



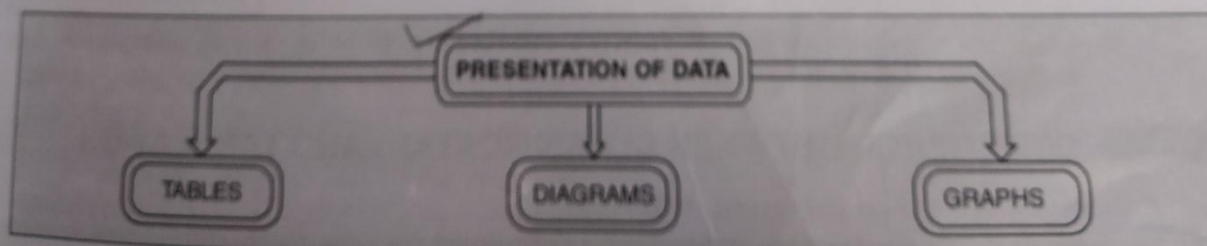
PRESENTATION OF DATA-I TABULATION

CHAPTER'S BLUE PRINT

1. Introduction
2. Definition; Objectives, Advantages and Importance
3. Difference between Classification and Tabulation
4. How to Prepare or Parts of a Table
5. Rules or Essentials of a Good Tabulation
6. Kinds of Tables
7. Solved Examples
8. Examination Questions; M.C.Qs. Short and Long Answer Questions

1. INTRODUCTION

In the preceding chapters we have seen that first of all, data collected by any method, are known as raw data. Then this data are organised. In this stage, data, are first edited and then are classified. Classification may be, discrete or continuous. After this step we proceed to presentation of this data. This presentation may be in shape of Tables, Diagrams or Graphs.



Here in this chapter, we will discuss the presentation of data in shape of tables, that is known as 'TABULATION' in the language of Statistics.

4.2

2. DEFINITION

Tabulation is the arrangement of data in a systematic manner in rows and columns judiciously. This arrangement of data presentation is known as 'Table'.

REMEMBER

"A statistical table is a systematic organisation of data in columns and rows". —Neiswanger
"Tabulation in broadest sense is orderly arrangement of data in columns and rows." —M.M. Blair

OBJECTIVES, ADVANTAGES AND IMPORTANCE OF TABULATION

REMEMBER

Tabulation is a method which can be used by any person. It presents the data in such a lucid style that it can be easily compared and understood. This technique is also economical and attractive. It is also easy to analyse.

1. **Simple.** Main purpose or advantage of tabulation is to present the data in a simple style so that these can be easily understood.
2. **Attractive.** It presents the figures in attractive method.
3. **Easy to compare.** Tabulation helps the data for making the comparison easily, even at first sight.
4. **Easy to Analyse.** This data can be analysed very easily. After such tabulation, we can proceed for further methods of statistics, graphical or numerical.
5. **Economy.** This method can present the data in less time and spending less money.
6. **Easy to understand.** Even with a bird's eye view, we can easily understand the whole data.
7. **Helpful in easy presentation.** This method helps us in presentation of data with the easiest possible method as compared to other method.
8. **Identity.** As data in this method also carries title with it, so data can be easily identified.
9. **Mistakes.** In this form of presentation, mistakes can easily be found.
10. **Brief Picture.** As data belongs to large area, it is one of the easiest way to present its brief picture.

PRESENTATION OF DATA-I TABULATION

2. This is a method of statistical analysis.
3. Here data is arranged in different classes.
4. It is performed before tabulation.
2. This is a method of presenting the data.
3. Here classified data is arranged in columns and rows.
4. It is performed after classification.

4. HOW TO PREPARE A TABLE ? OR PARTS OF A TABLE

Following are given the part of a table without which we can't prepare a table.

1. Table Number. It is necessary because every book or paper has many tables. So it is necessary to allot a Sr. No. 1, 2, 3, ... to each of those, so that it may be easy for the reader to locate a particular table.

2. Title. Every table must bear a title. It should be short. It must suit the data presented in the table. The heading or title must be able to show in the first instance that data is concerned with which (i) Time (ii) Problem (iii) Place, and (iv) Basis of classification.

3. Captions. Titles of the columns or sub-titles of columns are known as captions. It gives an expression of basis of classification. These heads may be divided into sub-heads. Captions are placed in the middle of the column.

4. Stubs. Stubs are the headings given to the Rows. It tells us what is shown in rows.

5. Head Notes Or Prefatory Note. If title is short and does not explain the table completely. To clarify the contents of the table, units are made clear such as 'kms', 'kgs' etc.

6. Body or Field. It is the main and most important part of the table. It contains the data or the figures to be presented to the on-looker. This also contains the total of rows from top to bottom and of columns from left to right. If any data is not available it is shown as 'N.A' or by a dash (-).

7. Foot-Notes. Sometimes an observer is not able to understand the table only through putting an eye on it. Hence some foot notes are given at its bottom to make it understand easily. Marks like *, #, @, etc. can be given as identification marks.

8. Totals. Totals of the various columns and rows should be given on the right side of columns and below the rows. A grand total should be provided in the lowest right corner.

9. Source Notes. Sources of data must be known to the observer. If data are secondary, its sources must be known to the observer. It must be printed below this data table. Page No., Publisher's Name etc. should also be given if available.

REMEMBER

It is impossible for us to prepare a table without going through its different parts. Every part is equally important and while preparing a table each part should be given due weightage.

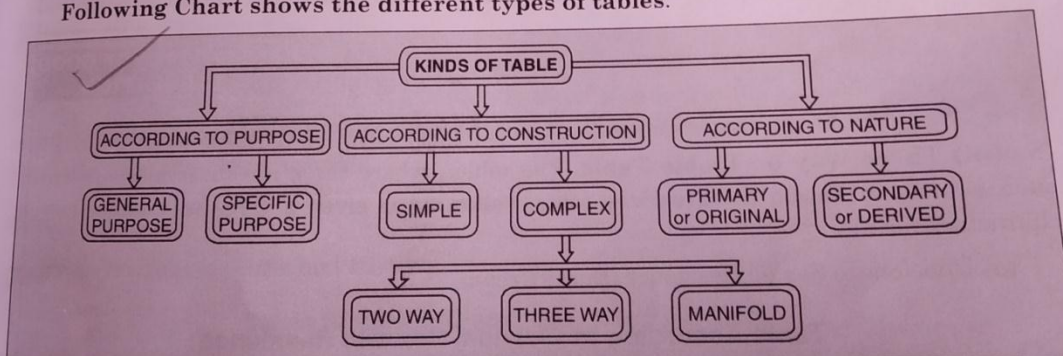
PARTS OF A TABLE

1. Table Number.
2. Title.
3. Captions.
4. Stubs.
5. Head Notes Or Prefatory Note.
6. Body or Field.
7. Foot-Notes.
8. Totals.
9. Source Notes.

10. **Total and Sub Totals.** Total and sub totals must be given as right most column and lowest row.
11. **Arrangement.** There should be a correct arrangement, according to size, time or place.
12. **Size of Columns.** Size of column may vary according to the information if necessary. Otherwise, if necessary, keep it equal.
13. **Headings.** Headings must be given to each row and column.
14. **Emphasis.** If some importance is to be given to some items, these may be typed bold or in italics.
15. **Zero.** If data figure is zero, it must be written there in the table. If it is left blank the observer may get an idea that data is not available. If such is case write N.A.
16. **Percentage and Ratio.** If necessary percentages and ratios should be mentioned in tables.
17. **Foot Notes.** If necessary, footnotes should be given. We can use signs *, #, @ etc. to show the items.
18. **Self-explanatory.** The caption and stubs should be self explanatory. The data contained by them should be clear at first sight.
19. **Suitability.** The table should be prepared in such a way that it must suit to the purpose of problem under enquiry.

6. KINDS OF TABLES

Following Chart shows the different types of tables.



Each of above is discussed below :

- ✓ 1. (a) **General Purpose Table.** Tables published by government or its agencies such as C.S.O., R.B.I. are often of this kind. These contain many types of information. These data are for general use only. It is very easy to detect the variables and items from such table.
- ✓ (b) **Specific Purpose Table.** It is the table constructed for any particular purpose or problem. These are also called text tables or summary tables as these do not contain extensive data.
- ✓ 2. (a) **Simple Or One way Table.** In this type, tables are presented on the basis of one

Public expenditure meaning and
Expenditure; Classification
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4.6 attribute only. In the given table only marks of students have been shown, may the be a boy or a girl. It has been prepared on the basis of marks of students.

Table According to marks (One Attribute is marks)

Marks	No. of Students
0-15	7
15-30	21
30-45	9
Total	37

(b) Complex Table. In this type of table we divide the table on the basis of more than one, i.e. 2, 3 or more attribute. But it becomes impossible to manage more than 4 attributes. These type of tables are often used much more than single way table.

This table can be of following types.

(i) Two Way table. In the given above table if we, present the number of students Boys and Girls, it will be a two way table. There are two attributes in such type of table extension of one way table. In this table we have divided the total number into boys and girls as shown. Two characteristics are marks and sex.

**Table According to Marks and Sex
(Two Attributes are marks and Sex)**

Marks	Students		
	Boys	Girls	Total
0-15	5	2	7
15-30	10	11	21
30-45	6	3	9
Total	21	16	37

(iii) Three Way or Treble Table. The tables, where there are three attributes in such a table in known as three way table. Following is given a three way table showing characteristics.

(a) Division (b) Sex (c) Residence (Rural/Urban).

**Table According to Division, Sex and Residence
(There attributes are Division, Sex and Resident Place)**

Division	Boys			Girls			Total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
I	4	7	11	2	3	5	6	10	16
II	16	28	44	7	21	28	23	49	72
III	12	3	15	6	2	8	18	5	23
Total	32	38	70	15	26	41	47	64	111

(iv) Manifold Table the number of character Let us prepare a table shown as below.
Table showing A (Age group 20-60)

Age (Years)	Married	
	Employed	Unemployed
20-30	7	
30-40	9	
40-50	11	
50-60	6	
Total	33	

3(a) Primary data collected from figures are actual
(b) Derived derived. Here averages, coefficient

7. SOL

EXAMPL

In 8th-52, 10 boys passed v a suitable table

Solution

Table sh

Class
8th
10th
12th
Total

EXA

a table

PRESENTATION OF DATA-I TABULATION

(iv) **Manifold Table.** In this type of table characteristics shown are more than three. As the number of characteristics increases the work becomes tedious.

Let us prepare a table with attributes age sex, marital status and employment. It can be shown as below.

Table showing Age, sex, marital status and employment among the villagers (Age group 20-60)

Age (Years)	Male				Female				Total		
	Married		Unmarried		Married		Unmarried		Em- plo- yed	Unem- ployed	Total
	Em- plo- yed	Unem- ployed	Em- plo- yed	Unem- ployed	Em- plo- yed	Unem- ployed	Em- plo- yed	Unem- ployed			
20-30	7	2	4	8	4	3	2	6	17	19	36
30-40	9	1	6	2	7	4	2	1	24	8	32
40-50	11	0	0	1	8	2	1	0	20	3	23
50-60	6	2	1	1	7	1	0	0	14	4	18
Total	33	5	11	12	26	10	5	7	75	34	109

3(a) **Primary or Original Table.** These tables in which show statistical facts from the data collected from primary sources. Data are presented in the original form. In this case figures are actual and not rounded off.

(b) **Derived or Secondary Table.** Here data are not presented in original form but are derived. Here data used is often secondary. Here the data are presented in percentages, averages, coefficients or measures like averages and dispersion.

7. SOLVED EXAMPLES

EXAMPLE 1. In final examination of CBSE. of a school 213 student of a school appeared. In 8th-52, 10th-49 and 12th-112. No. of boys in these classes was 32, 28 and 64. Number of boys passed were 24, 23 and 52, where as number of girls passed were 18, 20 and 44. Prepare a suitable table. Prepare a suitable.

Solution

Table showing sex, class and result.

Table Showing Class, Sex and Pass/Fail

Class	Boys			Girls			Pass	Fail	Total
	Pass	Fail	Total	Pass	Fail	Total			
8th	24	8	32	18	2	20	42	10	52
10th	23	5	28	20	1	21	43	6	49
12th	52	12	64	44	4	48	96	16	112
Total	99	25	124	82	7	89	181	32	213

EXAMPLE 2. In Ludhiana there are workers as given in (000); Total workers, 91, Make a table industry wise. In hosiery total No. 31, In cycle 33. In Hosiery no. of men 20 in



PRESENTATION OF DATA-II DIAGRAMS

CHAPTER'S BLUE PRINT

1. Introduction
2. Importance and Utility of Diagrams and Graphs
3. General Guidelines to Draw a Diagram or Graph
4. Types of Diagrams ;
 - A. Bar Diagrams, Simple, Multiple, Sub-divided and Percentage
 - B. Sub-divided Circular Diagrams (Pie Diagram)
5. Examination Questions; M.C.Qs. Short and Long Answer Questions

1. Introduction

Diagrams enable us to present the data visually so as to bring out the salient features of the data. They create a lasting impression of the relative magnitude of the values which can be easily remembered on the mind of an observer. Diagrams give us the bird's eye view to the whole mass of data that have been collected. Diagrams do not give any peculiar meaning to the data but help us in presenting the data in a simple and attractive manner.

REMEMBER

Tables are good instruments to present data but diagrams are more attractive and in the very first look, we can compare or analyze the data presented.

2. Importance or Utility of Diagrams and Graphs

1. **Comparison** can be made between different samples very easily. We don't use any statistical technique to compare the samples.
2. Diagrams also create **impressive value**. Tabulated and classified data has not much impression as compared to Diagrams.
3. This technique can be used in some cases for **numerical type of statistical analysis**. e.g. *Mode, Median or other Partition values* can be interpolated by it.

5.2

4. These give a very clear picture of data. Even a layman can understand easily and in a short time.
5. This art gives us more information as compared to tabulation and classification. Those techniques have their own limits.
6. It saves time and energy and also is economical. Even good diagrams and graphs can be prepared without much money.
7. These data are easily remembered. Diagrams which we see leave their impression much more than other data techniques.
8. This technique can be used at any place and at any time. This technique is used almost in all the subjects and other various related fields.
9. Data can easily be condensed with these diagrams. A simple most diagram can present what cannot be presented by 1000 words even.

3. General guidelines for drawal of a diagram or graph

In all the types of diagrams, the following guidelines should be followed while drawing a diagram or graph to represent the statistical data in a meaningful manner.

1. **Simple.** It should be drawn in simple manner. For this, too much information should not be put in a single diagram.
2. **Attractive.** Chief objective of diagrams and graphs is that they should be attractive. These should be drawn in neat and clean manner. Colour, shades, and artistic letters can be used.
3. **Appropriate type.** It is highly necessary to select the appropriate type of diagram for a given data. Otherwise it can create confusion and distorted impression in the minds.
4. **Heading.** An appropriate Title or Heading should be given at the top with the words like, "Diagrammatic representation of data relating to."
5. **Size.** The size of a diagram or graph should be neither too small nor too large according to the size of the paper.
6. **Scales.** There are two axes viz : Horizontal or X-axis, and Vertical or Y-axis. Scales of both the axes should clearly and briefly, be given. Description and size of the units they represent, rupees, persons, etc. should be made easily readable without turning the paper.
7. **Length and breadth.** To look attractive, decent, and impressive, a proportion should be maintained between the length and breadth of the figure. The ratio of 1.414 to 1 is considered proper.
8. **Reference Note.** To get ready references and comparative study, all figures should be assigned a number, or an alphabetic letter.
9. **Foot note.** For clarifying certain ambiguities in a figure, a note should be given at the foot of the diagram in order to remove any confusion arising in the mind of an observer.

GUIDELINES

1. Simple.
2. Attractive.
3. Appropriate type.
4. Heading.
5. Size.
6. Scales.
7. Length and breadth.
8. Reference Note.
9. Foot note.
10. Source Note.
11. Index.

10. Source Note from which the data are taken.
11. Index. An index should be given in brief in the beginning of the report.

Limitations of diagrams

Following are the limitations of diagrams:

- (i) These cannot represent qualitative data.
- (ii) Two or three diagrams are contained in a statement.
- (iii) It is very difficult to compare two diagrams.
- (iv) The main comparison is either by eye or by calculation.

4. Types of Diagrams



1. Bar Diagram

In these diagrams, the data are represented by vertical bars. The height of the bar represents the value of the data. It should be simple and attractive.

Merits

1. These are simple and easy to draw.
2. These are attractive and impressive.
3. Comparison is easy.

A. Simple

Like a bar diagram, a simple diagram is also used to represent data. It is a very simple and easy to draw diagram. It is used to represent data in a very simple and easy manner. It is used to represent data in a very simple and easy manner. It is used to represent data in a very simple and easy manner.

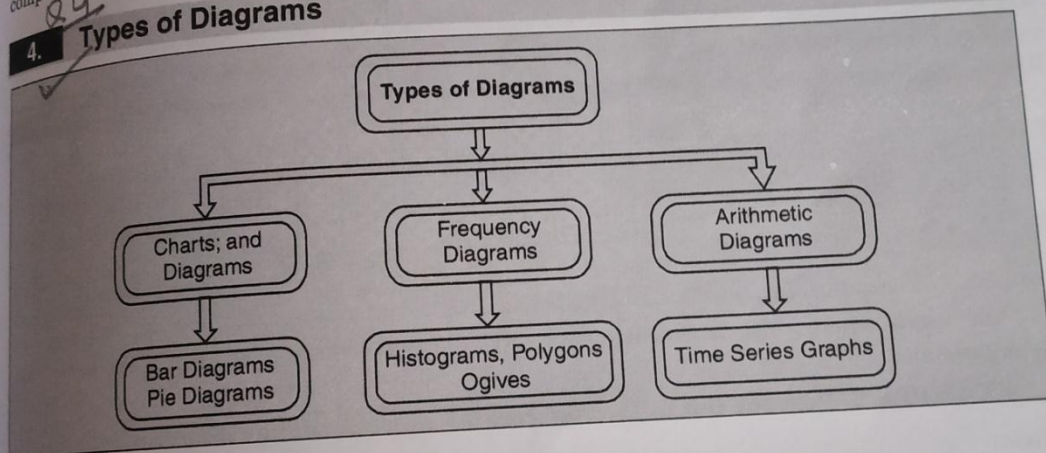
10. **Source Note.** For authentication, a note should be made in respect of the sources from which the data have been collected. Such a note should be at the bottom of a figure.
11. **Index.** An index of the colours, shades, lines, designs, etc. used in the figures should be given in brief in order to easily make out the significance of the figures to the observer.

Limitations of diagrammatic or graphic presentation of data

Following are the limitation of such representation of data :

- (i) These cannot show so many facts as a statistical table can do.
- (ii) Two or three dimensional diagrams are difficult to understand than the facts contained in a statistical table.
- (iii) It is very difficult to show the small differences through these diagrams or graphs.
- (iv) The main utility of figures is that comparison is possible but it is not to be used when comparison is either not possible or is not necessary.

4. Types of Diagrams



1. Bar Diagrams or Charts

In these diagrams only the length dimension is given the importance. The length is taken according to the size of variable and distance between them is kept equal. Bar diagrams may be Simple or Multiple or Percentage Bar Diagrams.

Merits

1. These are easy to construct.
2. These are easy to understand.
3. Comparison can be made easily by this device.

A. Simple Bar Diagram

Like line diagrams, these figures are also used where only single dimension can present the data. Procedure is the same, only the thickness of lines is made. The breadth and distance between them should be taken according to space available on the paper.

REMEMBER

These can be drawn either vertically or horizontally. Breadth of these bars should be equal and distance between these bars should be kept equal.

5.4

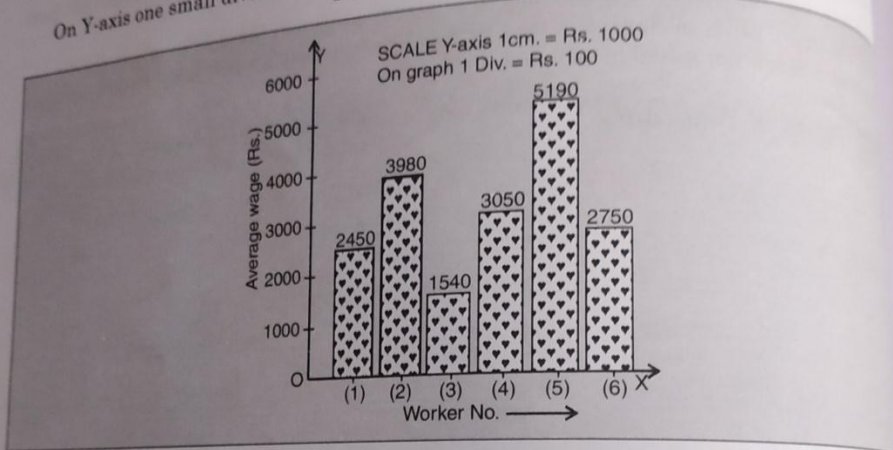
EXAMPLE 1. Average Monthly Wages of some workers (in ₹) are given below. Represent this by Simple Bar Diagram.

Workers No. :	1	2	3	4	5
Average Wage :	2450	3980	1540	3050	5190

Solution

Workers 1, 2, 3 are taken on X-axis and average wages of these workers (in ₹) taken on Y-axis.

On Y-axis one small division = $\frac{1000}{10} = ₹ 100$



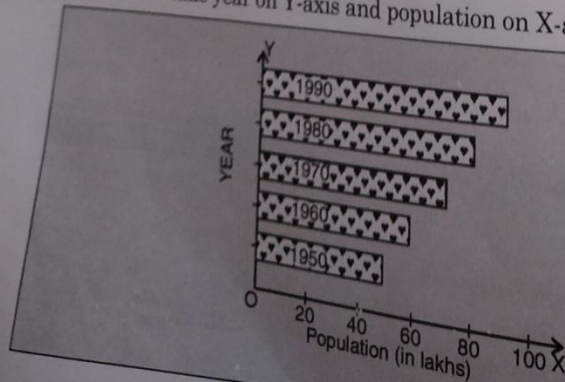
On X-axis equal width is given to each variable and distance between these bars is kept constant.

EXAMPLE 2. Present the following data by horizontal bar diagram.

Year :	1950	1960	1970	1980	1990
Population Crores) :	48	59	71	82	93

Solution

Here we take year on Y-axis and population on X-axis. On X-axis



B. Multiple Bar Diagrams

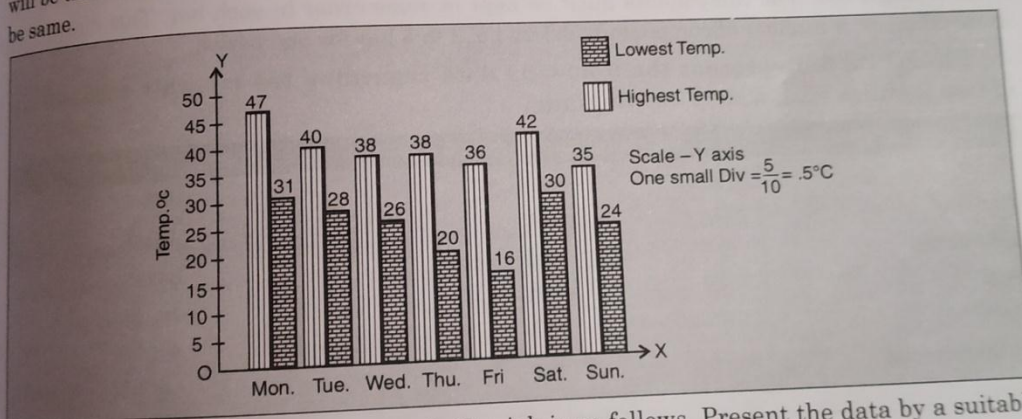
When we have to make comparison between two or more variables, this diagram is used. The number of variables may be 2, 3 or 4 or more. In case of 2 variables, two bars are drawn. Similarly, in case of 3 variables, we draw three bars. The bars are drawn on the same proportionate basis as in case of simple bar diagram. The same shade is given to the same item. Distance between pairs is constant.

EXAMPLE 3. Present the following data by a suitable diagram. (Regarding Temperature)

Day	Mon-day	Tues-day	Wednes-day	Thurs-day	Fri-day	Satur-day	Sun-day
Highest Temp -C	47	40	38	38	36	42	35
Lowest Temp -C	31	28	26	20	16	30	24

Solution

Day is taken along X-axis at equal distances. For each day, bars for high and low temperatures will be standing along each other. Width of bar for high and low temperature will be the same. However for these width can be different. Distance between each pair is will be same.



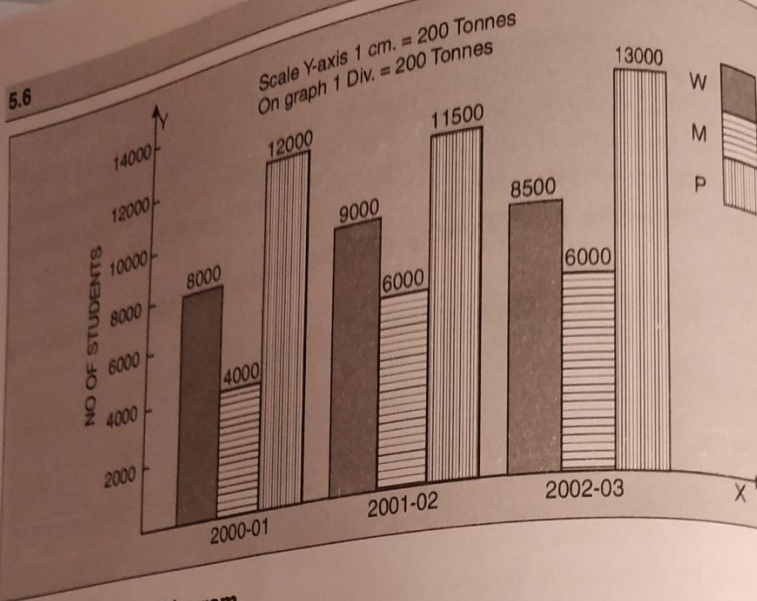
EXAMPLE 4. Production of grains in Punjab is as follows. Present the data by a suitable diagram

Year	Production in Tonnes		Paddy
	Wheat	Maize	
2000-01	8000	4000	12000
2001-02	9000	6000	11500
2002-03	8500	6000	13000

Solution

This figure is also like the last one of example 5. Taking time period on X-axis and Production on Y-axis, we get the bar chart as below.

5.6



C. Sub-divided Bar Diagram

This is another type of diagram those can be used to present above type of data. Here we draw a single bar. The components must be kept in same order in each bar. This diagram is more efficient, if number of components is less i.e. 3 to 5 bar for one period.

EXAMPLE 5. Represent the following data regarding the monthly expenditure of two families with a suitable diagram :

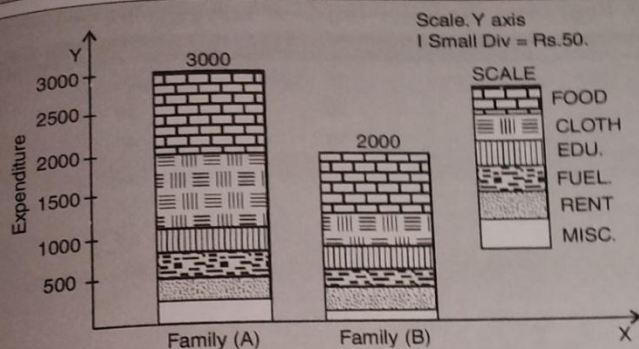
Articles	Expenditure Family A (₹)	Expenditure Family B
Food	1,200	800
Clothing	600	400
Education	450	240
Fuel	150	160
Rent	480	320
Miscellaneous	120	80
Total	3,000	2,000

Solution

We can make figure easily if we cumulate the data of both years.

Family A (Cumulative)	Family B (Cumulative)
1200	800
1800	1220
2250	1440
2400	1600
2880	1920
3000	2000

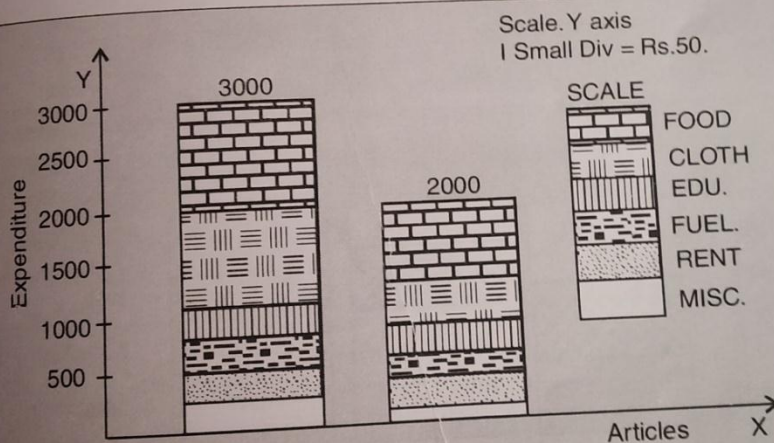
Presentation of Data-II Diagrams



EXAMPLE 6. Income of two Families is Rs. 6000 and 9000 respectively. Other variables are given below. Present by suitable diagram.

Expenditure	Food	Clothing	Fuel	Rent	Education	Miscellaneous
Family A	3300	1080	300	720	480	420
Family B	4500	1080	450	900	900	720

Solution



Here in this problem, the total expenditure in both the respective incomes. In the first case, income is less than the expenditure. However in the 2nd case it is more. In first case loss is suffered whereas in 2nd case, due to surplus, saving is there. Hence in the first case, loss is shown below X-axis.

D. Percentage Bar Diagram

Like sub-dividend bar diagram, in this case also data of one particular period or variable is put on single bar, but in terms of percentages. Components are kept in the same order in each bar for easy comparison.

5.8

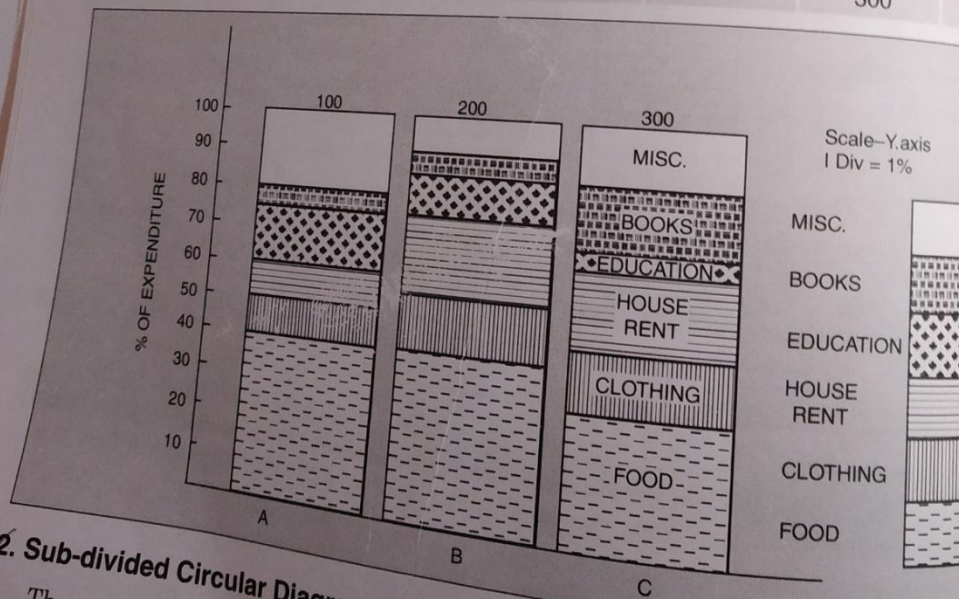
EXAMPLE 7. Represent the following data by a suitable diagram :

Items of expenditure	Family A	Family B	Family C
Food	40	80	90
Clothing	10	30	45
House Rent	10	40	60
Education	15	20	15
Books	5	10	45
Miscellaneous	20	20	45
	100	200	300

Solution

We first find the percentage of expenditure on each item for each family.

Items	Family A		Family B		Family C	
	Exp.	% age	Exp.	% age	Exp.	% age
Food	40	40	80	40	90	30
Clothing	10	10	30	15	45	15
House Rent	10	10	40	20	60	20
Education	15	15	20	10	15	5
Books	5	5	10	5	45	15
Misc.	20	20	20	10	45	15
Total	100	100	200	100	300	100



2. Sub-divided Circular Diagram (Pie Diagram)

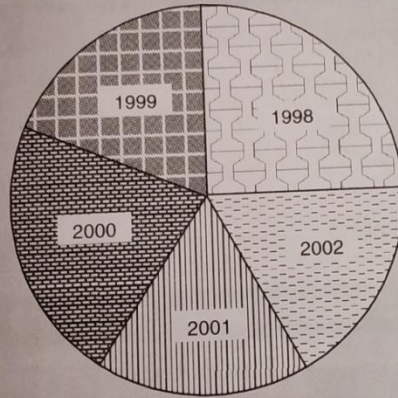
These are also called Pie or Angular Diagrams. We take the total of items and each item is given its proportionate angle taking the total as 360°. In this case we may have to compare in terms of totals also, if data belongs to two cases.

Presentation of Data-II Diagrams

EXAMPLE 8. Prepare Pie Diagram for following data

Year	1998	1999	2000	2001	2002
No. of Workers	180	120	150	130	140

Solution	Year	Workers	Share in Degrees
	1998	180	$\frac{360}{720} \times 180 = 90^\circ$
	1999	120	$\frac{360}{720} \times 120 = 60^\circ$
	2000	150	$\frac{360}{720} \times 150 = 75^\circ$
	2001	130	$\frac{360}{720} \times 130 = 65^\circ$
	2002	140	$\frac{360}{720} \times 140 = 70^\circ$
		Total = 720	Total = 360°



Take circle of any radius. In this circle, draw these angles one after the other.

EXAMPLE 9. Represent the data given below with a suitable diagram.

(Use Pie Diagram)

Component	Values in ₹ in 2001-02	Values in ₹ in 2004-05
Raw material	150	250
Labour	100	200
Power	75	150
Advertisement	25	100
Other charges	50	200
Total	400	900

5.10

Solution

As the cost of manufacturing for the year 2001-02 and 2004-05 are ₹ 400 and ₹ 900 respectively. So the square roots of these are 20 and 30. So they can be presented by circles having the diameters of 2 cms and 3 cms.

	2001-02		2004-05	
	Values in ₹	Degrees of angles	Values in ₹	Degrees of angles
Raw material	150	135°	250	100°
Labour	100	90°	200	80°
Advertisement	25	22.5°	100	40°
Power	75	67.5°	150	60°
Other charge	50	45°	200	80°
Total	400	360°	900	360°

