

## DATA HANDLING – III

### (Construction of bar graphs)

#### 24.1 INTRODUCTION

In class VI, we have learnt how to read bar graphs. We have learnt about reading and interpretation of bar graphs. In this chapter, we shall learn about the construction of bar graphs.

#### 24.2 CONSTRUCTION OF BAR GRAPHS

**BAR GRAPH** A bar graph is a pictorial representation of the numerical data by a number of bars (rectangles) of uniform width erected horizontally or vertically with equal spacing between them.

In a bar graph each rectangle or bar represents only one value of the numerical data and so there are as many bars as the number of values of numerical data. The height or length of a bar indicates, on a suitable scale, the corresponding value of the numerical data. If the bars are drawn vertically on the horizontal line (i.e. x-axis), then the scale of heights of the bars or rectangles is shown along the vertical line (i.e. y-axis). If the bars are drawn horizontally on the vertical line, then the scale of heights of bars is shown along the horizontal line.

In order to construct a bar graph for the given data, we follow the following steps:

- STEP I** Take a graph paper and draw two lines perpendicular to each other and call them horizontal and vertical axes.
- STEP II** Along the horizontal axis mark the information given in the data like days, weeks, months, years, places etc. at uniform gaps.
- STEP III** Choose a suitable scale to determine the heights of the rectangles or bars and then mark the heights on the vertical axes.
- STEP IV** Draw bars or rectangles of equal width and of heights marked in Step III on the horizontal axis with equal spacing between them.

The figure so obtained will be the bar graph representing the given numerical data.

The following examples will illustrate the construction of bar graphs of given data.

#### ILLUSTRATIVE EXAMPLES

**Example 1** The following data gives the number of students of Delhi state who went abroad for study during some years:

Year	1995	1996	1997	1998	1999	2000
Number of students	1400	1600	1250	1000	2000	2200

Represent the above data with the help of a bar graph.

**Solution**

In order to construct a bar graph representing the above data, we follow the following steps:

**STEP I** Take a graph paper and draw two mutually perpendicular lines  $OX$  and  $OY$  as shown in Fig. 1. Call  $OX$  as the horizontal axis and  $OY$  as the vertical axis.

**STEP II** Along  $OX$ , mark years and along  $OY$ , mark number of students.

**STEP III** Along  $OX$ , choose the uniform (equal) width of the bars and the uniform gap between them, according to the space available for the graph.

**STEP IV** Choose a suitable scale to determine the heights of the bars, according to the availability of space. Here, we choose 1 big division to represent 200 students.

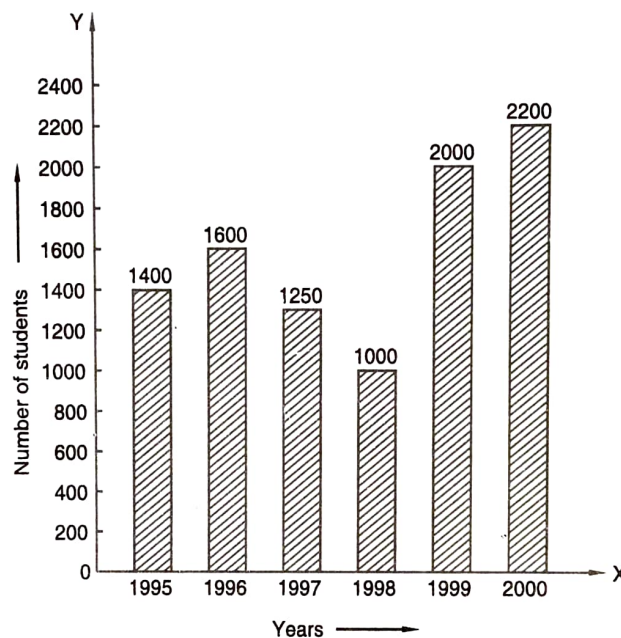


Fig. 1

**STEP V** Calculate the heights of various bars as follows:

The height of the bar for the year 1995 is equal to  $\frac{1400}{200} = 7$  big divisions;

The height of the bar for the year 1996 is equal to  $\frac{1600}{200} = 8$  big divisions

The height of the bar for the year 1997 is equal to  $\frac{1250}{200} = 6\frac{1}{4}$  big divisions = 6 big divisions and 2.5 small divisions

The height of the bar for the year 1998 is equal to  $\frac{1000}{200} = 5$  big divisions

The height of the bar for the year 1999 is equal to  $\frac{2000}{200} = 10$  big divisions

The height of the bar for the year 2000 is equal to  $= \frac{2200}{200} = 11$  big divisions.

**STEP VI** We draw the bars as shown in Fig. 1 and on the top of each bar we write the number of students represented by it.

**Example 2** In a school, there are five sections of class VII. The number of students in each section is given below. Construct a bar graph representing this data:

Section	A	B	C	D	E
Number of students	40	48	52	45	30

**Solution**

We go through the following steps to construct the bar graph:

**STEP I** Take a graph paper and draw two lines  $OX$  and  $OY$  perpendicular to each other. Call the horizontal line as  $OX$  and the vertical line as  $OY$ .

**STEP II** Along the horizontal axis  $OX$ , mark “sections of Class VII” and along the vertical axis  $OY$  mark “No. of students”.

**STEP III** Along the horizontal axis  $OX$ , choose the uniform (equal) width of the bars and the uniform gap between them.

**STEP IV** Choose a suitable scale to determine the heights of the bars, according to the space available for the graph. Here, we choose 1 small division to represent 1 student.

**STEP V** Calculate the heights of the various bars as follows:

Height of the bar for Section A =  $40 \times 1$

= 40 small divisions = 4 big division

Height of the bar for Section B =  $48 \times 1$

= 48 small divisions

= 4 big divisions and 8 small divisions

Height of the bar for Section C =  $52 \times 1$

= 52 small divisions

= 5 big divisions and 2 small divisions.

Height of the bar for Section D = 45 small divisions

= 4 big divisions and 5 small divisions.

Height of the bar for Section E = 30 small divisions

= 3 big divisions.

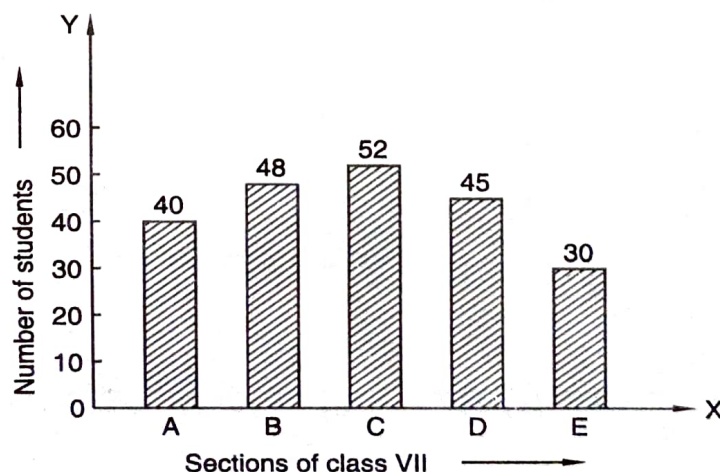


Fig. 2



**STEP VI** We draw the bars as shown in Fig. 2 and on the top of each bar, we write the number of students represented by it.

**Example 3** The population of four major cities in India in a particular year is given below:

City	Mumbai	Kolkata	Delhi	Chennai
Number of students	120	130	150	80

Construct a bar graph to represent the above data.

**Solution**

To construct the bar graph representing the given data, we follow the following steps:

**STEP I** We take a graph paper and draw two mutually perpendicular lines  $OX$  and  $OY$ .

**STEP II** Along the horizontal line  $OX$ , we mark 'cities' and along the vertical line, we mark the 'population'.

**STEP III** Along the axis  $OX$ , we choose equal suitable width of each bar. The gap between the bars is chosen same.

**STEP IV** Choose a suitable scale to determine the heights of the bars, according to the availability of space. Here, we choose 1 big division to represent 20 lakhs population.

**STEP V** Calculate the height of various bars as follows:

$$\text{The height of the bar for Mumbai} = \frac{120}{20} = 6 \text{ big divisions.}$$

$$\text{The height of the bar for Calcutta} = \frac{130}{20} = 6.5 \text{ big divisions.}$$

$$\text{The height of the bar for Delhi} = \frac{150}{20} = 7.5 \text{ big divisions.}$$

$$\text{The height of the bar for Chennai} = \frac{80}{20} = 4 \text{ big divisions.}$$

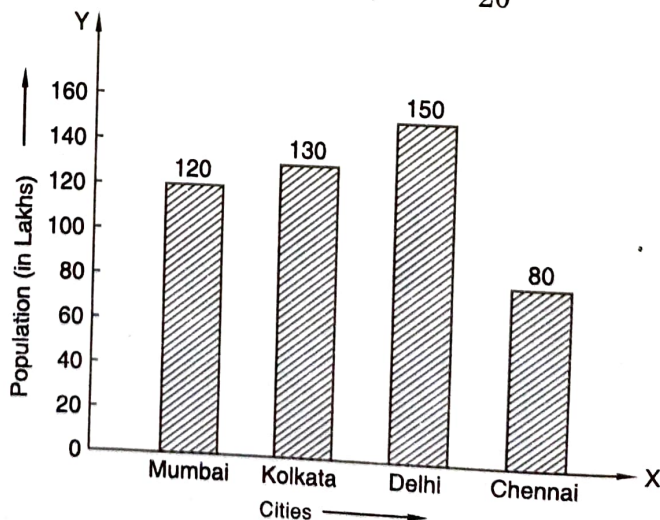


Fig. 3

**STEP VI** Now, we draw the bars as shown in Fig. 3 and at the top of each bar we write the population of the corresponding city.

**Example 4** The results of pass percentage of Class X and XII in C.B.S.E. examination for 5 years are given in the following table:

Year	1994-95	1995-96	1996-97	1997-98	1998-1999
X	90	95	90	80	98
XII	95	80	85	90	95

Draw bar graphs to represent the data.

*Solution*

We go through the following steps to construct the bar graphs:

**STEP I** We draw two lines perpendicular to each other on a graph paper and call them horizontal and vertical axes as shown in Fig. 4.

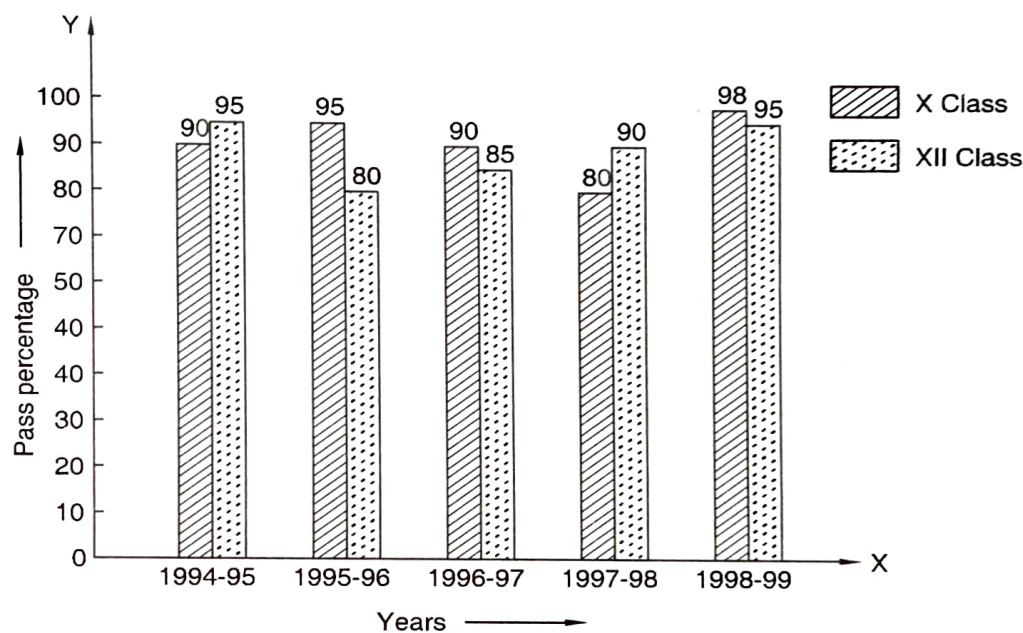


Fig. 4

**STEP II** Along the horizontal axis, we mark the 'years' and along the vertical axis, we mark the 'pass percentage'.

**STEP III** We choose a suitable scale to determine the heights of bars. Here, we choose the scale as 1 big division to represent 10.

**STEP IV** First we draw the bars for Class X results and then bars for Class XII results for different years.

Bars for X and XII class results are shaded separately and the shading is shown in the top right corner of the graph paper.

### EXERCISE 24.1

- Two hundred students of class VI and VII were asked to name their favourite colours so as to decide upon what should be the colour of their school house. The results are shown in the following table.

Colour:	Red	Green	Blue	Yellow	Orange
Number of students:	43	19	55	49	34

Represent the given data on a bar graph.

(i) Which is the most preferred colour and which is the least?

(ii) How many colours are there in all?

2. Following data gives total marks (out of 600) obtained by six children of a particular class.

Student:	Ajay	Bali	Dipti	Faiyaz	Gotika	Hari
Marks obtained:	450	500	300	360	400	540

Represent the data by a bar graph

3. Number of children in six different classes are given below. Represent the data on a bar graph.

Class:	V	VI	VII	VIII	IX	X
Number of children:	135	120	95	100	90	80

(i) How do you choose the scale.

(ii) Which class has the maximum number of children?

(iii) Which class has the minimum number of children?

4. The performance of students in 1st term and 2nd term is as given below. Draw a double bar graph choosing appropriate scale and answer the following:

Subject:	English	Hindi	Maths	Science	S. Science
1 <sup>st</sup> term:	67	72	88	81	73
2 <sup>nd</sup> term:	70	65	95	85	75

(i) In which subject, has the children improved their performance the most?

(ii) Has the performance gone down in any subject?

5. Consider the following data gathered from a survey of a colony:

Favourite Sport:	Cricket	Basket-Ball	Swimming	Hockey	Athletics
Watching	1240	470	510	423	250
Participating	620	320	320	250	105

Draw a double bar graph choosing an appropriate scale. What do you infer from the bar graph?

(i) Which sport is most popular?

(ii) What is more preferred watching or participating in sports?

5. The production of saleable steel in some of the steel plants of our country during 1999 is given below:



Plant	Bhilai	Durgapur	Rourkela	Bokaro
Production (In thousand tonnes)	160	80	200	150

Construct a bar graph to represent the above data on a graph paper by using the scale 1 big division = 20 thousand tonnes.

6. The following data gives the number (in thousands) of applicants registered with an Employment Exchange during, 1995-2000:

Year	1995	1996	1997	1998	1999	2000
Number of applicants registered (in thousands)	18	20	24	28	30	34

Construct a bar graph to represent the above data.

7. The following table gives the route length (in thousand kilometres) of the Indian Railways in some of the years:

Year	1960-61	1970-71	1980-81	1990-91	2000-2001
Route length (in thousand kilometres)	56	60	61	74	98

Represent the above data with the help of a bar graph.

8. The following data gives the amount of loans (in crores of rupees) disbursed by a bank during some years:

Year	1992	1993	1994	1995	1996
Loan (in crores of rupees)	28	33	55	55	80

(i) Represent the above data with the help of a bar graph.

(ii) With the help of the bar graph, indicate the year in which amount of loan is not increased over that of the preceding year.

9. The following table shows the interest paid by a company (in lakhs):

Year	1995-96	1996-97	1997-98	1998-99	1999-2000
Interest (in lakhs of rupees)	20	25	15	18	30

Draw the bar graph to represent the above information.

10. The following data shows the average age of men in various countries in a certain year:

Country	India	Nepal	China	Pakistan	U.K.	U.S.A.
Average age (in years)	55	52	60	50	70	75

Represent the above information by a bar graph.

11. The following data gives the production of foodgrains (in thousand tonnes) for some years:

Year	1995	1996	1997	1998	1999	2000
Production (in thousand tonnes)	120	150	140	180	170	190

Represent the above data with the help of a bar graph.

12. The following data gives the amount of manure (in thousand tonnes) manufactured by a company during some years:

Year	1992	1993	1994	1995	1996	1997
Manure (in thousand tonnes)	15	35	45	30	40	20

- (i) Represent the above data with the help of a bar graph.  
 (ii) Indicate with the help of the bar graph the year in which the amount of manure manufactured by the company was maximum.  
 (iii) Choose the correct alternative:

The consecutive years during which there was maximum decrease in manure production are:

- (a) 1994 and 1995  
 (b) 1992 and 1993  
 (c) 1996 and 1997  
 (d) 1995 and 1996

### ANSWERS

1. (i) Blue, Green (ii) 5      3. (ii) V      (iii) X      4. (i) Maths      (ii) Hindi  
 5. (i) Cricket      (ii) Watching      8. 1995      12. (ii) 1994      (iii) 1996 and 1997.