

Occurrence of an Event

Any subset E of a sample space S is called an event.

Consider an experiment of throwing a dice.

E denote the event “a number less than 4 appears”

If 1 or 2 or 3 had appeared on dice, we say event E has occurred.

Does event E of a sample space S is said to have occurred if the outcomes W of the experiment is such that $W \in E$. If outcome W is such that $W \notin E$ we say that event E has not occurred.

Types of events

Events can be classified into various types of basis of elements they have.

1. Impossible and sure events

Experiment of rolling a dice:

Sample Space = $\{1,2,3,4,5,6\}$

* Let E be the event “the number appears on the dice is a multiple of 7”

As no element of sample space satisfy this event

$E = \phi$ is possible event.

* Let F be the event “the number turns on the dice is even or odd”

Clearly $F = \{1,2,3,4,5,6\} = S$ all outcomes of the experiment ensure the occurrence of the event F .

Thus the event $F = S$ is a sure event.

2. Simple event

If an event E has only one sample point of a sample space, it is called a simple or elementary event.

For example, in the experiment of tossing two coins, sample space is

$$S = \{HH, HT, TH, TT\}$$

There are four sample events corresponding to the sample space.

$$E_1 = \{HH\}$$

$$E_2 = \{HT\}$$

$$E_3 = \{TH\}$$

$$E_4 = \{TT\}$$

are simple events

3. Compound event

If an event has more than one sample point it is called a compound event.

For example, In an “experiment of tossing a coin thrice” the events

- E Exactly one head appeared
- F At least one head appeared
- G Almost one head appeared etc.

are all compound events. The subset of S associated with these events are

- E $\{HTT, THT, TTH\}$
- F $\{HTT, THT, TTH, HHT, HTH, THH, HHH\}$
- G $\{TTH, THT, HTT, TTH\}$