Presentation of Data

After the data have been collected, the next step is to present them in some suitable form. Presentation can take two basic forms (i) statistical Table, and (ii) statistical chart.

However, before tabulating data it is often necessary to first classify them.

Classification of data:

After collection and editing of data an important step towards processing the data is classification. Classification is the grouping of related facts into different classes

Types of classification:

Broadly, the data can be classified on the following four basis:

(i) Geographical, i.e., area-wise, e.g., cities, districts etc
(ii) Chronological, i.e., on the basis of time
(iii) Qualitative, i.e., according to some attributes,
(iv) Quantitative, i.e., in terms of magnitudes.

Geographical classification: In geographical classification data are classified on the basis of geographical or locational differences between the various items. For example when we present the production of sugar cane, wheat rice etc., for various states, this would be calle geographic classification.

Chronological classification :

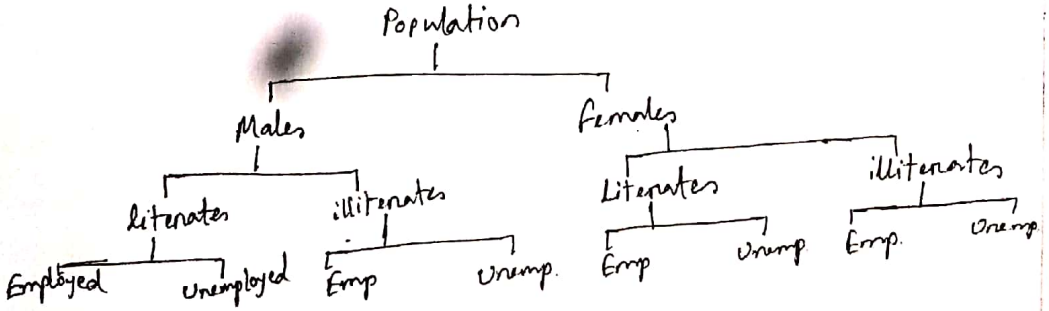
When data are observed over a period of time, the type of classification is known as chronological classification.

For example, the sales figures of a company are given below :

Year	Sales (Rs. lakhs)	Year	Sales (Rs. lakhs)
1998-99	18810	2003-04	46725
1999-00	23601	2004-05	45724
2000-01	23816	2005-06	50117
2001-02	32435	2006-07	53900
2002-03	39343	2007-08	61795

Qualitative classification :

In qualitative classification data are classified on the basis of some attributes or quality such as sex, color of hair, religion etc.



Quantitative classification :

Quantitative classification refers to the classification of data according to some characteristics that can be measured, such as height, weight, income, sales etc.

For example, the workers of a factory may be classified according to wages as follows :

Monthly Wages (Rs.)	No. of Workers
4000 – 4500	50
4500 – 5000	200
5000 – 5500	260
5500 – 6000	360
6000 – 6500	90
6500 – 7000	40
	total 1,000

Frequency distribution table :

A table which shows the frequency of occurrence of each of the values of a variable under consideration and which gives a numerical picture of the variable is known as a frequency table or frequency distribution table.

No. of children	No. of families.
0	10
1	400
2	800
3	700
4	250
5	150
6	50
	Total 2360

(a) Discrete frequency distribution

Age (years)	No. of Employees
20 - 25	10
25 - 30	15
30 - 35	40
35 - 40	45
40 - 45	26
45 - 50	4
	Total 140

(b) Continuous frequency distribution

Graphical Representation of Data :

One picture is worth ten thousand words. Charts, graphs or diagrams are more effective in attaining attention than is any of the other methods of representing the data. A simple, attractive, well-constructed graph, showing important facts more clearly is easier to understand than a table. Furthermore it emphasises important statistical relationships and to illustrate statistical distribution of a tabulated data. A graph helps us to grasp and understand the

data more rapidly sometimes at a glance. A statistical table is often inferior to a good chart or graph for conveying to the reader an immediate and clear impression of its content no matter how much informative and well designed it is.

Pictograms:

Statistical charts consisting of pictures are called pictograms or pictographs.

Scatter diagram:

Statistical diagrams consisting of dots (: showing the nature of association between two variables are called scatter or dot diagram

The most common forms of graphs and diagra are the bar diagram, pie chart, histogram, line diagram, scatter diagram - frequency polygon and ogive. Bar diagrams and pie charts are usually constructed for categorical data and the remaining graphs and diagrams are constructed for data measured in t interval scale.

Bar diagram

There are three types of bar diagrams and these are as follows.

1. simple Bar diagram
2. Component Bar diagram and
3. Multiple Bar diagram.

simple Bar diagram

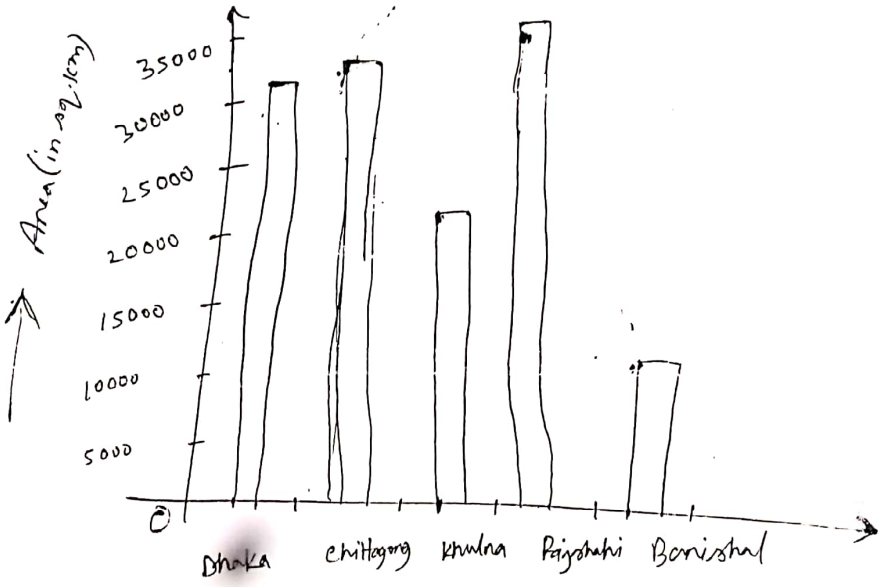
This is a simple type of bar diagram and this type of bar diagram is usually drawn for a qualitative variable. This diagram is used to represent only one variable. The vertical axis represents the frequency and the horizontal base represents the time or categories of the qualitative variable under consideration.

Construction of simple bar diagram:

To construct this type of bar diagram two axes are drawn on a graph paper. The frequency, count or number is represented by Y-axis and the categories of the qualitative variable or time is represented by X-axis. Vertical rectangles or bars are drawn such that the lengths or heights of the bars are proportional to the frequencies or counts. The width of each bar is equal and a space of equal width is kept in between the bars.

Example: Region-wise Area of Bangladesh (in sq. km)

Region	Area
Dhaka	31119
Chittagong	33771
Khulna	22274
Rajshahi	34513
Barishal	13297

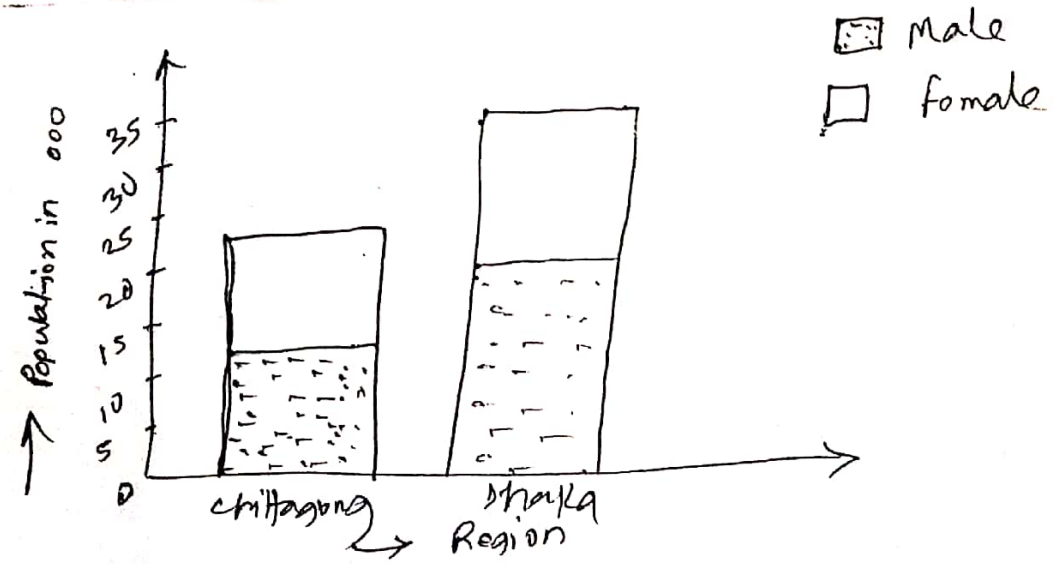


Component Bar diagram:

Component bar diagram is a good device to display categorical data. In such a diagram, the total values as well as the various components constituting the total are shown. The bar is subdivided into as many parts as there are components. Because of this, the diagram is also known as sub-divided bars. The component parts are variously colored or shaded to make them distinct. Instead of using absolute values one can use also percentage values to construct the component bar diagram.

Example: The 1991 census population of chittagong and Dhaka divisions by sex are given below

Region	Population in '000		Percent of population	
	Male	Female	Male	Female
chittagong	11228	10637	51.3	48.7
Dhaka	17634	16306	52.0	48.0



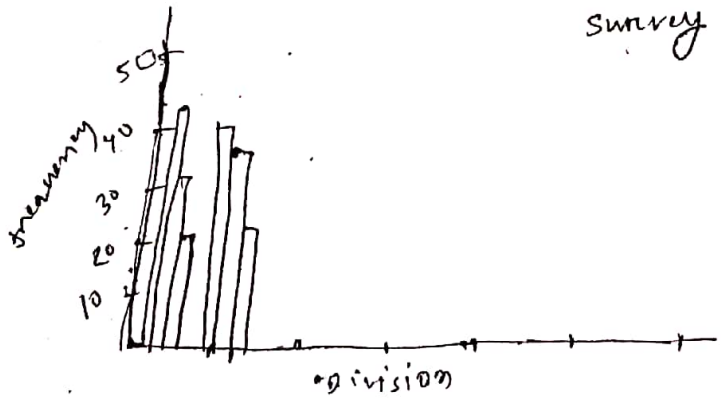
Multiple Bar diagram:

Multiple bar diagram is usually drawn when it is desired to compare different phenomena relating to the same period of time. In a multiple bar diagram two or more simple bars are drawn for each category side by side without having any gap and each of them is designed or coloured differently to make them distinct.

Example: Education level of female population of Bangladesh by administrative division

Division	Percent of females with		
	NO education	Primary education	secondary education
Barisal	43.9	34.4	21.7
Chittagong	41.8	37.0	21.2
Dhaka	45.9	35.3	18.8
Khulna	39.6	41.2	19.2
Rajshahi	48.5	37.8	13.7
Sylhet	52.6	36.1	11.3

Source: Bangladesh Demographic and Health survey: 1996-97



Example 2.6:

Data on production of different pulses (in '000 tons) in Bangladesh during the years from 1991-92 to 1994-95 and the corresponding multiple bar diagram are shown below :

Yield of Pulses (000 tons)

Pulses	Year			
	1991-92	1992-93	1993-94	1994-95
Kheshari	185	172	188	189
Moshur	153	163	168	168
Mug & Mashkalai	82	82	82	85

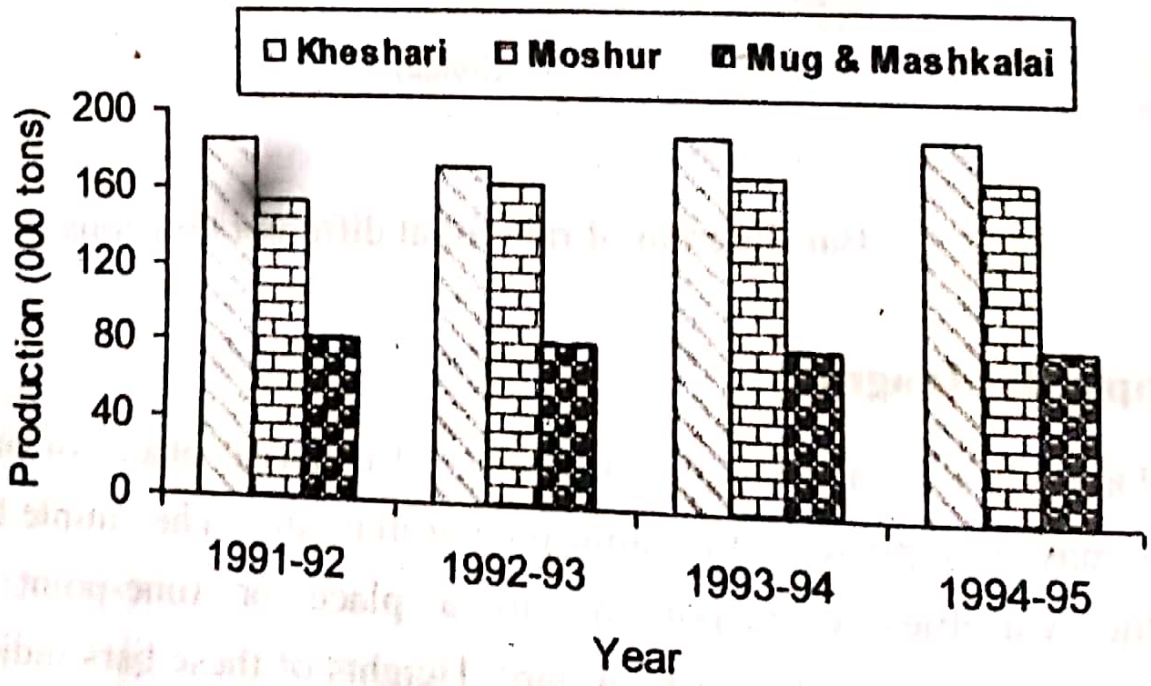


Fig. 2.6: Multiple bar diagram of pulses production.

Pie chart

The pie charts or pie diagrams are useful when the relationship of parts to the whole is of our interest, like the component bar diagram. However, there is one important difference. In the case of component bar diagram, the lengths of bars are compared, whereas, in the case of pie diagram, areas of segments are compared.

To construct such a diagram we use the fact that the whole corresponds to the total number of degrees in the circular arc, namely 360°. A circle is drawn on a plain paper. The four right angles at the centre are divided into angles proportional to the frequency, number or counts of different categories or components.

Example: Forest Types (in sq. km) of Bangladesh - 1991

Forest type	Sq. km	Proportion	Angle
Evergreen	7820.45	$\frac{7820.45}{16261.99} = 0.481$	$0.481 \times 360^\circ = 173.13^\circ$
Most deciduous	1029.14	$\frac{1029.14}{16261.99} = 0.063$	$0.063 \times 360^\circ = 22.78^\circ$
Mangrove	7412.40	$\frac{7412.40}{16261.99} = 0.456$	$0.456 \times 360^\circ = 164.09^\circ$
Total	16261.99	1.00	360.00°

How to Construct:

(1) Draw a circle to represent the whole data set.
(2) For each category, calculate the "slice" size. A circle has 360 degrees.
So, slice size = 360 × (category relative frequency).
(3) Divide the circle into slices according to their sizes.
(4) Label the slices with the distinct categories and their relative frequencies.

- To construct a pie chart by hand, use a protractor to approximate the angles for each slice.

When to use: To display categorical data with a relatively small number of categories.

What to look for: How the categories are distributed. To interpret the categories that form large and small proportions of the whole data set.

Example 4.11 Pie chart

Blood Type Construct a pie chart of the blood type of the students in Professor Mr Rahman's business statistics class summarized in Table 4.5 on page 54.

Solution We construct the following table to draw a pie chart for the data displayed in Table 4.5.

Blood types	Frequency	Relative Frequency	Slice size = Relative frequency × 360^0
O	14	0.35	126
A	10	0.25	90
B	10	0.25	90
AB	6	0.15	54
Total	40	1.00	360

We draw a circle and divide it into four wedge-shaped slices that comprise 35%, 25%, 25% and 15% of the circle. We do so by using a protractor and the fact that there are 360◦ in a circle. Thus for instance, the first slice of the circle is obtained by marking off 126^0.

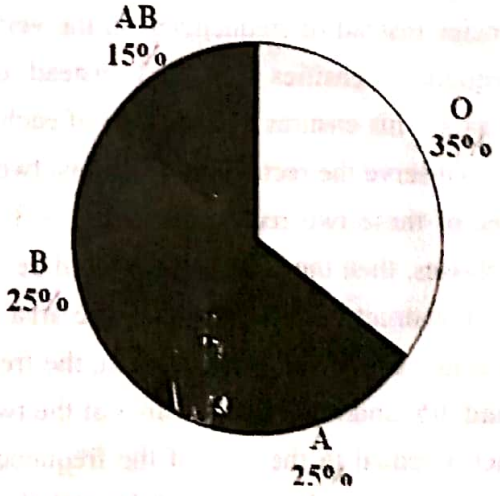


Figure 4.6.4 Pie chart for blood type data

Interpretation From the pie chart we can state that the most common blood type is O in the data set, and the most uncommon type is AB.