

Assignment 1

AI1110 : Probability And Random Variables

Siddhant Godbole
CS22BTECH11054

lemh- 12.13.1.8 -

Question: A die is thrown three times,

E : 4 appears on the third toss,

F : 6 and 5 appears respectively
on first two tosses

Solution: A fair dice is tossed thrice.

There are three differnt ordered outcome each with values from 1 to 6 with equal probability.

Let X be a random variable which takes the values 1 , 2 , 3 , 4 , 5 and 6.

P_1, P_2 and P_3 are probabilities connected to respective three dice rolls.

A fair die gives equal $(1/6)$ probability for any X .

S being the set of the sample space.

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

$$P(E) = P_1(S) \cdot P_2(S) \cdot P_3(X = 4) \quad (2)$$

$$\therefore P(E) = 1 \cdot 1 \cdot (1/6) \quad (3)$$

$$P(F) = P_1(X = 6) \cdot P_2(X = 5) \cdot P_3(S) \quad (4)$$

$$\therefore P(F) = (1/6) \cdot (1/6) \cdot 1 \quad (5)$$

$$= (1/36) \quad (6)$$

dice-dependence

Base	Contribution			Final
X	D1	D2	D3	P
E	1	1	1/6	1/6
F	1/6	1/6	1	1/36

So, probability of

E : 4 appears on the third toss is : $1/6$ or 0.167 or 16.7%

F : 6 and 5 appears respectively on first two tosses is : $1/36$ or 0.0278 or 2.78%