

10

Data Handling

IN THIS CHAPTER, YOU WILL LEARN:

- Data
- Organizing data
- Pictograph
- Bar graph

DATA

In our daily life, we collect various numerical facts such as the number of students present in different classes of a school, the marks scored by the students of a class in an examination, the number of runs scored by players of Indian cricket team in a match etc. These numerical facts are called **data**. Thus:

A data is a collection of facts in the form of numerical figures to give some information.

For example:

Suppose the marks obtained (out of 10) by 32 students of class VI of a school in a monthly test are:

3, 0, 1, 9, 5, 7, 9, 7, 10, 5, 9, 10, 3, 7, 9, 7, 5, 3, 10, 5, 7, 9, 10, 9, 7, 7, 5, 9, 9, 1, 5, 7.

We note that each entry in this list is a fact regarding marks obtained by a student in the form of numerical figure, so it is a data.

The data in this form is called **raw data**.

Observation. *Each numerical figure (entry) in the above list is called an **observation**.*

Frequency. *The number of times a particular observation occurs is called its **frequency**.*

Suppose we wish to know the achievement of the students in the test, the data in the above form does not give much information. It is not easy to answer the following questions:

- What is the highest score?
- How many students have obtained 7 marks?
- How many students have obtained 3 marks or less than 3 marks?
- How many students have obtained 9 marks or more marks?

Organizing data

Let us arrange the above data in ascending or descending order. The above data in ascending order is:

0, 1, 1, 3, 3, 3, 5, 5, 5, 5, 5, 5, 7, 7, 7, 7, 7, 7, 7, 7, 9, 9, 9, 9, 9, 9, 9, 9, 9, 10, 10, 10, 10

The data in this form is called **arrayed data**.

The data in this form gives much better information. From this data, it is easy to answer the first question: the highest score is 10. But answering the other three questions is still not easy. Moreover, arranging the data in this form is quite tedious and time-consuming, particularly when the number of observations is large.

To answer the remaining three questions and to make the data easily understandable, we arrange the data in tabular form.

*A table showing the frequency of various observations is called **frequency distribution table** or **frequency table**.*

To prepare frequency distribution table, we take each observation from the data, one at a time, and mark a stroke (|) called **tally mark** in the next column opposite to the particular value of observation. For convenience, we write tally marks in bunches of five, the fifth one crossing the four diagonally, like |||| . The number of tally marks opposite to a particular value of observations is its frequency. This frequency is written in the next column of tally marks, called column of frequency.

The frequency table for the above (raw) data is given below:

Marks obtained	Tally marks	Number of students (Frequency)
0		1
1		2
3		3
5	 	6
7	 	8
9	 	8
10		4

Now, it is very easy to answer the above remaining three questions:

The number of students who obtained 7 marks = 8,

the number of students who obtained 3 marks or less marks

$$= 3 + 2 + 1 = 6 \text{ and}$$

the number of students who obtained 9 marks or more marks

$$= 8 + 4 = 12.$$

Note that the sum of all the frequencies is equal to the total number of observations in the given data.

■ **Example 1.** Ekta is asked to collect data for size of shoes of students in her class VI. Her finding are recorded as follows:

5	4	7	5	6	7	6	5	6	6	5
4	5	6	8	7	4	6	5	6	4	6
5	7	6	7	5	7	6	4	8	7	

Construct a frequency distribution table for the above data. Also answer the following questions:

- (i) The size of shoes worn by the maximum number of students.
- (ii) The size of the shoes worn by minimum number of students.

Solution. The frequency distribution table for the above given data is:

Shoe size	Tally marks	Number of students (Frequency)
4		5
5		8
6		10
7		7
8		2

(i) The size of shoes worn by the maximum number of students = 6.

(ii) The size of shoes worn by the minimum number of students = 8.

■ **Example 2.** In a school, 35 students of class VI were asked about the number of their family members. Their answers were recorded as follows:

5	6	4	3	7	4	5	4	3	5	6	8
4	5	3	4	6	7	4	5	6	6	7	4
8	5	6	4	7	8	3	5	4	6	5	

Arrange the above data in ascending order and construct frequency distribution table. Also answer the following questions:

(i) The smallest size of family.

(ii) The largest size of family.

(iii) The number of families having 5 members.

(iv) The number of families having 4 members or less members.

(v) The number of families having 6 members or more members.

Solution. The above given data in ascending order is:

3	3	3	3	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	6	6	6	6	6
6	6	7	7	7	7	8	8	8				

The frequency distribution table for the given data is

Number of members in a family	Tally marks	Number of families (Frequency)
3		4
4		9
5		8
6		7
7		4
8		3

(i) The smallest size of family = 3 (members).

(ii) The largest size of family = 8 (members).

(iii) The number of families having 5 members = 8.

(iv) The number of families having 4 members or less members
= 9 + 4 = 13.

(v) The number of families having 6 members or more members
= 7 + 4 + 3 = 14.

EXERCISE 10.1

1. Following is the choice of 20 students of class VI of a school:
Banana, Apple, Guava, Orange, Apple, Banana, Orange, Guava, Banana, Banana, Apple, Banana, Apple, Banana, Orange, Guava, Apple, Banana, Guava, Banana.

- (i) Arrange the name of fruits in a table using tally marks.
(ii) Which fruit is liked by maximum number of students?
(iii) Which fruit is liked by minimum number of students?

2. In a ready-made garment shop, on a particular day the following sizes of shirts were sold:

34, 38, 42, 40, 44, 32, 34, 36, 42, 40, 44, 36, 38, 42, 44, 40, 38, 40, 42, 32, 34, 38, 42, 40, 36, 42, 40, 38, 36, 40.

Arrange the above data in ascending order and construct frequency distribution table. Also answer the following questions:

- (i) Which shirt size had the maximum sale?
(ii) Which shirt size had the minimum sale?
(iii) The number of shirts sold of size 42 or greater than size 42.

3. In a Mathematics test, the following marks were obtained by 40 students:

8	1	3	7	6	5	5	4	4	2
4	9	5	3	7	1	6	5	2	7
7	3	8	4	2	8	9	5	8	6
7	4	5	6	9	6	4	4	6	6

- (i) Construct frequency distribution table for the above data.
(ii) Find how many students obtained 7 marks or more than 7 marks.
(iii) How many students obtained marks below 4?
4. Joginder threw a dice 40 times and noted the number appearing (on the top face) each time as shown below:

1	3	5	6	6	3	5	4	1	6
2	5	3	4	6	1	5	5	6	1
1	2	2	3	5	2	4	5	5	6
5	1	6	2	3	5	2	4	1	5

Construct frequency distribution table for the above data. Also find the number that appeared:

- (i) The minimum number of times.
(ii) The maximum number of times.
(iii) An equal number of times.

PICTOGRAPH

For visual understanding, the data can be presented in the form of pictures. Pictures help us in understanding the data just at a glance.

The presentation of an information (data) by pictures is called pictograph.

■ **Example 1.** The following pictograph shows the number of absentees in a class of 30 students during the previous week:

Days	Number of absentees	 = 1 Absentee
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		

Observe the above pictograph and answer the following questions:

- On which day were the maximum number of students absent?
- Which day had full attendance?
- What was the total number of absentees in that week?

Solution.

- We observe that in the row of Saturday, there are seven pictures and on all other days, the number of pictures is less. Therefore, the maximum number of absentees was on Saturday.
- In the row of Thursday, there is no picture *i.e.* none is absent. Hence, on Thursday the class had full attendance.
- Total number of pictures in all rows = $5 + 4 + 2 + 1 + 7 = 19$.
Thus, the total number of absentees in that week = 19.

■ **Example 2.** The following pictograph shows the number of T.V. sold by Vijay Electricals during a week:

Days	Number of T.V. sold	 = 2 T.V.
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		

Observe the above pictograph and answer the following questions:

- Find the number of T.V. sold on Monday.
- How many T.V. are sold on Tuesday?