



## SYLLABUS

Class – B.Com. II Year

Subject – Statistics

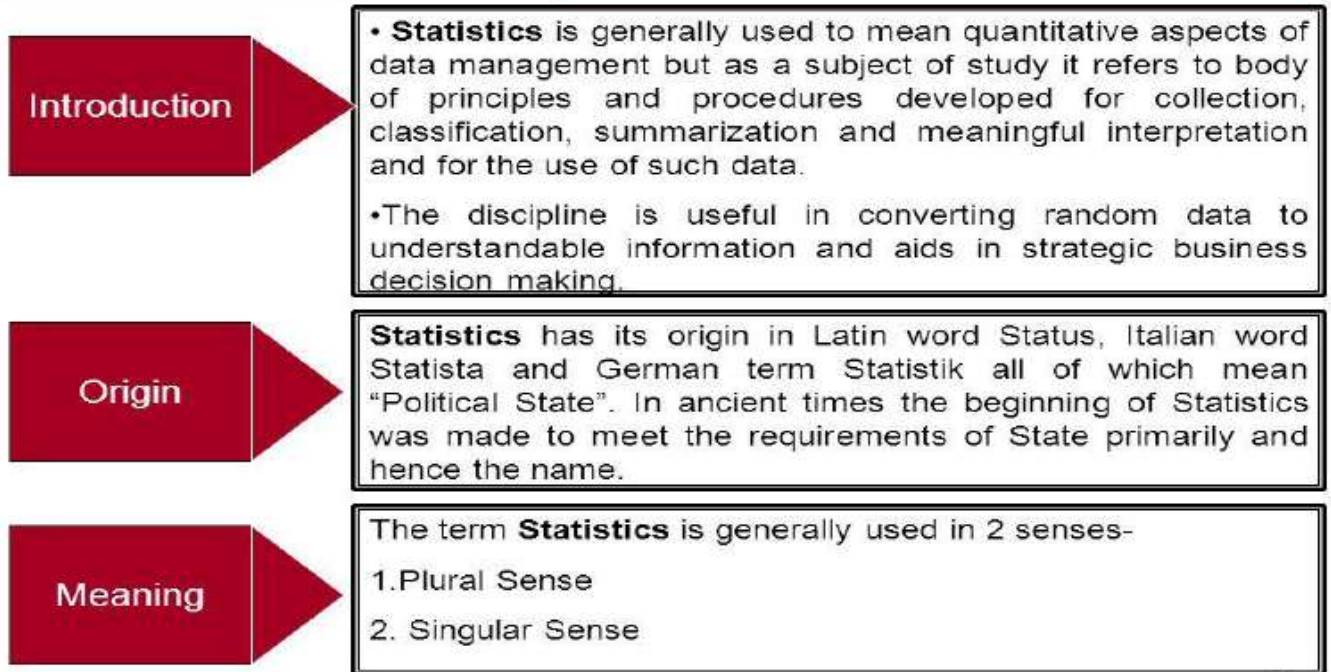
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**UNIT – I**      **Meaning, definition, significance, scope and limitations of statistical investigation process of data collection, primary and secondary data. Method of sampling, preparation of questionnaire, classification and tabulation of data preparation of statistical series and its type.**

**UNIT – II**      **Measurement of central tendency – mean, median, quartile, mode, geometric mean and harmonic mean.**



## UNIT – I STATISTICS



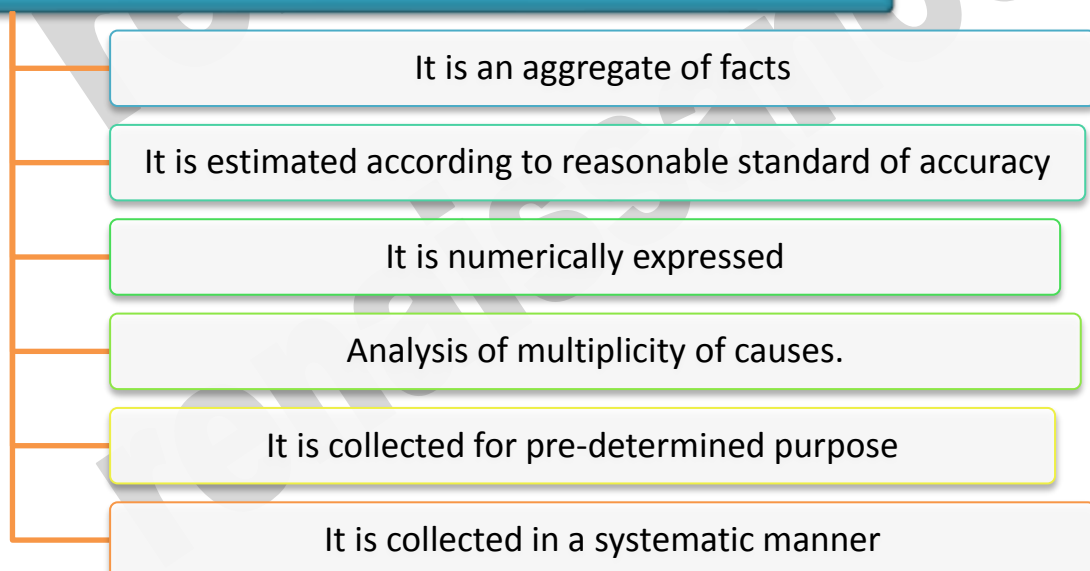
**Definitions:** - "The classified facts relating the condition of the people in a state specially those facts which can be stated in members or in tables of members or in any tabular or classified arrangements."

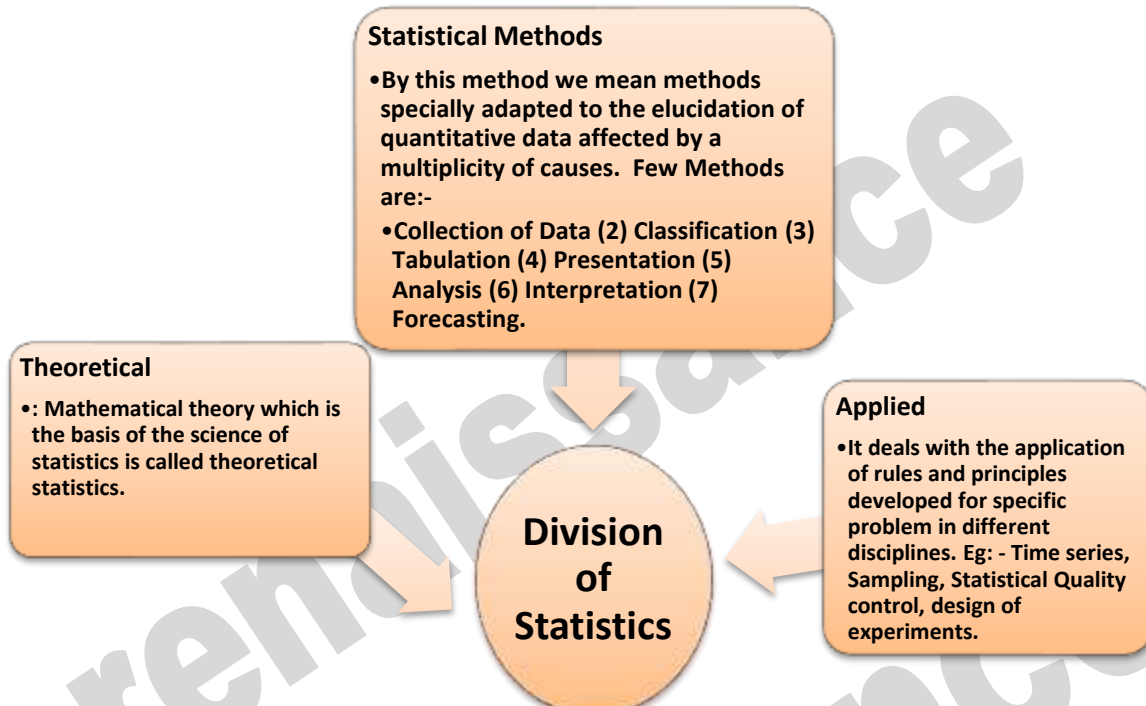
-Webster

"Statistics may be regarded as (i) the study of population (ii) The study of variation (iii) The study of method of reduction of data"

-R.A. Fisher

### Nature /Features /Characteristics of statistics





### Functions of Statistics:-

- It presents facts in a definite form.
- It simplifies mass of figures
- It facilitates comparison
- It helps in prediction
- It helps in formulating suitable & policies.

### Scope of Statistics:-

1. Statistics and state or govt.
2. Statistics and business or management.
  - Marketing
  - Production
  - Finance
  - Banking
  - Control
  - Research and Development
3. Statistics and Economics
  - Measures National Income
  - Money Market analysis
  - Analysis of competition, monopoly, oligopoly,
  - Analysis of Population etc.
4. Statistics and science
5. Statistics and Research

### Limitations:-

- (i) It is not deal with items but deals with aggregates.
- (ii) Only on expert can use it
- (iii) It is not the only method to analyze the problem.
- (iv) It can be misused etc.

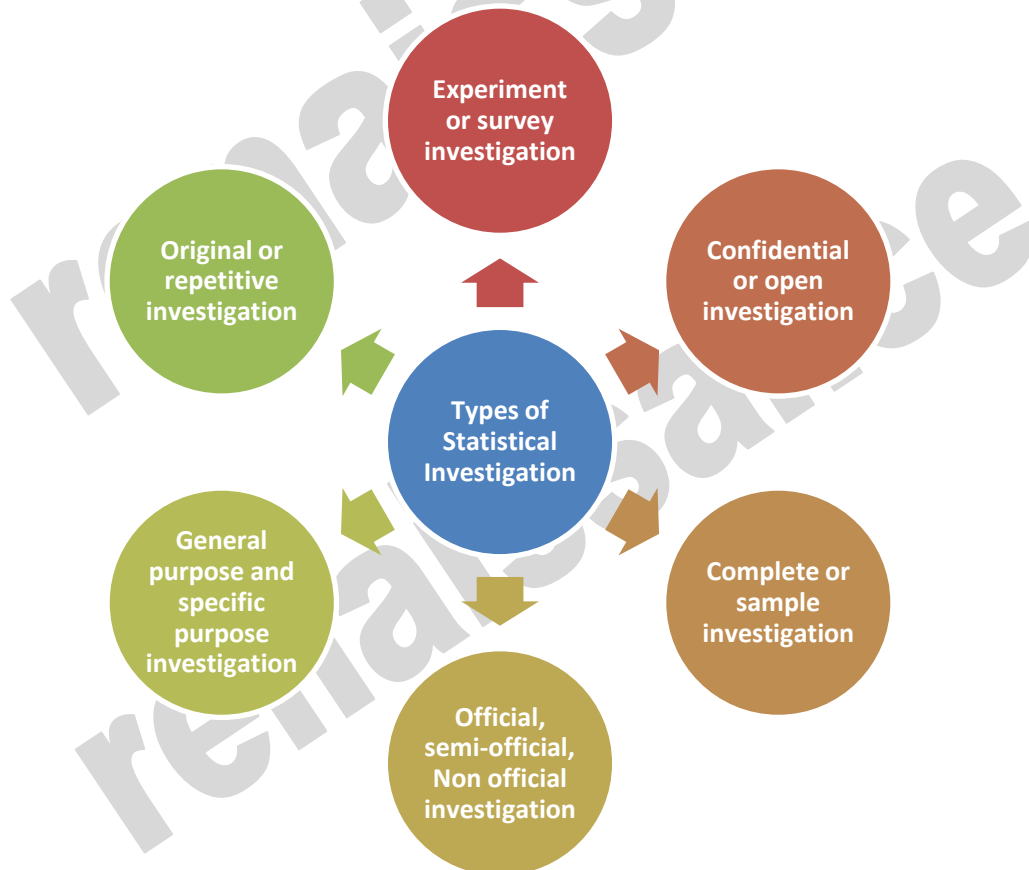
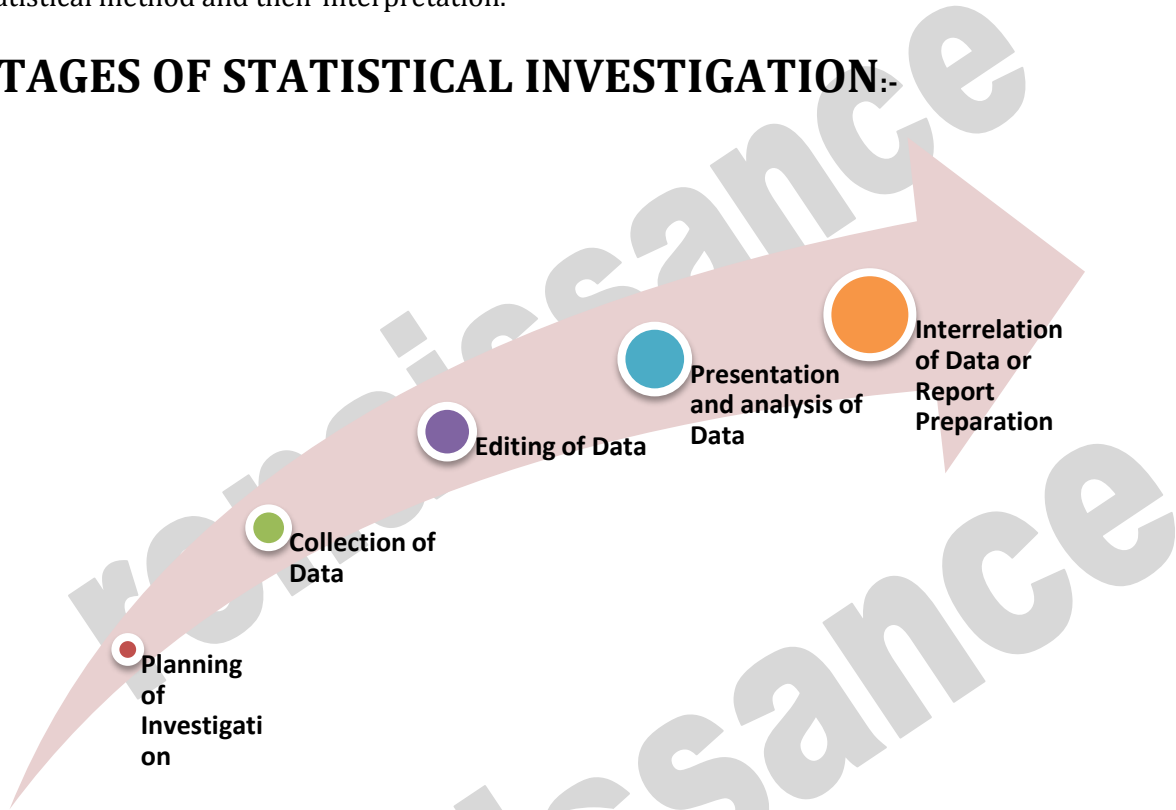


**STATISTICAL INVESTIGATION**

**Meaning:** In general it means as a statistical survey.

In brief, it is Scientific and systematic collection of data and their analysis with the help of various statistical method and their interpretation.

**STAGES OF STATISTICAL INVESTIGATION:-**

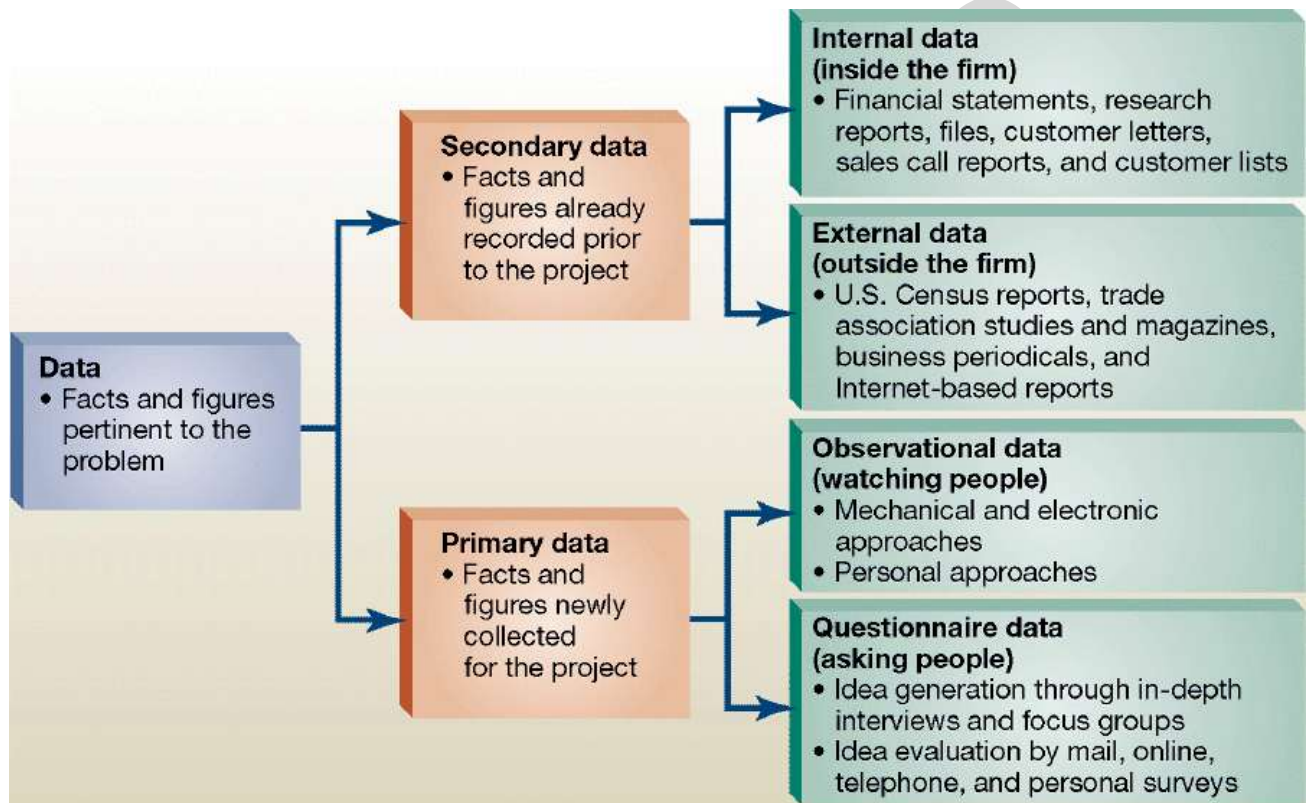




## PROCESS OF DATA COLLECTION

**Data:** - A bundle of Information or bunch of information.

**Data Collection:** Collecting Information for some relevant purpose & placed in relation to each other.



**Collection of Data:** - It means the methods that are to be employed for obtaining the required information from the units under investigations.

### Methods of Data Collection:- (Primary Data)

- Direct Personal Interviews
- By observation
- By Survey
- By questionnaires

### Preparation of Questionnaires:-

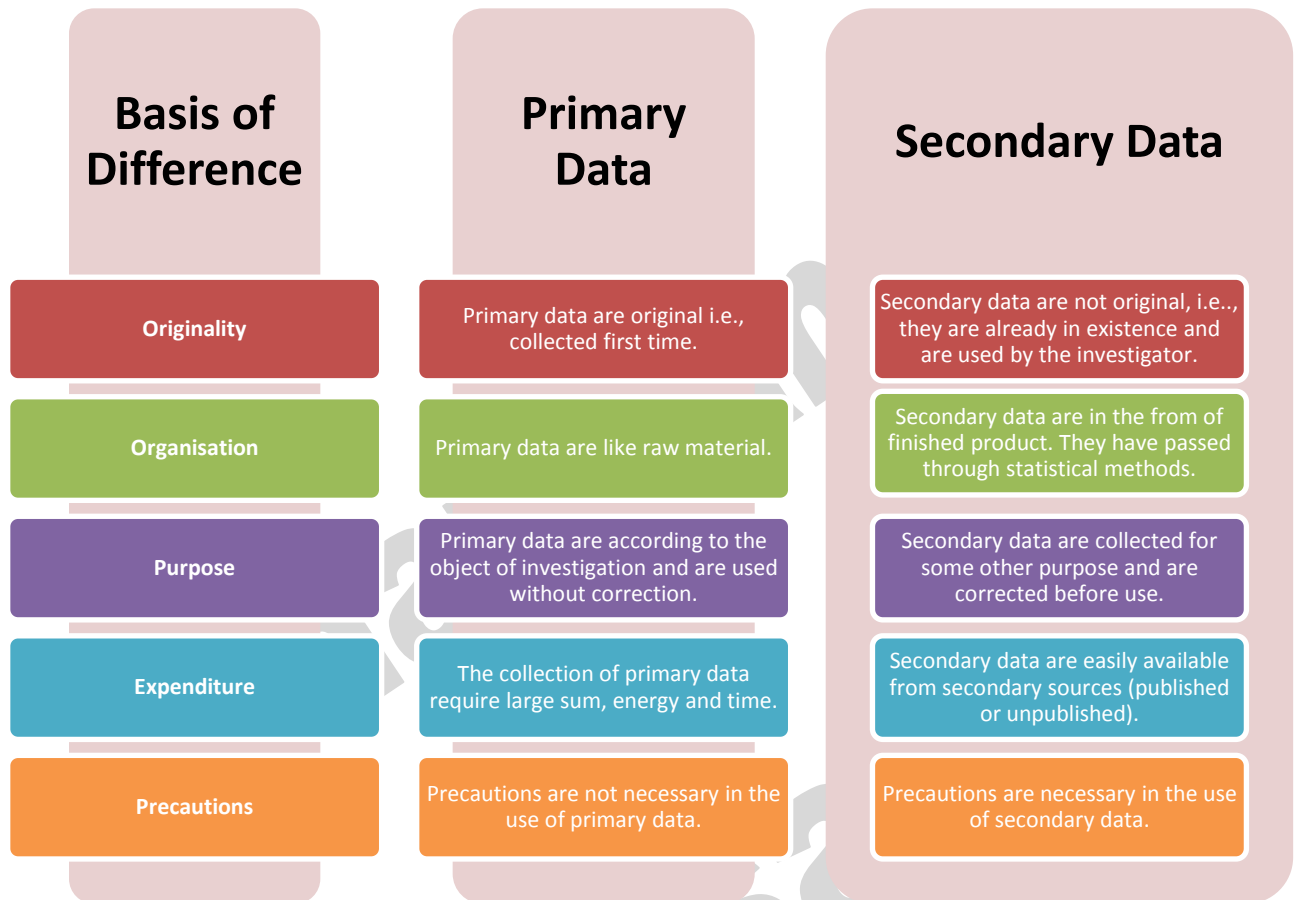
This method of data collection is quit popular, particularly in case of big enquires, it is adopted by individuals, research workers. Private and public organization and even by government also.

A questionnaires consists of number of question printed or type in a definite order on a form or set of forms. The respondents have to answer the question on their own.

### Importance:-

- i. Low cost and universal
- ii. Free from biases.
- iii. Respondents have adequate time to respond
- iv. Fairly approachable

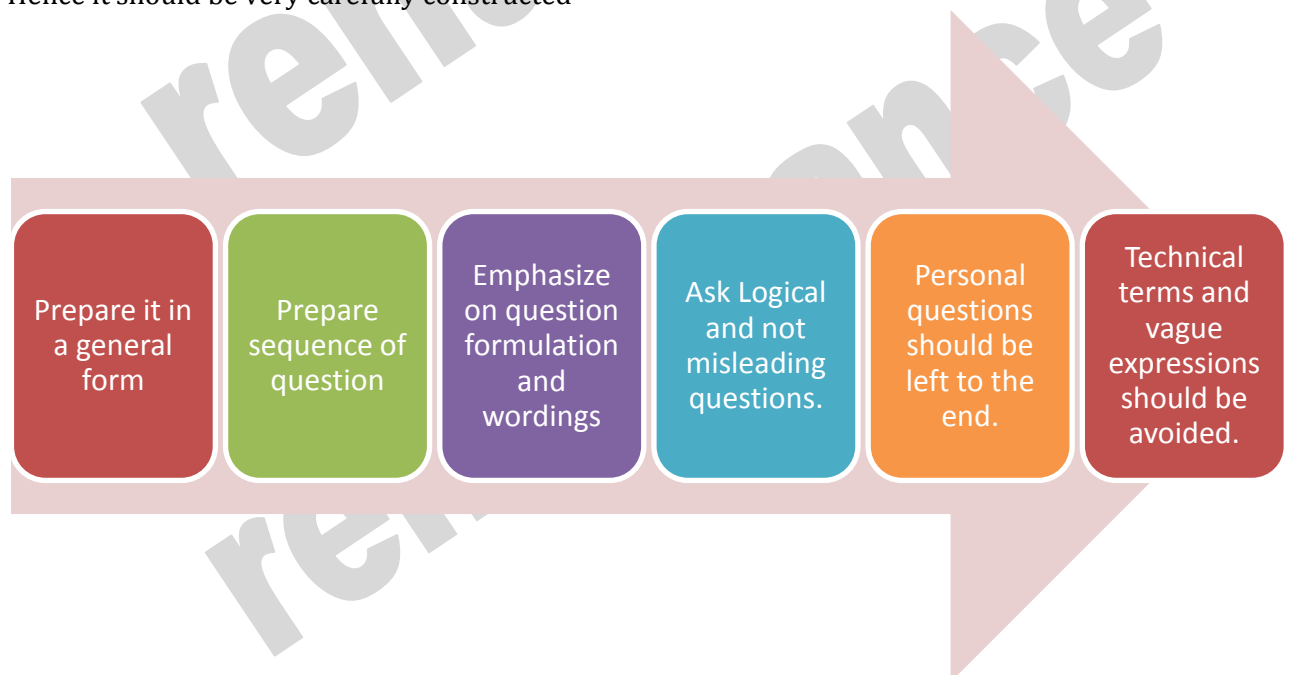




**Demerits:-**

- (i) Low rate of return
- (ii) Fill on educated respondents
- (iii) Slowest method of Response

**Steps in construction of a questionnaire :** It is considered as the heart of a survey operation. Hence it should be very carefully constructed





Example :



Classification & Tabulation of Data

After collecting and editing of data an important step towards processing that classification. It is grouping of related facts into different classes.

Types of classification:-

- i. **Geographical:-** On the basis of location difference between the various items. E.g. Sugar Cave, wheat, rice, for various states.
- ii. **Chronological:-** On the basis of time e.g.-

Year	Sales
1997	1,84,408
1998	1,84,400
1999	1,05,000

- iii. **Qualitative classification:** - Data classified on the basis of some attribute or quality such as, color of hair, literacy, religion etc.
- iv. **Quantitative Classification:** - When data is quantify on some units like height, weight, income, sales etc.

Tabulation of Data

A table is a systematic arrangement of statistical data in columns and Rows.

Part of Table:-

1. Table number
2. Title of the Table
3. Caption
4. Stub
5. Body of the table
6. Head note
7. Foot Note

Types of Table:-

(i) Simple and Complex Table:-

(a) Simple or one-way table:-



Age	No. of Employees
25	10
30	7
35	12
40	9
45	6

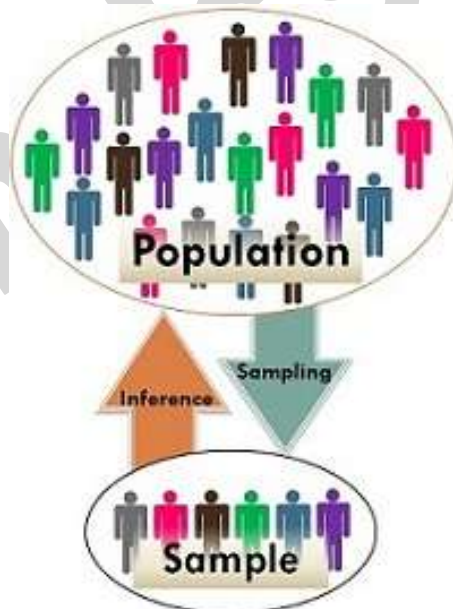
(b) Two way Table

Age	Males	Females	Total
25	25	15	40
30	20	25	45
35	24	20	44
40	18	10	28
45	10	8	18
<b>Total</b>	<b>97</b>	<b>78</b>	<b>175</b>

**2) General Purpose and Specific Purpose Table:-** General purpose table, also known as the reference table or repository tables, which provides information for general use or reference. Special purpose are also known as summary or analytical tables which provides information for one particular discussion or specific purpose.

**METHODS OF SAMPLING**

**Meaning:** - The process of obtaining a sample and its subsequent analysis and interpretation is known as sampling and the process of obtaining the sample if the first stage of sampling.



The various methods of sampling can broadly be divided into:

- i. Random sampling method
- ii. Non Random sampling method

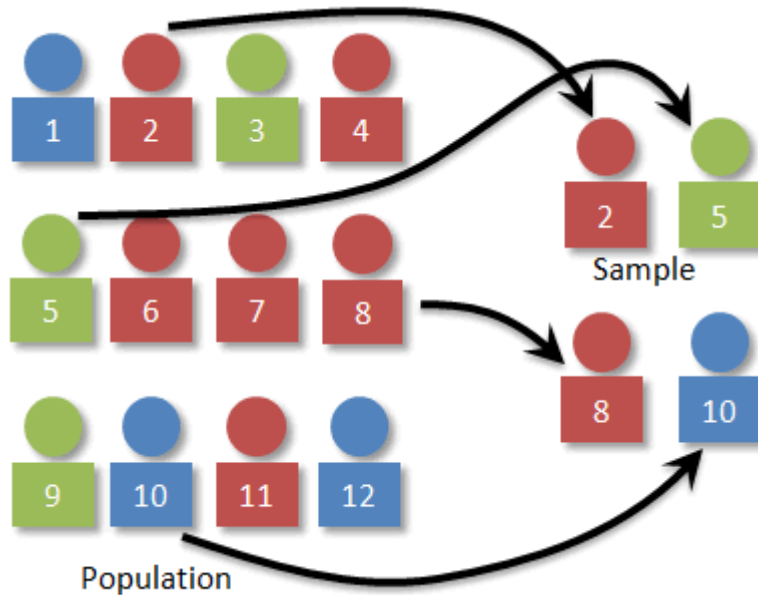
**Random Sampling Method**





**I Simple Random Sampling:** - In this method each and every item of the population is given an equal chance of being included in the sample.

(a) Lottery Method (b) Table of Random Numbers



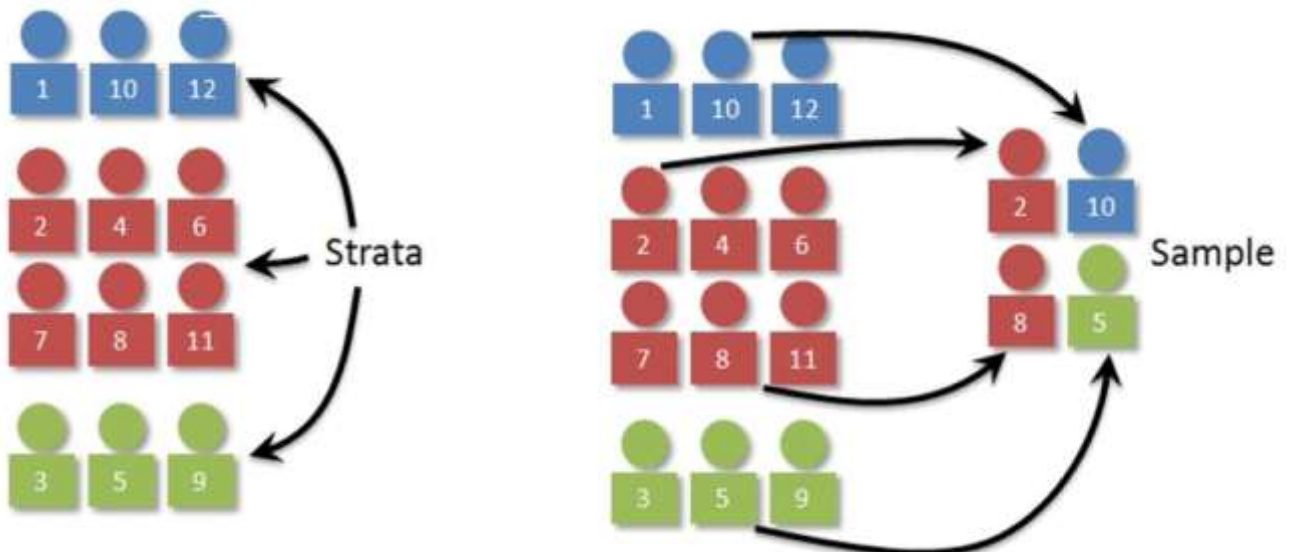
**Merits:**

- Equal opportunity to each item.
- Better way of judgment
- Easy analysis and accuracy

**Limitations:**

- Different in investigation
- Expensive and time consuming
- For filed survey it is not good

**II Stratified Sampling:-** In this it is important to divided the population into homogeneous group called strata. Then a sample may be taken from each group by simple random method.



**Merit:-** More representative sample is used.

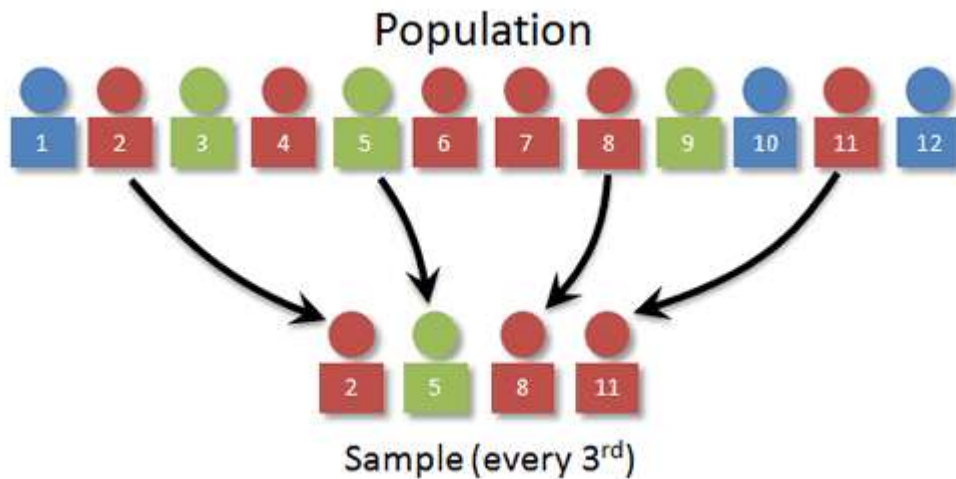


Grater accuracy

Geographically Concentrated

**Limitations:** Utmost care must be exercised due to homogeneous group deviation. In the absence of skilled supervisor sample selection will be difficult.

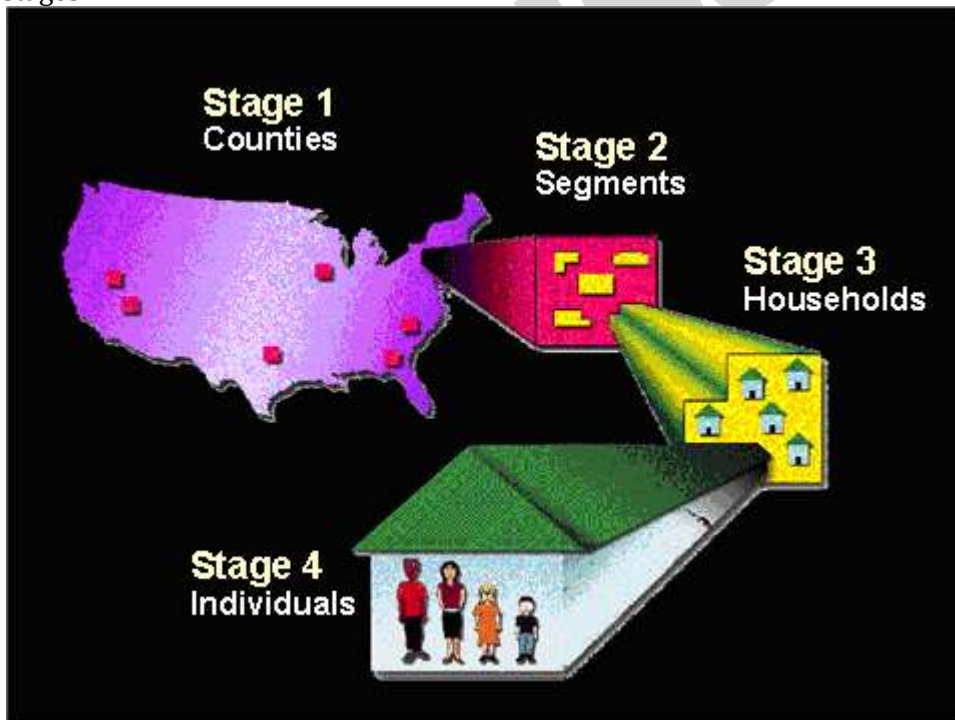
**III Systematic Sampling:-** This method is popularly used in those cases where a complete list of the population from which sampling is to be drawn is available. The method is to be select k th item from the list where k refers to the sampling interval.



**Merits:** - It can be more convenient.

**Limitation:** - Can be Biased.

**IV Multi- Stage Sampling:** - This method refers to a sampling procedure which is carried out in several stages.



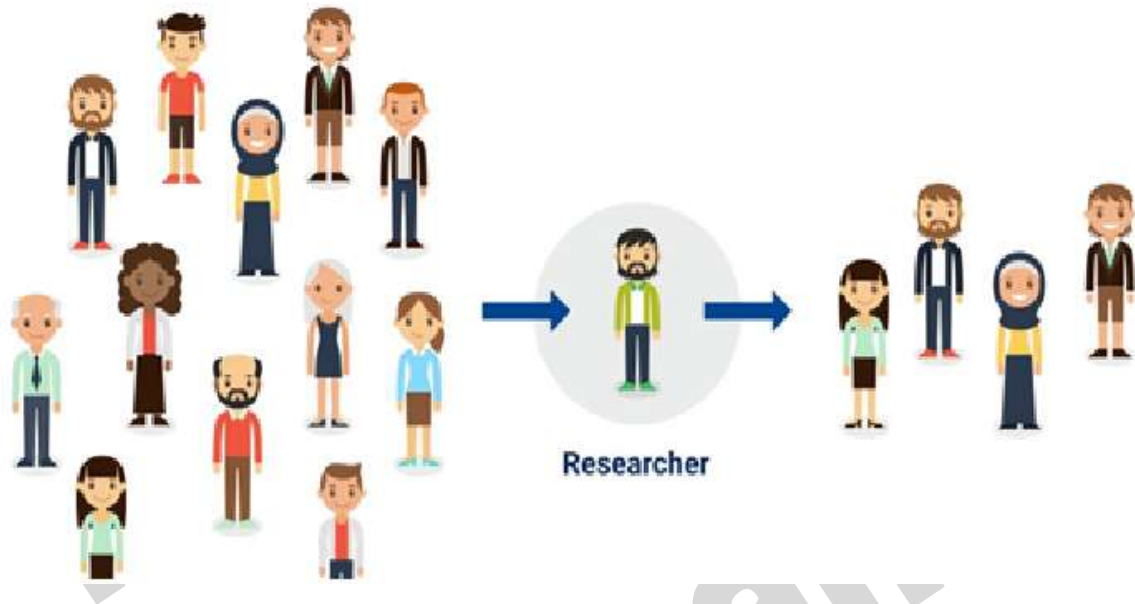
**Merit:** - It gives flexibility in Sampling

**Limitation:** - It is difficult and less accurate

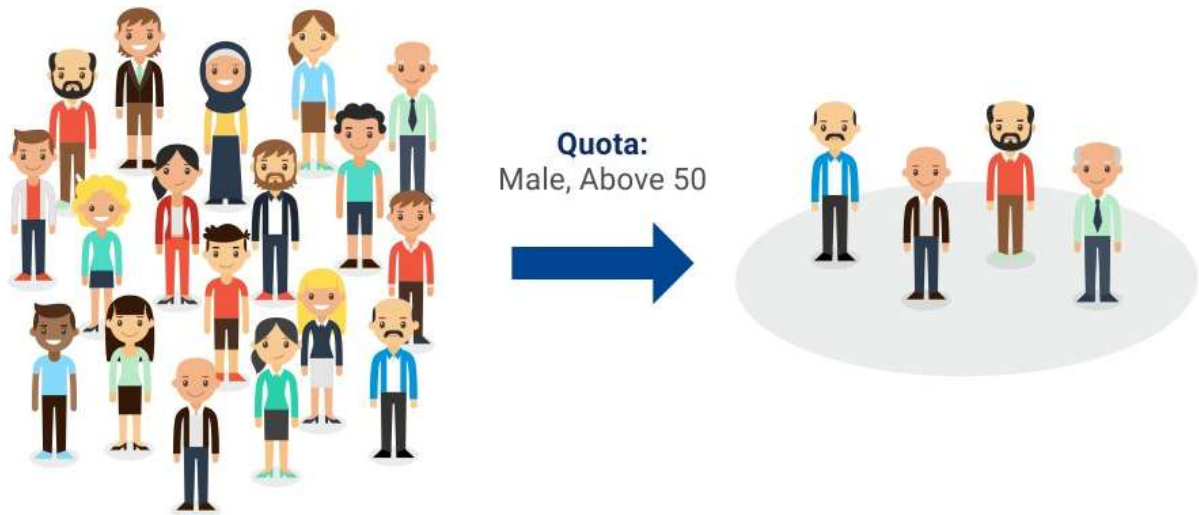


### Non Random Sampling Method:-

I. **Judgment Sampling:** - The choice of sample items depends exclusively on the judgment of the investigator or the investigator exercises his judgement in the choice of sample items. This is an simple method of sampling.



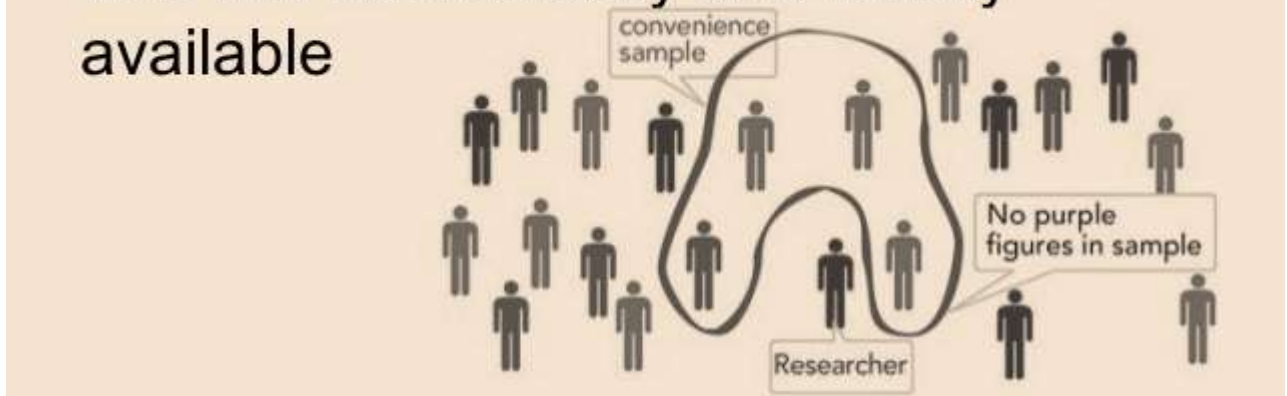
II. **Quota Sampling:** - Quotas are set up according to given criteria, but, within the quotas the selection of sample items depends on personal judgment.



III. **Convenience Sampling:** - It is also known as chunk. A chunk is a fraction of one population taken for investigation because of its convenient availability. That is why a chunk is selected neither by probability nor by judgment but by convenience.



select any members of the population who are conveniently and readily available



**Size of Sample:-** It depends upon the following things:-

Cost aspects.

The degree of accuracy desired.

Time, etc.

Normally it is 5% or 10% of the total population.

**Limitation of overall sampling Method:-**

Some time result may be inaccurate and misleading due to wrong sampling.

Its always needs superiors and experts to analyze the sample.

It may not give information about the overall defects. In production or any study.

It Becomes Biased due to following reason:-

(a) Faulty process of selection

(b) Faulty work during the collection of information

(c) Faulty methods of analysis etc.





## UNIT-II MEASURES OF CENTRAL TENDENCY

The point around which the observations concentrate in general in the central part of the data is called central value of the data and the tendency of the observations to concentrate around a central point is known as Central Tendency.

### Objects of Statistical Average:

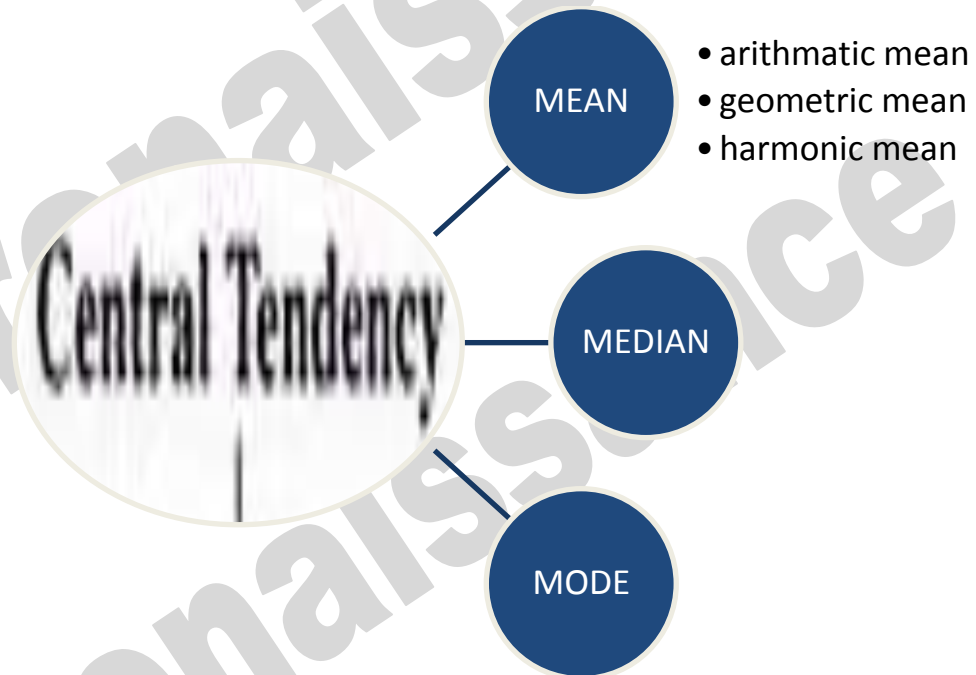
- To get a single value that describes the characteristics of the entire group
- To facilitate comparison

### Functions of Statistical Average:

- Gives information about the whole group
- Becomes the basis of future planning and actions
- Provides a basis for analysis
- Traces mathematical relationships
- Helps in decision making

### Requisites of an Ideal Average:

- Simple and rigid definition
- Easy to understand
- Simple and easy to compute
- Based on all observations
- Least affected by extreme values
- Least affected by fluctuations of sampling
- Capable of further algebraic treatment



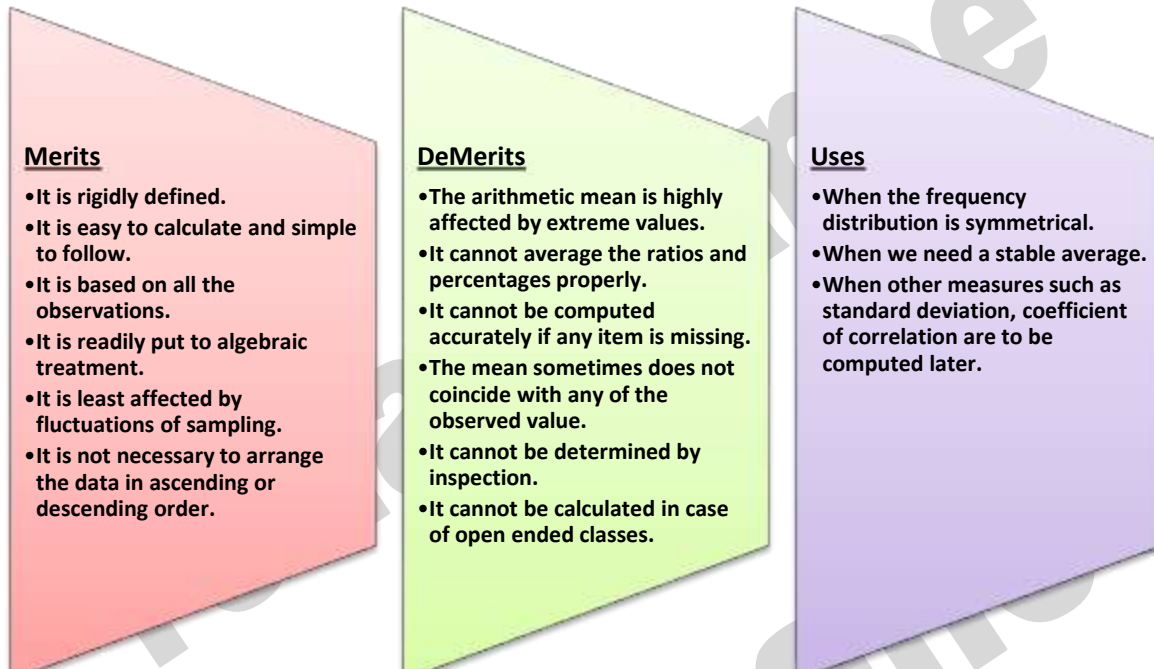
### ARITHMETIC MEAN ( $\bar{X}$ )

Arithmetic Mean of a group of observations is the quotient obtained by dividing the sum of all observations by their number. It is the most commonly used average or measure of the central



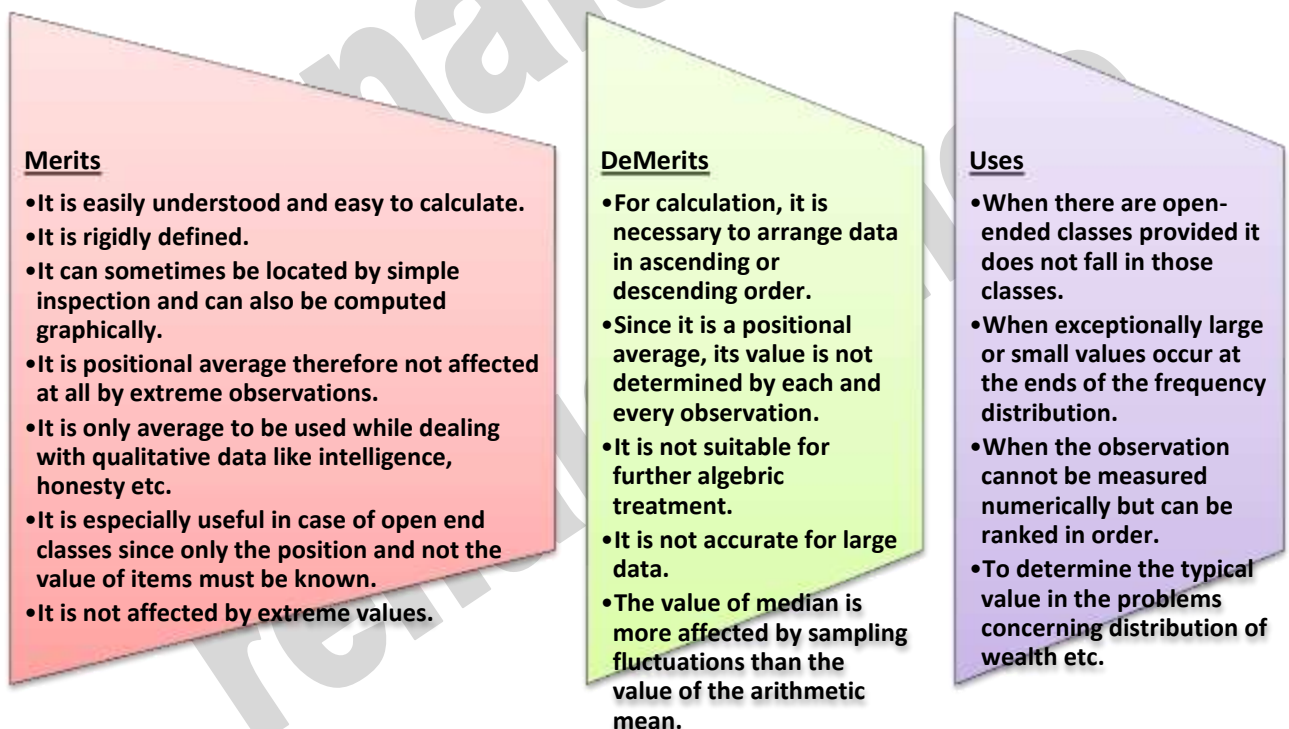


tendency applicable only in case of quantitative data. Arithmetic mean is also simply called “mean”. Arithmetic mean is denoted by  $\bar{X}$ .



### MEDIAN (M)

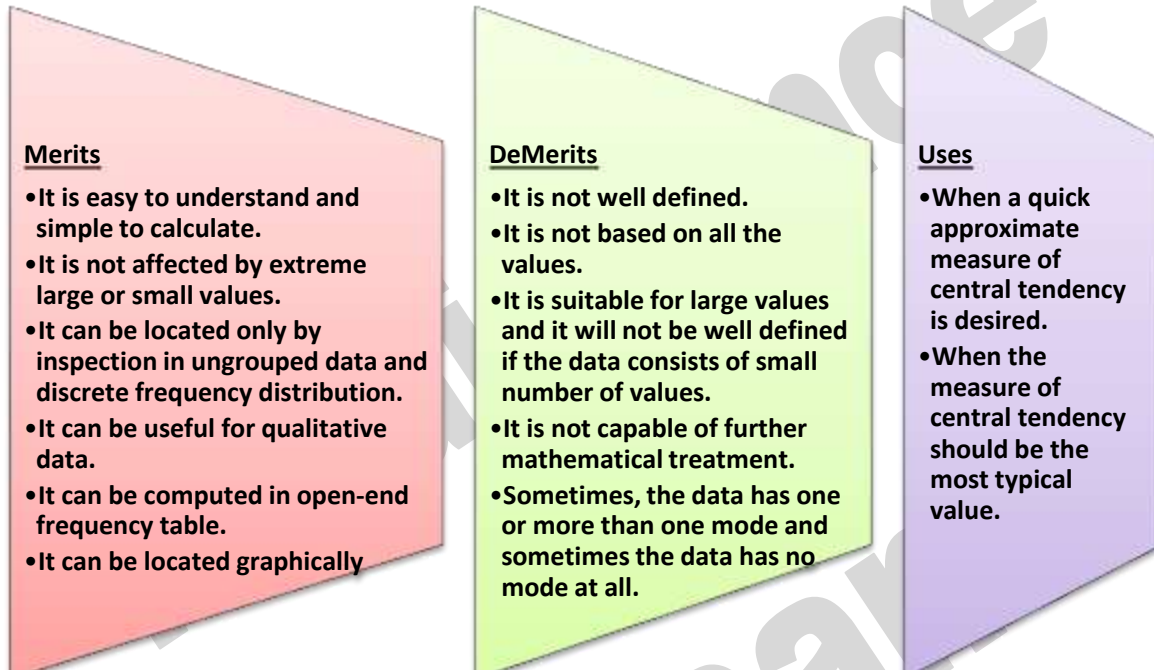
The median is that value of the variable which divides the group into two equal parts, one part comprising of all values greater and other of all values less than the median. For calculation of median the data has to be arranged in either ascending or descending order. Median is denoted by **M**.





### MODE (Z)

Mode is the value which occurs the greatest number of times in the data. The word mode has been derived from the French word '**La Mode**' which implies fashion. The Mode of a distribution is the value at the point around which the items tend to be most heavily concentrated. It may be regarded as the most typical of a series of values. Mode is denoted by **Z**.



### GEOMETRIC MEAN (G.M)

The geometric mean also called geometric average is the  $n$ th root of the product of  $n$  non-negative quantities. Geometric Mean is denoted by **G.M**.

#### Properties of Geometric Mean:

- The geometric mean is less than arithmetic mean,  $G.M < A.M$
- The product of the items remains unchanged if each item is replaced by the geometric mean.
- The geometric mean of the ratio of corresponding observations in two series is equal to the ratios their geometric means.
- The geometric mean of the products of corresponding items in two series.

#### Merits of Geometric Mean:

- It is rigidly defined and its value is a precise figure.
- It is based on all observations.
- It is capable of further algebraic treatment.
- It is not much affected by fluctuation of sampling.
- It is not affected by extreme values.

#### Demerits of Geometric Mean:

- It cannot be calculated if any of the observation is zero or negative.
- Its calculation is rather difficult.
- It is not easy to understand.
- It may not coincide with any of the observations.

#### Uses of Geometric Mean:

- Geometric Mean is appropriate when:



- Large observations are to be given less weight.
- We find the relative changes such as the average rate of population growth, the average rate of interest etc.
- Where some of the observations are too small and/or too large.
- Also used for construction of Index Numbers.

### **HARMONIC MEAN (H.M)**

Harmonic mean is another measure of central tendency. Harmonic mean is also useful for quantitative data. Harmonic mean is quotient of "number of the given values" and "sum of the reciprocals of the given values". It is denoted by **H.M.**

### **Merits of Harmonic Mean:**

- It is based on all observations.
- It is not much affected by the fluctuation of sampling.
- It is capable of algebraic treatment.
- It is an appropriate average for averaging ratios and rates.
- It does not give much weight to the large items and gives greater importance to small items.

### **Demerits of Harmonic Mean:**

- Its calculation is difficult.
- It gives high weight-age to the small items.
- It cannot be calculated if any one of the items is zero.
- It is usually a value which does not exist in the given data.

### **Uses of Harmonic Mean:**

- Harmonic mean is better in computation of average speed, average price etc. under certain conditions.



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