Introduction:

While studying any phenomenon we come come across two types of characteristics:
i) constant (ii) variable.

The characteristic which does not change its value (or nature) is considered as constant
eg: Height of person after 25 years of age, altitude of a certain place from sealevel etc.

on other hand there are many characteristics which are qualitative or quantitative in nature and change their values (or nature)
eg: Examination result of a candidate can be recorded as pass or fail which is qualitative variable characteristics. whereas we can express a candidate's performance as % of marks which is quantitative variable

Attributes & Variables:-

Attribute:-

A qualitative characteristic like sex, nationality, religion, grade in exam, blood group, beauty, defectiveness of an article produced by machine is called as attribute.

Attributes are measured using nomial & ordinal scale.

Nominal Scale:-

It consists of two or more named categories into which the objects are classified.

eg:- i) classification of individuals using blood group.
ii) classification of students in various divisions of the

same standard.
c) classification of individuals according to caste, nationality etc.
d) House no, survey no., pincode nos are also examples of nomial scale.

Ordinal scale :—

Ordinal scale of measurement gives numbers to groups of objects using some quantifiable characteristics. so ordered arrangement of groups is possible

eg :) i) Group of individuals according to income such as poor, middle class, rich
ii) Group of students according to grades in exam such as fail, second class, first class, F.C with distiction.
iii) Group using weight such as light, heavy
iv) —11— height such as short, medium, tall.
Simly group of individuals as dull or intelligent, group of objects as soft or hard. etc are all situations where ordinary scale can be used.

variable :—

A quantitave characteristic (which changes its value) like weight of person, examination marks, population of country, profit of salesman is called as variable

variables are measured using interval scale and ratio scale.

Interval scale:

of measurement has equal units of measurement however zero point is arbitrary.

The classic example of interval scale in our day to day life is centigrade or Farenheight scale of temp. measurement In both case zero is arbitrary. it does not mean absense of heat. Moreover 60°c does not contain exactly double the heat that 30°c has. However difference in the temp. betn 10°c to 20°c is same as that betn 50°c to 60°c (or that betn similar pair)

Ratio scale:

It has equal units of measurement and those are taken from true zero.

eg.- All measurements of type height (cm) weight (kg), time (hrs) etc

In this scale 60 kg weight is exactly double heavy as compared to 30 kg. weight.

Further variables can be divided into two categories.

i) discrete (ii) continuous.

Discrete variable:-

A variable taking only particular values is called as D.V

eg: no of students in class, no of articles produced by m/c, no of worker in factory etc.

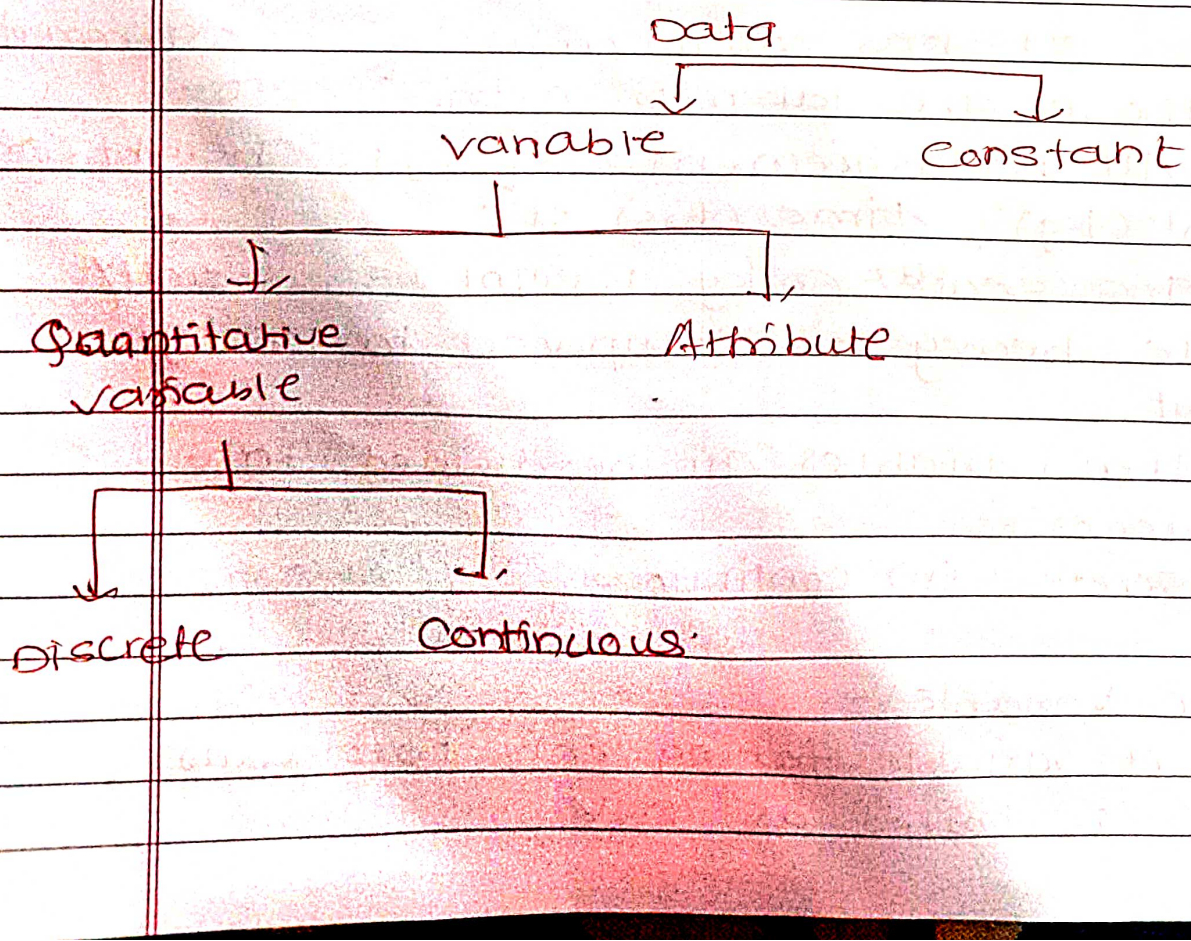
Continuous variable:-

A variable taking all possible values in a certain range is called as C.V.

eg: weight of person, length of screw produced by m/c, temp at certain place etc.

It is observed that many continuous variable such as marks, income, weight looks like

In the following diagram summarizes various types of data



* Collection & organisation of data:

Collection of data is very important work & needs to be done carefully. One has to decide the objectives clearly before collecting data. In order to ~~depend~~ determine dependable & reliable results, proper data should be collected in proper way. The data according to the method of collection are of two types viz (a) Primary data (b) Secondary data.

Apart from the method of collection the type of data according its nature are also in existence viz time series data, cross-sectional data.

a] Primary data:

Primary data means original data (ie facts & figures) obtained by investigator himself. Primary data may be a result of a survey or enquiry conducted. This may be regarded as first hand information. Primary data are also called as raw data. No doubt, primary data are more reliable than any other type but are expensive & time consuming.

Primary data are collected by following methods

(1) Direct personal investigation or interview.

In this method, the investigator meets concerned persons known as informants & collects necessary information by process of interview. Investigator should be thorough in handing problems of investigation. This will result into reliable data. Investigator has to go upto the source of original information. For example,

if he wants to know the amount of production in a particular industry he should collect the figures by visiting the machine floor rather than from office or bulletin.
This is the best method of collecting primary data. However investigator has to take certain precautions.

(ii) Indirect oral investigation.

(iii) Investigation thr questionnaire

(b) Secondary data :—

Data taken from sources like office records, bulletins, reports etc which are already collected by some other agency is called secondary data.

The data which are already collected may be tabulated, classified, ordered etc. Hence it is called processed or Finished ata. So secondary data can also be called Finished data.

Secondary data is relative term. For example if A collects original data then it becomes primary data for him. Whereas if the same data is used by B Then it becomes secondary data for B. In this case the only difference is that the user of secondary data may not have thorough understanding of the background as the user of primary data has.

The methods of data collection are
(i) surveys (ii) laboratory experiments
(i) simulation

* Surveys:

With the help of sample surveys or complete enumeration primary or secondary data may be collected

* Laboratory experiments:

The observations generated in lab. expts will be method of data collection.

* Simulation:

Some expts can't be conducted in lab eg: genetic expts, expt with hazardous material or radioactive material. In such cases, now a days the data are generated using simulation techniques with the help of computers. It has tremendous scope in Industry, business etc. Eg: how many counters or salesmen are required in a departmental store can be simulated using queueing theory.

The other types of Data:

a) Time series data

The data arranged in the chronological order (as per the order of occurance) are called as time series data.

eg (i) Daily sales of departmental store
(ii) Daily electricity consumption of a town
(iii) Prime of gold recorded daily.

b) Cross seetional data:

The values of variables observed

at a particular time at several places or on several objects are called cross sectional data.

eg :-

i) Sales on a specific day of several departmental store is cross sectional data

ii) Electricity consumption on specific data for several towns constitutes cross sectional data.

* Population and sample:-

In order to study a group of large number of items we require to draw sample. We use technique of sampling several times in everyday life.

eg :- While purchasing food grains we inspect only handful of grains & draw conclusion about whole sack. While examining blood of an individual few drops are enough for diagnosis. Quality of milk is tested with the help of small quantity of milk taken out of can.

Sampling is well accepted means of collecting information. Moreover it is believed to be scientific & objective procedure of selecting items. Sampling plays an imp. role in statistical inference.

Population :-

In the technical language of statistics the word population is used in somewhat wider sense. It does not mean only human

Population eg:

I) In the study of industrial development, all the industries under consideration is population

II) In the study of socio-economic conditions of particular village, all families or houses in village will be population

III) In the study of agricultural yield, all the cultivated farms together will be population

~~IV~~ Thus population may be group of employees, collection of books, total industrial production, a group of persons suffering from particular disease, collection of explosives, group of students etc.

* Specific defⁿ of population & sample :-

Defⁿ :- An aggregate of objects or individuals under study is called population or universe

Population may be contain finite or infinite elements. Accordingly it is called as finite or infinite population.

Defⁿ :- Any part of population understudy is called sample.

As the sampling methods are used to study population, the samples should be chosen carefully. A natural requirement would be that the sample should be representative of concerned population. There are several methods of sampling in practise. ~~the that dead~~