

# Assignment 1

## AI1110: Probability and Random Variables

### Indian Institute of Technology Hyderabad

Arjit Jain  
AI22BTECH11002

#### Chapter 13 , Exercise 13.2

##### Question 17 :

The Probability of obtaining an even prime number on each die , when a pair of dice is rolled is :

- 1) 0
- 2)  $\frac{1}{3}$
- 3)  $\frac{1}{12}$
- 4)  $\frac{1}{36}$

##### Solution:

Let X and Y be two random variables representing outcomes on both the die,

$$X \in \{1, 2, 3, 4, 5, 6\} \quad (1)$$

$$Y \in \{1, 2, 3, 4, 5, 6\} \quad (2)$$

$\Pr(X = 2)$	The probability of occurrence of 2 on die roll 1.
$\Pr(Y = 2)$	The probability of occurrence of 2 on die roll 2.
$\Pr(X = 2, Y = 2)$	The probability of occurrence of 2 on both the die.

TABLE 4

As both die rolls are independent :

$$\Pr(AB) = \Pr(A) \Pr(B) \quad (3)$$

$$\Pr(X = 2) = \frac{1}{6} \quad (4)$$

$$\Pr(Y = 2) = \frac{1}{6} \quad (5)$$

$$\Pr(X = 2, Y = 2) = \Pr(X = 2) \Pr(Y = 2) = \frac{1}{6} \times \frac{1}{6} \quad (6)$$

$$\therefore \text{Required probability} = \frac{1}{36} \quad (7)$$