# Probability And Random Variables Assignment -I

Talasu Sowmith EE22BTECH11218*

**Q)** A fair coin and an unbiased die are tossed. Let A be the event 'head appears on the coin' and B be the event '3 on the die'. Check whether A and B are independant events or not.

**Solution** :

We can say that two events are independant if $P(A \cap B) = P(A).P(B)$ Here we are tossing a fair coin and rolling an unbiased die, so the possible outcomes are :

$$S = \{(H,1),(H,2),\ldots,(H,6),(T,1),(T,2),\ldots,(T,6)\}$$

H represents Head and T represents Tail
So, the total number of outcomes are 12.
Now, Favourable outcomes of A would be :

$$A : \{(H,1),(H,2),(H,3),(H,4),(H,5),(H,6)\}$$

$$P(A) = \frac{6}{12} = \frac{1}{2}$$

Favourable outcomes of B would be :

$$B : \{(H,3),(T,3)\}$$

$$P(B) = \frac{2}{12} = \frac{1}{6}$$

The intersection of both the events would be :

$$= \{(H,3)\}$$

So,

$$P(A \cap B) = \frac{1}{12}$$

And

$$P(A).P(B) = \left(\frac{1}{2}\right).\left(\frac{1}{6}\right)$$

$$= \frac{1}{12}$$

So here we are getting $P(A \cap B) = P(A).P(B) = \frac{1}{12}$

Therefore, we can say that A and B are independant events.