

Probability in Real Life

What is Probability?

The likelihood of the occurrence of any event can be called Probability.

Application of probability

Some of the applications of probability are predicting the outcome when you:

- Flipping a coin.
- Choosing a card from the deck.
- Throwing a dice.
- Pulling a green candy from a bag of red candies.
- Winning a lottery 1 in many millions.

Probability in Mathematics

Al-Khalil, a Middle Eastern mathematician, wrote the Book of Cryptographic Messages, which demonstrates the first use of permutation and combination to list all the Arabic words with or without vowels. This was the earliest form of probability and statistics.

Probability of a branch of mathematics relating the numerical illustration of how likely an event can exist.

The likelihood of any event to occur is a number between 0 and 1, where 0 indicates the impossibility of the event and 1 indicates certainty.



Probability theory is widely used in the area of studies such as statistics, finance, gambling artificial intelligence, machine learning, computer science, game theory, and philosophy.

Formula to calculate probability



$$\text{PROBABILITY} = \frac{\text{EVENT}}{\text{OUTCOMES}}$$

Examples of Real Life probability

Weather Planning:

Probability forecast is an assessment of how likely an event can occur in terms of percentage and record the risks associated with weather. Meteorologists around the world use different instruments and tools to predict weather changes. They collect the weather forecast database

from around the world to estimate the temperature changes and probable weather condition for a particular hour, day, week and a month.

Example:

If there are 40 % chances of raining then the weather condition is such that 40 out of 100 days it has rained.

Sports Strategies:

In sports, analyses are conducted with the help of probability to understand the strengths and weaknesses of a particular team or player. Analysts use probability and odds to foretell outcomes regarding the team's performance and members in the sport. Coaches use probability as a tool to determine in what areas his team is strong enough and in which all areas they have to work to attain victory. Trainers even use probability to gauge the capacity of a particular player in his team and when to allow him to play and against whom.

Example:

A cricket coach evaluates a player batting and bowling capability by taking his average performances in previous matches before placing in the line-up.

Insurance:

Insurance companies use the theory of probability or theoretical probability for framing a policy or completing at a premium rate. Theory of probability is a statistical method used to predict the possibility of future outcomes.

Example:

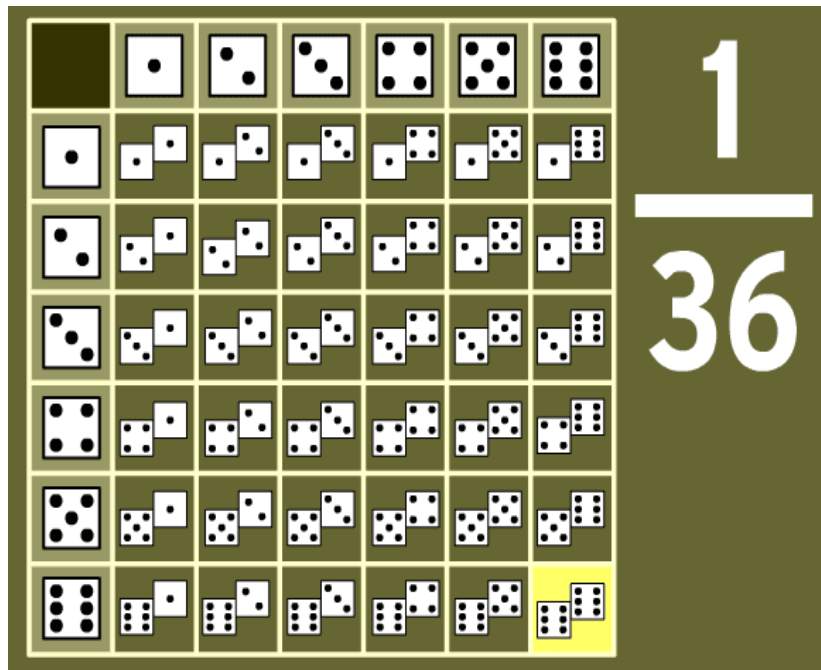
Issuing health insurance for an alcoholic person is likely more expensive compared to the one issued to a healthy person. Statistical analysis shows high health risks for a regular alcoholic person, ensuring them is a great financial risk given a higher probability of serious illness and hence filing a claim of premium money.

In Games:

Blackjack, poker, gambling, all sports, board games, video games use probability to know how likely a team or person has chances to win.

Example:

When two dices are rolled simultaneously, the outcomes will be as given below



Game Theory:

It is the study of mathematical representation of strategic relations among analytical outcomes.

It has applications in social science, logic, system science and computer science. In 1944, John Von Neumann published a paper, "Theory of Games and Economic Behaviour".

He proved Brouwer's fixed point theorem on continuous mapping into compact convex sets, the standard game theory method.

Application of portability in Game theory:

- **Economics and business:** Economists use game theory as a tool to analyse the economic competition and phenomena such as bargaining, voting theory, auction, mechanism design. Executives, investors, and managers in the business world use the game theory strategy for investments, launching of new products or entering a new business. Game theory models force each player to consider the action made by their competitor and plan the next strategy.
- **In politics:** Diplomats and politicians use game theory to analyze any situation of conflict between individuals, companies, state and political parties. It is also used in war strategies, political voting and political affairs.
- **In philosophy:** Philosophers use game theory in various aspects of philosophy.
- **In biology:** It is applied to the analysis of the abnormal natural phenomenon in biology.