"Probability"

Basics of Probability"

Probability __ chances

Possible chance -> 0% to 100%.

$$\left(\begin{array}{cccc} \frac{0}{100} & t_0 & \frac{100}{100} \right)$$

Random experiment:

An experiment which produces different results even though it is repeated a large number of times under essentially similar conditions, is called a random experiment.

A random experiment has three properties:

- i) Repeated any number of times.
- ii) Two or more possible outcomes.
- iii) Repeated outcome are un predictable.

rial:
A single performance of an experiment is called a trial.

Outcome:

Results obtained from an experiment or a trial is called an outcome.

Sample Space:

A set consisting of all possible outcomes that can result from a random experiment is defined to be a sample space and is denoted by S. For example:

S = {1, 2, 3, 4, 5, 6} # roll a single dice

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S= {names of all cities of pakistan}.

An event is an individual outcome or any number of outcomes (Sample points) of a random experiment.

"Axioms of Events"

- i) Mutually Exclusive Events.
- ii) Exhaustive Events.
- iii) Equally likely events.

Revision (Sets)

$$U = \{1, 2, 3, 4, \ldots, 20\}$$

$$A = \{1, 2, 3, 5, 7, 10, 11\}$$

$$B = \{2, 5, 6, 8, 9, 10, 13\}$$
.

:
$$ANB = \{2, 5, 10\}$$

Common numbers

$$AVB = \{1, 2, 3, 5, 6, 8, 7, 9, 10, 11, 13\}$$

all the elements of A, all the elements of B and repeated numbers just once.

$$A = U - A = \{4, 6, 8, 9, 12, 13, \dots, 20\}$$

all the elements of universal set, which are not in A.

$$B-A = \{2, 6, 8, 9, 13\}$$

elements of B which are not in A.

i) Mutually Exclusive Events:

Two events A and B of a Single experiment are said to be mutually exclusive or disjoint if and only if they can't both occur at the Same time. That is they have no common point. Similarly for two or more events.

$$P(A \cap B) = 0.$$

A, NA, N... NA x= { 3 K mutually exclusive events.

ii) Exhaustive Events:

Events are said to be collectively exhaustive, when the union of mutually exclusive events is the entire Sample Space s.

i.e;
$$AUB = S$$

 $A, UA_2 U...UA_k = S$
 $A, UA_2 U...UA_k = S$
 $A, UA_2 U...UA_k = S$
 $A, UA_2 U...UA_k = S$

iii) Equally Likely Events:

Two events A and B are said to be equally likely, when one event is as likely to occur as the other.

Tree Diagram

to know the Sample points of a Sample Space.

Q-1:- An experiment consists of flipping a coin and then flipping it a Second time if a head occurs. If a tail occurs, then a die is tossed.

List the sample points of Sample Space.

sol:

(T, 1) (T, 1) (T, 2) (T, 3) (T, 4) (T, 5) (T, 6)

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Q-2:- Three items are selected at random from a manufacturing process. Each item is inspected and classified as defective (D) and Nondefective (N' Make a tree diadram to show all possibilities.

D (D,D,D)

N (D,N,N)

N (D,N,N)

N (D,N,N)

N (N,D,D)

N (N,D,D)

N (N,N,D)

N (N,N,N)

Practice: Sam is going to assemble a computer by himself. He has the choice of chips from two brands. (C,,C₂), a hard derive from three (H, H₂, H₃), memory from two (M, M₂) and an accessory bundle from four local stores (A, A₂, A₃, A₄).

Make a tree diagram to Show all possibilities for Sam to assemble a computer by himself. ©