally likely.

Therefore ,

$$\Pr(X_i = n) = \begin{cases} \frac{1}{6} & 1 \leq n \leq 6 \\ 0 & \text{otherwise} \end{cases} \quad (2.0.1)$$

Let us assume

$$p = \frac{1}{6}, \quad (2.0.2)$$

probability of event E ,

$$\Pr(E) = \Pr(X_3 = 4) = p \quad (2.0.3)$$

similarly, Probability of event F would be ,

$$\Pr(F) = \Pr(X_1 = 6, X_2 = 5) = \Pr(X_1 = 6) \Pr(X_2 = 5) \quad (2.0.4)$$

$$= p \cdot p = p^2 \quad (2.0.5)$$

since events are independent .