Queens College of Arts and Science for Women, Punalkulam. Near Thanjavur, Pudukkottai (Dt)

DEPARTMENT OF BUSINESS ADMINISTRATION
TOPIC: STATISTICS (Unit-III)
SUBJECT: MATHEMATICS AND STATISTICS FOR MANAGERS
SUB CODE: 16CCBB4

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What is Statistics?

- The subject Statistics, as it seems, is not a new discipline but it is as old as the human society, itself. It has been used right from the existence of life on this earth, although the sphere of its utility was very much restricted.
- In the olden days Statistics was regarded as the ‘Science Statecraft’ and was the by-product of the administrative activity of the state. The word Statistics seems to have been derived from the Latin word ‘status’ or the Italian word ‘statista’ or the German word ‘statistik’ or the French word ‘statistique’ each of which means a political state.

Define Statistics

Perhaps the best definition seems to be one given by Croxton and Cowden, according to whom statistics may be defined as the science which deals with the collection, analysis and interpretation of numerical data.

Characteristics Statistics

- **Statistics are Aggregate of Facts:**

  Only those facts which are capable of being studied in relation to time, place or frequency can be called statistics. Individual, single or unconnected figures are not statistics because they cannot be studied in relation to each other.

- **Statistics are Affected to a marked Extent by Multiplicity, of Causes:**

  Statistical data are more related to social sciences and as such, changes are affected to a combined effect of many factors. We cannot study the effect of a particular cause on a phenomenon.

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- **Statistics are Numerically Expressed:**

  Qualitative phenomena which cannot be numerically expressed, cannot be described as statistics e.g. honesty, goodness, ability, etc. But if we assign numerical expression, it maybe described as ‘statistics’.

- **Statistics are Enumerated or estimated according to Reasonable Standards of Accuracy:**

  The standard of estimation and of accuracy differs from enquiry to enquiry or from purpose to purpose. There cannot be one standard of uniformity for all types of enquiries and for all purposes. A single student cannot be ignored while calculating I.Q. of 100 students in group whereas 10 soldiers can be easily ignored while finding out I.Q. of soldiers of whole country.

- **Statistics are Collected in a Systematic Manner:**

  In order to have reasonable standard of accuracy statistics must be collected in a very systematic manner. Any rough and haphazard method of collection will not be desirable for that may lead to improper and wrong conclusion. Accuracy will also be not definite and as such cannot be believed.

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- **Statistics for a Pre-determined Purpose:**
  The investigator must have a purpose beforehand and then should start the work of collection. Data collected without any purpose is of no use. Suppose we want to know intelligence of a section of people, we must not collect data relating to income, attitude and interest. Without having a clear idea about the purpose we will not be in a position to distinguish between necessary data and unnecessary data or relevant data and irrelevant data.
- **Statistics are Capable of being Placed in Relation to each other:**
  Statistics is a method for the purpose of comparison etc. It must be capable of being compared, otherwise, it will lose much of its value and significance. Comparison can be made only if the data are homogeneous.

Scope of Statistics

- Statistics being indispensable in the modern world has been of utmost use to the government as they are using statistics constantly researching to improve the economic development of countries.

- Statistics in the industry are widely used for equality control.
  In education also statistics are widely used because now research has become a common feature in all branches of activities and studies.

- In the field of Medical sciences too statistical tools play a very vital role, for example, it is used to test the efficiency of a new drug or medicine.

Diagrammatic Presentation of Data

- Diagrammatic Presentation of Data gives an immediate understanding of the real situation to be defined by data in comparison to the tabular presentation of data or textual representations. Diagrammatic presentation of data translates pretty effectively the highly complex ideas included in numbers into more concrete and quickly understandable form. Diagrams may be less certain but are much more efficient than tables in displaying the data.

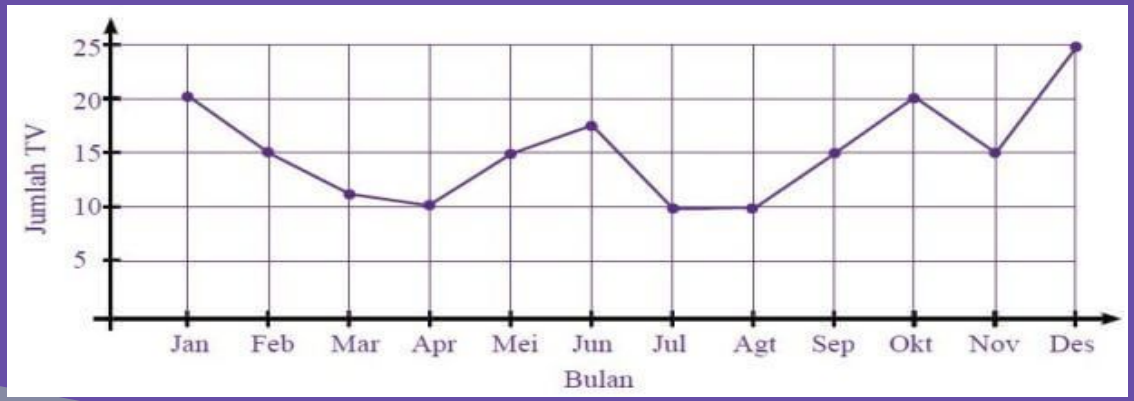
Types of Diagrams

★ Line diagram

Line diagram is a diagram mostly used to present data obtained from time to time on a regular basis with a certain distance. Generally line diagrams are often used to see the progress of something on an ongoing basis.

To draw a line diagram it takes two axes, ie the vertical axis and the flat axis. The flat axis works to show the time, and the axis is upright to show its quantity such as value, quantity, cost, income, and so forth. Next, Draw each coordinate point that shows the observed data at a given time.

Here is an example of a line diagram:



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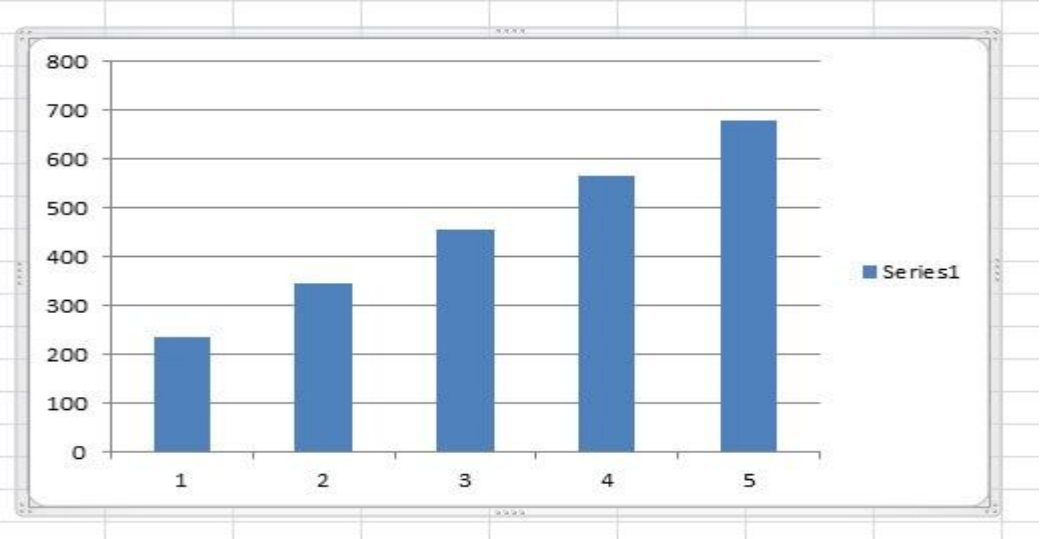
★ Bar diagram

Bar diagram is a diagram that presents data in the form of vertical rectangles or horizontal rectangles. Bar diagram is generally used to describe the development value of a research object within a certain time. The bar diagram shows descriptions with straight or horizontal bars and is the same width with separate trunks.

Here is an example of a bar diagram :



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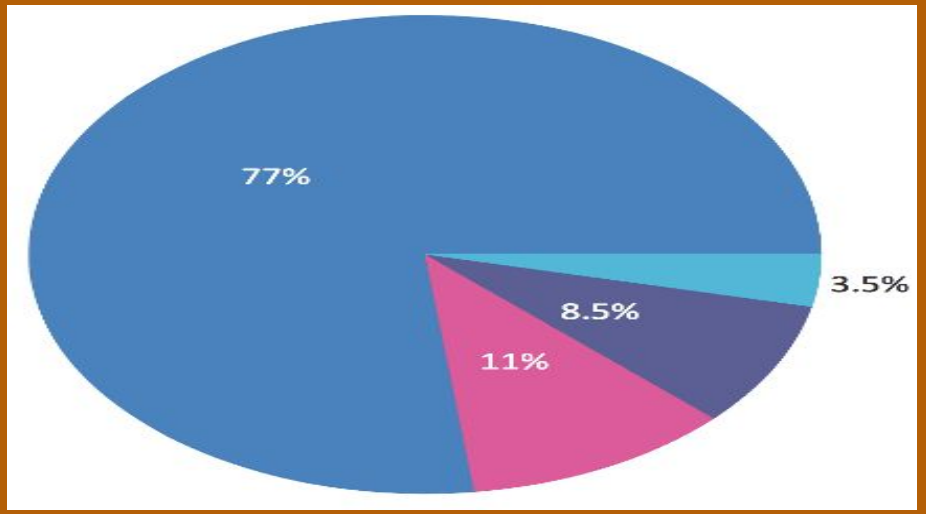
★ Pie diagram

The pie chart is a diagram to describe or represent the data as a circle image. Because of its representation as a circle then the data must form a sum and each datum (data item) can be expressed as a percent (having a certain portion between 0 to 100) against the data.

Here is an example of a pie diagram :



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★ Pictogram

The picture diagram or pictogram is a diagram where the data is presented in the form of drawings or paintings to represent objects that display many actual objects. However, the method of data presentation using pictograms has its own weaknesses such as there are pictures of people who only seem half, it is used to represent the number of students who only 10 people.

Here is an example of a pictogram :

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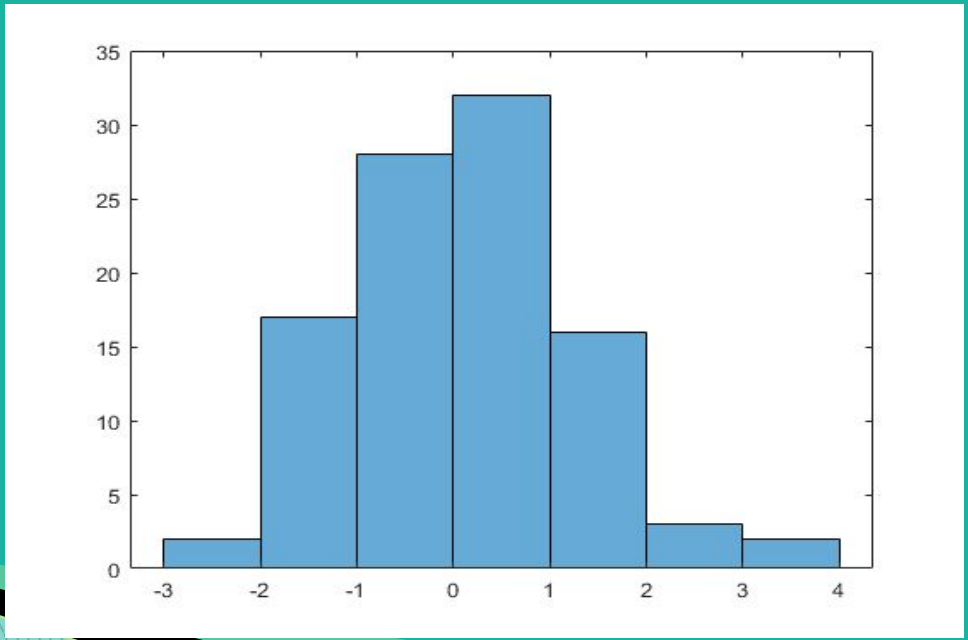
★ Histogram

The histogram is a graphical display of the frequency tabulation described in graphical bars as a binary data manifestation. Each rod display shows the proportion of frequencies in each category deet that coexists with non-overlapping intervals.

A histogram is a block beam showing one kind of measurement of a process or event. This graph is very suitable for the data in the grouping. Histogram is a neighboring frequency diagram that looks like a bar chart. The adjacent bar should coincide.

Here is an example of a histogram :



Types of One-dimensional Diagram:

- Simple Bar Diagram
- Multiple Bar Diagram
- Sub-divided Bar Diagram
- Percentage Bar Diagram
- Broken-scale Bar Diagram
- Deviation Bar Diagram

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❖Simple Bar Diagram

Simple Bar diagram comprises of a group of rectangular bars of equal width for each class or category of data.

❖Multiple Bar Diagram

This diagram is used when we have to make a comparison between two or more variables like income and expenditure, import and export for different years, marks obtained in different subjects in different classes, etc.

❖Sub-divided Bar Diagram

This diagram is constructed by sub-dividing the bars in the ratio of various components.

❖ Percentage Bar Diagram

Sub-divided bar diagram presented on a percentage basis is known as Percentage Bar Diagram.

❖Broken-scale Bar Diagram

This diagram is used when the value of one observation is very high as compared to the others.

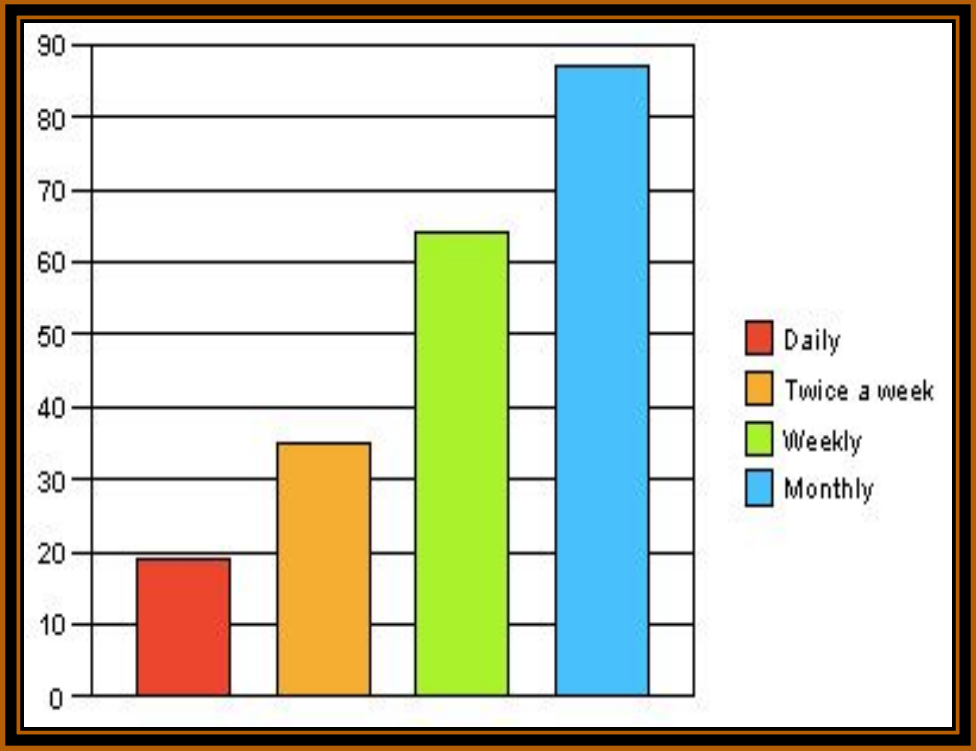
In order to gain space for the smaller bars of the series, the largest bars may be broken.

The value of each bar is written at the top of the bar.

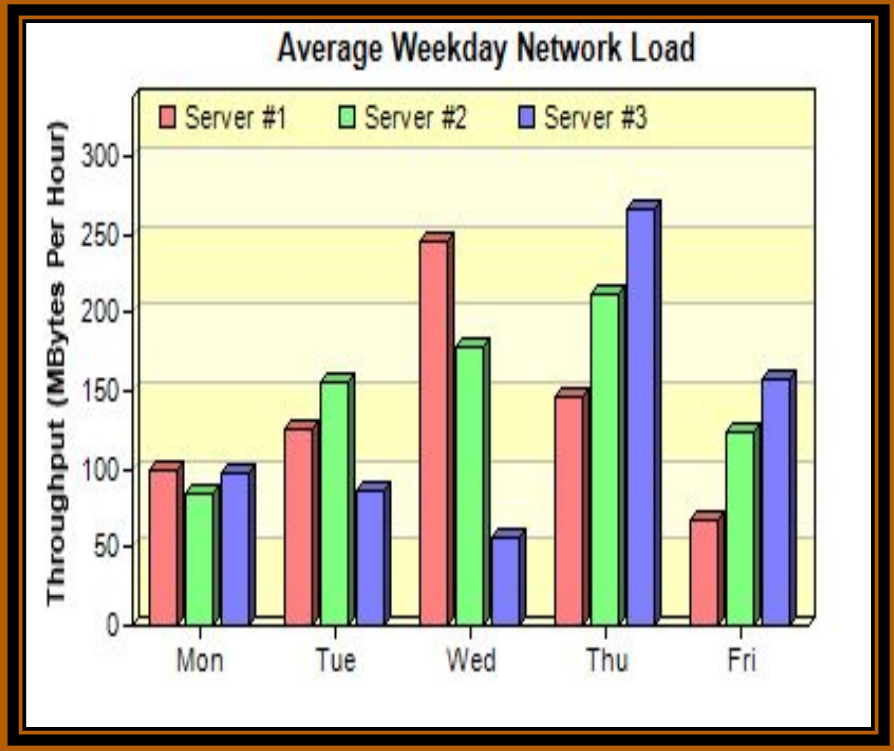
❖ Deviation Bar Diagram

Deviation bars are used for representing net changes in data like Net Profit, Net Loss, Net Exports, Net Imports, etc.

1.Simple Bar Diagram Example



2.Multiple Bar Diagram Example



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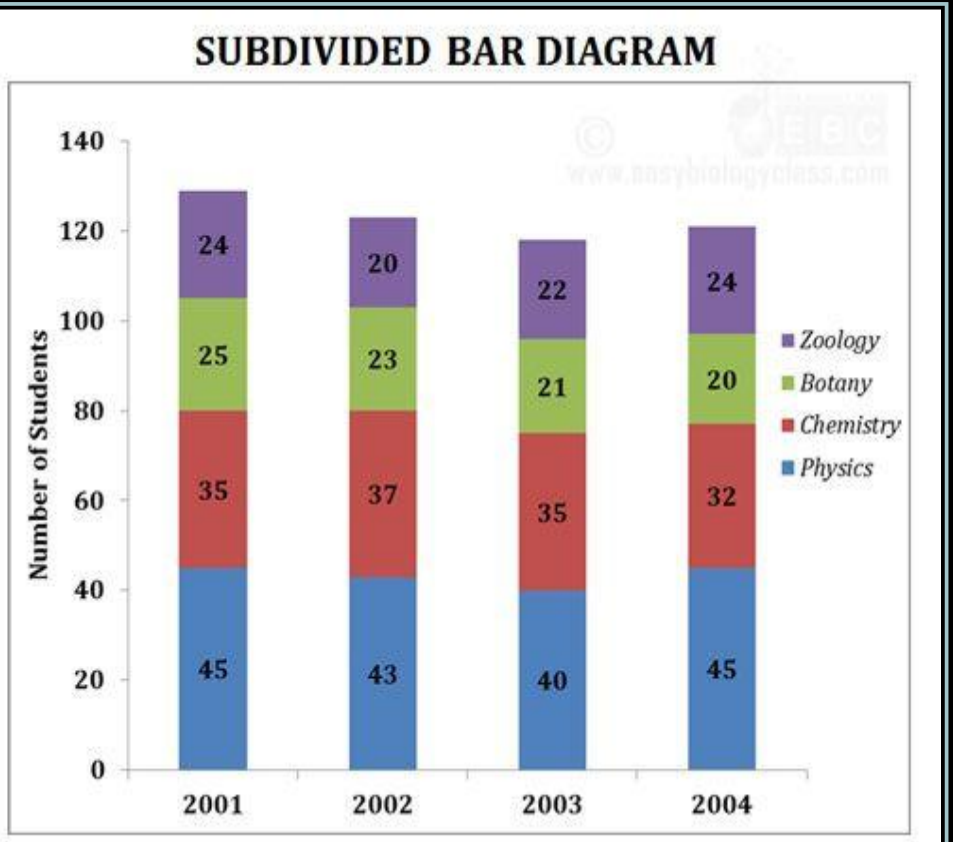
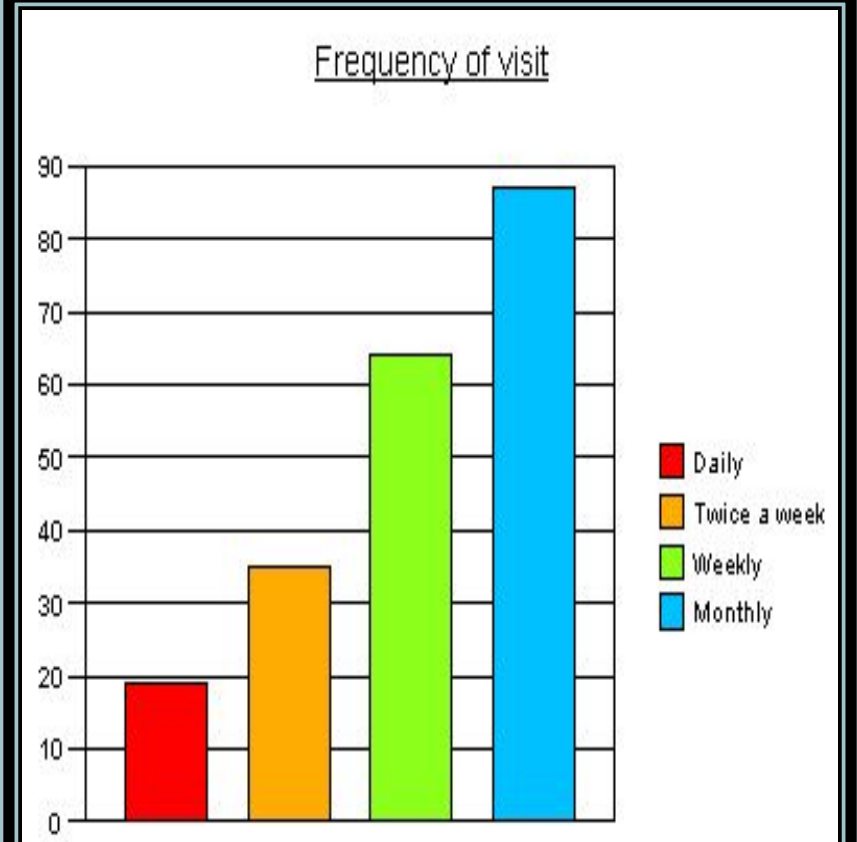
3.Sub-divided Bar Diagram Example



4.Percentage Bar Diagram Example



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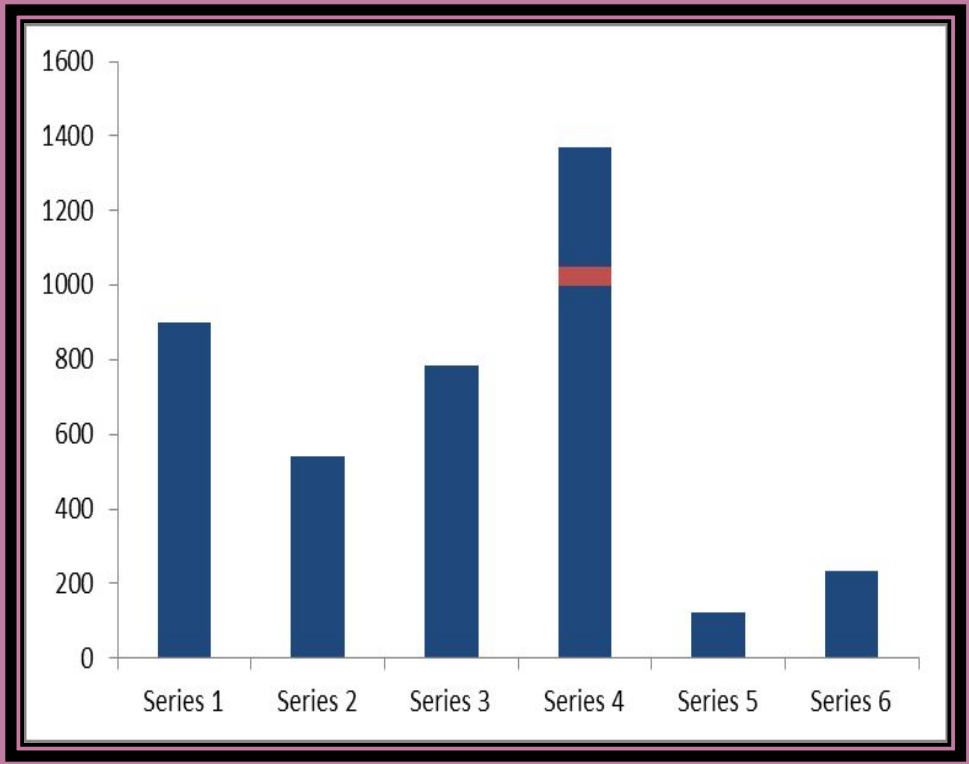
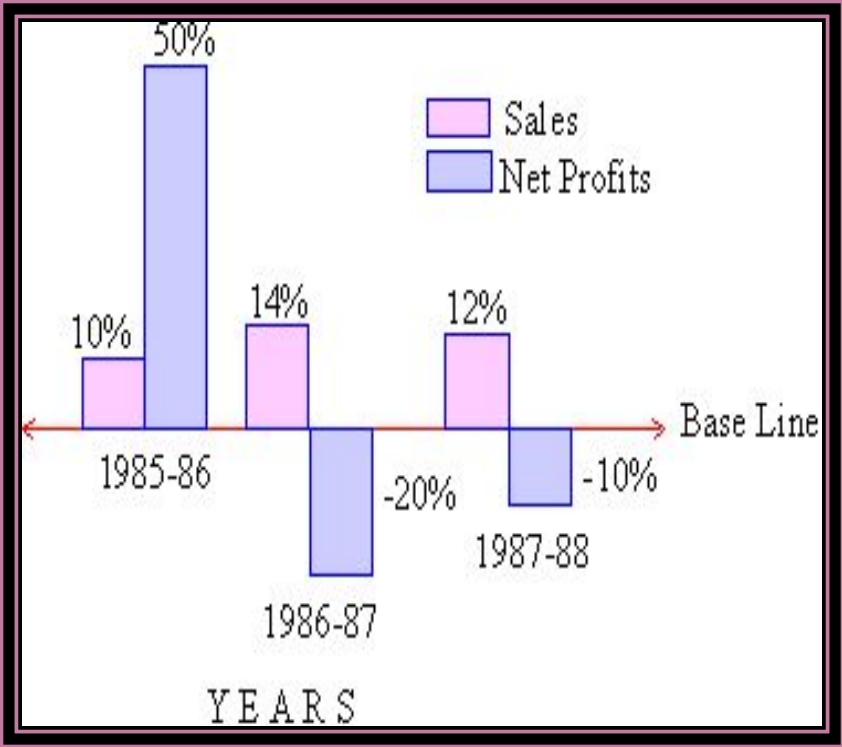
5.Broken-scale Bar Diagram
Example



6.Deviation Bar Diagram
Example



What is Graphic Representation

Graphic representation is another way of analysing numerical data. A graph is a sort of chart through which statistical data are represented in the form of lines or curves drawn across the coordinated points plotted on its surface.

Types of graphical representation

- Line Graphs.
- Bar Graphs.
- Histograms.
- Line Plots.
- Frequency Table.
- Circle Graph, etc.

THANK YOU