PROBABILITY

* The measure of uncertainity is called Probability.
* It is expressed as a number from zero to One.

Some Basic Terms

1. **Experiment:** A process which results in some well-defined outcome is known as an experiment.

   eg: When a die is thrown the possible outcomes are 1, 2, 3, 4, 5 & 6, which is well-defined.

2. **Random Experiment:** It means all the outcomes of the experiment are known in advance, but any specific outcome of the experiment is not known in advance.

3. **Sample Space:** The set of all possible outcomes of an experiment is called sample space. & denoted by `S`.

   eg: When two coins are tossed together, Thus the Sample Space $S = \{(H,H), (H,T), (T,H), (T,T)\}$

4. **Equally Likely Outcomes:** Each outcome of an experiment occurs with equal probability.

   eg: 1) In case of tossing a coin, there are equal chances for the coin to land with its head or tail up.

   2) The outcomes are not equally likely, if a single draw of a ball from the bag contains 6 red and 2 yellow balls.

Measurement of Probability:

The probability of an event denotes the likelihood of its happening.

$$P(E) = \frac{\text{Numbers of events (outcomes) favourable to event E}}{\text{Total number of all possible outcomes}}$$

1. **Empirical (or, experimental) probability :** When the probability is based on ~~When~~ an actual experiment is called an empirical probability.

2. **Classical (or, theoretical) probability :** When a repetition of an experiment can be avoided for calculating the exact probability.

Impossible Event .: If the probability of an event = 0, the event is called an impossible event.

eg: It is impossible to get a number 7 in single throw of a die, so the probability of this event is 0.

Certain Event or Sure Event: If the probability of an event = 1, the event is called a certain event.

eg: It is sure that a number less than 7 will be obtained whenever a die is thrown, so the probability of the event is 1.

Probability of any event can never be less than 0 or more than 1.

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