<u>Outcomes and sample space</u>

<u>Outcome</u>

<u>Definition</u> : A possible result of a random experiment is called its outcome.

<u>Sample Space</u> : consider the experiment of rolling a dice. The outcomes of this experiment are 1, 2, 3, 4, 5, 6, if we are interested in the number of dots on the upper face of the dice.

The set of outcomes{1, 2, 3, 4, 5, 6} is called the sample space of the experiment. Sample space is denoted by the symbol S.

<u>Sample Point</u> : each element of the sample space is called the sample point. In other words, each outcome of the random experiment is called sample point.

<u>Example1</u> : Two coins (a one rupee coin and the two rupee coin) tossed once. Find the sample space.

The possible outcomes may be
Heads on both coins (H, H) = H H

Head on first coin and tail on the other (H, T) = H T

Tail on the first coin and head on the other (T, H) = T H

Tail on both coins (T, T)= T T

Example 2 : find the sample space associated with the experiment of rolling a pair of dice
(one is blue and the other is red) once.

Suppose 1 appears on blue dice and two on red we denote this outcome by ordered pair (1,2)

Similarly 3 appears on blue dice 5 on red
The outcome is denoted by (3,5)

S = { (x, x) : x is the number of on the blue dice
y is the number on the red dice}

Number of elements of the sample space is 6 x 6 = 36

S = { (1,1) , (1,2) , (1,3) , (1,4) , (1,5) , (1,6) ,
(2,1) , (2,2) , (2,3) , (2,4) , (2,5) , (2,6) ,
(3,1) , (3,2) , (3,3) , (3,4) , (3,5) , (3,6) ,
(4,1) , (4,2) , (4,3) , (4,4) , (4,5) , (4,6) ,
(5,1) , (5,2) , (5,3) , (5,4) , (5,5) , (5,6) ,
(6,1) , (6,2) , (6,3) , (6,4) , (6,5) , (6,6) }

Example 3 : in an experiment a coin is tossed repeatedly unit a head comes up. Describe the sample space.

In the experiment had may come up on the first toss or the second test or the third toss and so on till head is obtained
Hence desired sample space will be
S = {H, TH, TTH, TTTTH, TTTTH, ………………..}