Probability

Empirical Probability:

It is a probability of event which is calculated based on experiments

$$\boldsymbol{Emprical\ Probability} = \frac{\boldsymbol{No\ of\ trails\ which\ expected\ outcome\ came}}{\boldsymbol{Total\ Number\ of\ trials}}$$

Example:

A coin is tossed 1000 times, we get 499 times head and 501 times tail,

So empirical or experimental probability of getting head is calculated as

$$p = \frac{499}{1000} = .499$$

Empirical probability depends on experiment and different will get different values based on the experiment

Theoretical Probability

The theoretical probability or the classical probability of the event is defined as

$$\boldsymbol{P(E)} = \frac{\boldsymbol{Number\ of\ outcome\ favourable\ to\ E}}{\boldsymbol{Number\ of\ all\ possible\ outcome\ of\ the\ experiment}}$$

Some Important points

1) Here in this probability approach, it is assumed that all the events of the experiment are equally likely

2) An event having only one outcome of the experiment is called an elementary event.

"The sum of the probabilities of all the elementary events of an experiment is 1."

I.e. If we three elementary event A,B,C in the experiment ,then

P(A)+P(B) +P(C)=1

3) The event Ā, representing 'not A', is called the complement of the event A. We also say that Ā and A are complementary events. Also

P(A) +P(Ā)=1

4) The probability of an event (U) which is impossible to occur is 0. Such an event is called an **impossible event**

P(U)=0

5) The probability of an event (X) which is sure (or certain) to occur is 1. Such an event is called a **sure event or a certain event**

P(X)=1

5) Probability of any event can be as

$$0 \leq P(E) \leq 1$$