Monday 9/10/23

# 7.3 Conditional Probability

## 7.3.1 Introduction of conditional probability:

⇒ Sometimes our computation of the probability of an event is changed by the knowledge that a related event has occurred (or is guaranteed to occurs) or by some additional conditions imposed on the experiment.

⇒ Conditional Probability:-

→ $P(A|B)$ indicates the probability of event "A" happening given that event "B" happened.

$$\therefore P(A|B) = \frac{P(A \cap B)}{P(B)}$$

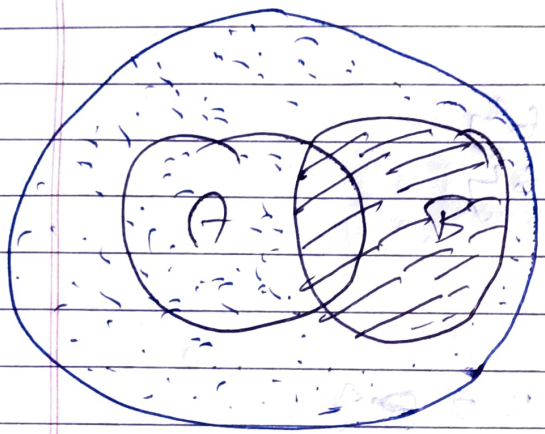
e.g.:- Tossing 2 coins simultaneously
B: getting head on one coin
A: getting head on both coins.

To find $P(A|B)$.

→ $P(A|B) = \frac{P(A \cap B)}{P(B)}$

$= \frac{1/4}{3/4} = \frac{1}{3}$

→ We can easily understand the formula for conditional probability using the below diagram.




Not possible to happen as B already happened

New sample space (After B happened).

→ Since B has already happened, the sample space reduce to B. So, the probability of A happining becomes P(A∩B) divided by P(B).

e.g.:- In a batch, there are 80% C programmers, and 40% are Java and C programmers. What is the probability that a C programmer is also Java programmer.

→ Given P(C) = 0.8
P(J∩C) = 0.4

To find P(J/C) = $\frac{P(J \cap C)}{P(C)} = \frac{0.4}{0.8}$

$= 1/2 = 0.5$