**Experiment** (or) **trial**:- Each performance of a Random Experiment is called a trial also known as Bernoulli trial.

**Ex**:- A fair die is thrown at a time — trial.

{1, 2, 3, 4, 5, 6} ; {1} {2}, .. {6} are called sample elements (or) elementary events.

⇒ ~~out come~~

**outcome**:-

An outcome is a possible result of an experiment or trial

⇒ **Ex**:- Coin tossing

{H} - out-come

* Sample-space:-

"The set of all the possible out-comes of a given random experi-ment is called the sample space, Each possible out-come of or element in a Sample space is called sample point (or) an elementary point.

Ex:- Tossing a fair-coin

Sample-space = { H, T }

* Favorable case (or) event:-

The no. of favorable cases favorable to an event in a trial is the no. of outcomes which entries the happenning of the event.

* Ex:- when a dice is thrown No. of favorable cases to

| Even no. | Odd number |
| --- | --- |
| 2 | 1 |
| 4 | 3 |
| 6 | 5 |
| n(e) = 3 | n(o) = 3 |

* probability:-

is the branch of mathamatics concerning numerical descriptions of how likely an event is to occur, or how likely it is that a propo-sition is true.

The probability of an event is a number between 0 and 1. where roughly speaking, 0 - indicates impossi-bility of the event and 1 - indicates certainity.

Types:-

There are three major types of probability

① Theoritical probability, ② Experimental probability ③ Axiomatic probability

— o —

③ Given that

P (older people / loan default) = 1.4%

P(loan default) = 0.184

P (older people) = 0.8%

= 0.008

To find

P( loan default/older people ) = ?

P( loan default/older people) By using Baye's therom

$$= \frac{P(\text{older people}/\text{loan default}) \cdot P(\text{loan default})}{P(\text{older people})}$$

$$= \frac{0.014 \times 0.184}{0.008} = \frac{0.002576}{0.008}$$

$$= 0.322$$

There are 32.2% of people default on loan knowing that he is a an person.

— o —

(5) Baye's therom :-

Statement :- If $E_1, E_2 \ldots E_n$ are mutually disjoint Events with $P(E_i) \neq 0$ $(i = 1, 2, \ldots n)$ then for any orbitary event A which is a subset of $\left[\bigcup_{i=1}^{n} E_i\right]$ such that $P(A) > 0$, we have.

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$$\boxed{P(E_i/A) = \frac{P(E_i).\,P(A/E_i)}{\sum_{i=1}^{n} P(E_i).\,P(A/E_i)}} \quad ; \; i = 1, 2, \ldots n$$

This is to find multiple variables for a sing variable is

$$\boxed{P(A/B) = \frac{P(A).\,P(B/A)}{P(B)}}$$

(5) Given that

$P(\text{free}/\text{spam}) = 0.30$

$P(\text{free}/\text{non-spam}) = 1\% = 0.01$

$P(\text{spam}) = 50\%$

$= 0.5$

$P(\text{spam}) + P(\text{non-spam}) = 1$

$P(\text{non-spam}) = 1 - P(\text{spam})$

$P(\text{non-spam}) = 1 - 0.5$

$P(\text{non-spam}) = 0.5$

To find

P( spam / free) – using Baye's theorom

$$\Rightarrow \frac{P(\text{spam}) \cdot P(\text{free}/\text{spam})}{P(\text{free})}$$

$$= \frac{0.5 \times 0.30}{0.01} = \frac{0.15}{0.01} = 15$$