Chapter- 15

PROBABILITY

STUDY NOTES

Probability: It is the numerical measurement of the degree of certainty.

- Theoretical probability associated with an event E is defined as "If there are 'n' elementary events associated with a random experiment and m of these are favourable to the event E then the probability of occurrence of an event is defined by P(E) as the ratio m/n ".

$$P(E) = \frac{\text{Number of outcomes favourable to } E}{\text{Number of all possible outcomes of the experiment}}. \quad \text{Thus, } P(E) = \frac{m}{n}$$

Event and outcome

An **Outcome** is a result of a random experiment. For example, when we roll a dice getting six is an outcome.
An **Event** is a set of outcomes. For example when we roll dice the probability of getting a number less than five is an event.

Impossible event

An event that has **no chance of occurring** is called an **Impossible event**, i.e. P(E) = 0.
E.g: Probability of getting a 7 on a roll of a die is 0. As 7 can never be an outcome of this trial.

Sure event

An event that has a **100% probability** of occurrence is called a **sure event**. The probability of occurrence of a **sure event** is **one**.
E.g: What is the probability that a number obtained after throwing a die is less than 7?
So, P(E) = P(Getting a number less than 7) = 6/6= 1

The probability of an event E is a number P(E) such that: $0 \leq P(E) \leq 1$

- An event having only one outcome is called an elementary event. The sum of the probabilities of all the elementary events of an experiment is 1.
- For any event E, $P(E) + P(\bar{E}) = 1$, where $\bar{E}$ stands for 'not E'. E and $\bar{E}$ are called complementary events.
- Favourable outcomes are those outcomes in the sample space that are favourable to the occurrence of an event..
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