Probability

- Some of the terms related to probability are:
  - **Experiment**: When an operation is planned and done under controlled conditions, it is known as an experiment. For example, tossing a coin, throwing a die etc., are all experiments.
  - **Outcomes**: Different results obtained in an experiment are known as outcomes. For example, on tossing a coin, if the result is a head, then the outcome is a head; if the result is a tail, then the outcome is a tail.
  - **Random**: An experiment is random if it is done without any conscious decision. For example, drawing a card from a well-shuffled pack of playing cards is a random experiment if it is done without seeing the card.
  - **Trial**: A trial is an action or an experiment that results in one or several outcomes. For example, if a coin is tossed five times, then each toss of the coin is called a trial.
  - **Sample space**: The set of all possible outcomes of an experiment is called the sample space. It is denoted by the letter 'S'. Sample space in the experiment of tossing a coin is {H, T}.
  - **Event**: The event of an experiment is one or more outcomes of the experiment. For example, tossing a coin and getting a head or a tail is an event.

- **Certain events:** Events which are definite to happen.

  For example, the day after Saturday will be Sunday or the sun will rise from the east.

- **Impossible events:** Events which are impossible to happen.

  For example, March comes before February in a year, the apple goes up when dropped from the tree.

- **Matter of Chance:** Results of events which can not be known before they happen.

  In a cricket match, India will win or it will rain tomorrow.

- **Probability** is the measure or estimation of likelihood of happening of an event in a particular way.

  Example:

  What is the probability of getting one head and one tail when two coins are tossed together?

  Solution:

  When two coins are tossed together, the possible outcomes are:

  - Head on first coin, head on second coin(H, H)
  - Head on first coin, tail on second coin (H, T)
  - Tail on first coin, head on second coin (T, H)
  - Tail on first coin, tail on second coin (T, T)

    ∴ Total number of outcomes = 4

    Outcomes in favour of the event are (H, T) and (T, H).

    Number of favourable outcomes = 2

    Therefore, probability of getting one head and one tail

$$\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$$

$$= \frac{2}{4} = \frac{1}{2}$$