CHAPTER - 8 DATA HANDLING

8.1 INTRODUCTION

Siri's father wants to buy a mobile phone. He asks his friends about the different types of models available in the market and writes their prices and features.

He prepares the following table:

Features	Brand-1 Mobile	Brand-2 Mobile	Brand-3 Mobile
Price	Rs.1500	Rs.1200	Rs.2000
MP3	Yes	Yes	Yes
Camera	No	No	Yes
Bluetooth	No	No	Yes
Alarm	Yes	Yes	Yes
FM	Yes	No	Yes
Guarantee Period	1 Year	3 Months	6 Months

Siri asked her father, why he prepared the table? Her father replied, "I want to buy a mobile. To find a model that suits my needs, I have to compare the features of the different models. So I have collected all the information and then organised in the form of a table."

Siri liked the idea that for taking the right decision it is often necessary to collect **information** and **organise** it.

Information either in the form of numbers or words, which helps us to take decisions is called data. In the above example, the price of the mobile phones, the presence or absence of a camera in cell phone, the presence and absence of FM in cellphones etc., is all data. In our daily life we come across several situations where we collect information to take decisions.

Let us consider one more example.

Manager of a shoe factory decided to increase his sales. He has to decide the size of shoe is to be produced in more number. For this he conducted a survey among 500 people and got the data like this.

Shoe Size	7	8	9	10	11	**Total**
Number Sold	42	126	278	44	10	**500**

Looking at the data the manager can decide the size of the shoes to be produce in more number and the size of the shoe to be produce in less number.

8.2 Recording of Data

Laxmi is preparing to go for a picnic with her friends. She has to take fruits for everybody in the picnic. Laxmi's mother asked her to find the required number of fruits each type. Laxmi prepared a list like this:

Person	Like to have
Laxmi	Orange
Preeti	Guava
Radha	Orange
Uma	Custard apple
Reshma	Guava
Mary	Orange
Latha	Orange
Gouri	Banana
Salma	Custard Apple
Rita	Guava

Try These •

Give two examples of data in numerical figures. • Give two examples of data in words.

She gave the list to her mother. Her mother read the list. To find the number of fruits required for each type. First counted the number of oranges by going over all the names in the list. She then repeated this process for the guavas then the bananas and then the custard apples.

She finally wrote as

Oranges - 4, Guava - 3, Banana - 1, Custard apple - 2

Here Oranges came 4 times. So 4 is called the frequency of an Orange. Similarly frequency of Guava is 3 .....

Would it have been so easy for Laxmi's mother to count if the number of children in class had been 50. It would not have been as she would have had to repeat the process of going over the list of fruits for finding the number of each fruit.

Laxmi's mother needs a way in which she can count all the fruits simultaniously.

8.3 Organisation of Data

In Census 2001, an enumarator collected information about the family size of 55 families in a habitation. He asked some students to help him to organise the data.

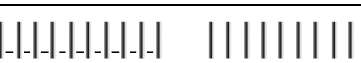
All students used tally marks to organize the data, but used them differently.

Poorna made tally marks like this:

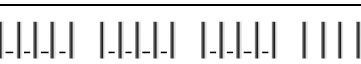
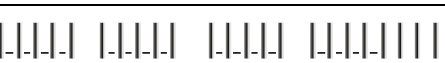
Family size	Tally marks	Number of families

2		6
3		19
4		23
5		5
6		2

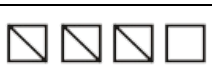
Rahim encircled every ten tally marks into a group:

Family size	Tally marks	Number of families
2		6
3		19
4		23
5		5
6		2

Dinesh encircled 5 tally marks into a group.

Family size	Tally marks	Number of families
2		6
3		19
4		23
5		5
6		2

Chetan also encircled 5 tally marks but did so differently. He marked 4 tally marks as a square and the fifth tally mark as a diagonal.

Family size	Tally Marks	Number of families
2		6
3		19

4		23
5		5
6		2

Sarala made tally marks by crossing every four tally marks with a fifth tally mark.

Family size	**Tally Marks**	**Number of families**
2		6
3		19
4		23
5		5
6		2

The manner in which Sarala has made the tally marks is generally used to obtain the frequency or the count of the data items. A table showing the frequency or count of various items is called a frequency distribution table.

Example-1. 25 students in a class got the following marks in an assignment- 5, 6, 7, 5, 4, 2, 2, 9, 10, 2, 4, 7, 4, 6, 9, 5, 5, 4, 3, 7, 9, 5, 2, 4, 5, 7. The assignment was for 10 marks.

(i) Organise the data and represent in the form of a frequency distribution table using tally marks.

(ii) Find out the marks obtained by maximum number of students.

(iii) Find out how many students received least marks.

(iv) How many students got 8 marks?

Solution:

(i)

Marks obtained	Tally Marks	Number of Students
2		4
4		5
5		6
6		2
7		4
9		3

10	|	1

(ii) Maximum number of students (6) got 5 marks

(iii) Least mark (2) was obtained by 4 students.

(iv) No student in the class got 8 marks.

Exercise - 8.1

1. A child's Kiddy bank is opened and the coins collected are in the following denomination.

Type of coin Number of coins

50 Piasa 

1 Rupee 

2 Rupees 

5 Rupees 

Represent the data in a frequency distribution table using tally marks.

2. The favourite colours of 25 students in a class are given below:

Blue, Red, Green, White, Blue, Green, White, Red, Orange, Green, Blue, White, Blue, Orange, Blue, Blue, White, Red, White, White, Red, Green, Blue, Blue, White.

Write a frequency distribution table using tally marks for the data. Which is the least favourite colour for the students?

3. A TV channel invited a SMS poll on 'Ban of Liquor' giving options :

A - Complete ban B - Partial ban C - Continue sales

They received the following SMS, in the first hour-

A A B C A B B C A A

A A C C B A A C B A

A A A B B C C A A C

C B B B A A A A A C

Represent the data in a frequency distribution table using tally marks.

4. Vehicles that crossed a checkpost between 10 AM and 11 AM are as follows:

car, lorry, bus, lorry, auto, lorry, lorry, bus, auto, bike, bus, lorry, lorry, zeep,

lorry, bus, zeep, car, bike, bus, car, lorry, bus, lorry, bus, bike, car, zeep, bus,

lorry, lorry, bus, car, car, bike, auto.

Represent the data in a frequency distribution table using tally marks.

Play the game

Take a die. Throw it and record the number. Repeat the activity 40 times and record the numbers. Represent the data in a frequency distribution table using tally marks.

8.4 Representation of Data

Data that has been organised and presented in frequency distribution tables can also be presented using pictographs and bar graphs.

8.4.1 Pictographs

A book-shelf has books of different subjects. The number of books of each subject is represented as a picto graph given below. Observe them.

Subject	Number of books
Telugu	
English	
Hindi	
Maths	
Science	
Social	

(i) Which books are more in number?

(ii) Which books are least in number?

(iii) How many total books are there?

We can answer these questions by studying the pictograph. A pictograph uses pictures or symbols to represent the frequency of the data.

Now, let us represent the strength of a school in the form of a pictograph.

Class	VI	VII	VIII	IX	X
Number of Students	28	30	35	25	22

Is it reasonable to represent 35 students using 35 symbols? To draw the pictograph conveniently, in such situations we can assume that 5 students can be represented by one symbol. This is called scaling. Generally the scale must be the Greatest Common Divisor of all the frequencies.

In case the frequency is less than the scalling unit, we must make appropriate assumptions. In the above example:

If  represents 5 students

 represents 4 students

 represents 3 students

 represents 2 students

 represents 1 student.

Now, let us construct a pictograph for the data given above-

Class	Number of Students
VI	
VII	
VIII	
IX	
X	

Example-1. In a class of 25, students like various games. The details are shown in the following pictograph. (No student plays more than one game).

(i) How many students play badminton?

(ii) Which game is played by most number of students?

(iii) What is the game in which least number of students are interested?

(iv) How many students do not play any game?

Game	Number of Students
Kabaddi	
Tennikoit	
Badminton	
Cricket	

Solution: i. 5 students play badminton.

ii. Kabaddi is played by most number of students i.e. 7.

iii. Tennikoit is played by least number of students i.e. 4.

iv. Total number of players = 7 + 4 + 5 + 6 = 22

Number of students in the classroom = 25

Thus, number of student who do not play any game = 25 - 22 = 3

Example-2. The following pictograph shows the number of tractors in five different villages.

Scale :  **= 2 Tractors**

Village	Number
A	
B	
C	
D	
E	

(i) Which village has the minimum number of tractors?

(ii) Which village has the maximum number of tractors?

(iii) How many more tractors does village C have as compared to village B.

(iv) What is the total number of tractors in all the five villages?

Solution: (i) Village B and E have the minimum number of tranctors, 8 tractors each.

(ii) Village D has the maximum number of tractors, 20 tractors.

(iii) Village C has 9 tractors more than B.

(iv) There are 64 tractors in all in the village.

Exercise - 8.2

1. The number of wrist watches manufactured by a factory in a week are as follows:

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
300	350	250	400	300	275

Represent the data using a pictograph. Choose a suitable scale.

2. Details of apples sold in a week by Ahmed, a fruit vendor are given here under. Prepare a pictograph for the data: [Scale: Represent 5 fruit with a symbol]

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
100	85	90	80	60	95	70

Answer the following questions:

(i) How many symbols represent the fruits sold on Tuesday?

(ii) How many symbols represent the fruits sold on Friday?

3. Votes polled for various candidates in a sarpanch election are shown below, against their symbols in the following table.

Symbol	Sun	Pot	Tree	Watch
Number of votes	400	550	350	200

Represent the data using a pictograph. Choose a suitable scale.

Answer the following questions:

(i) Which symbol got least votes?

(ii) Which symbol candidate won in the election?

4. The following pictograph shows the number of student cycles, in five classes of a school.

Class	Number of cycles
VI	
VII	
VIII	
IX	
X	

Answer the following questions based on the pictograph given above-

(i) Which class students have the maximum number of cycles?

(ii) Which class students have the minimum number of cycles?

(iii) Which class students have 9 cycles?

(iv) What is the total number of cycles in all the five classes?

5. The sale of television sets of different companies on a day is shown in the pictograph given below.

Scale :  **= 5 televisions**

Company	Number of television sets
A	
B	
C	
D	
E	

Answer the following questions:

(i) How many TVs of company A were sold?

(ii) Which company's TVs are people more crazy about?

(iii) Which company sold 15 TV sets?

(iv) Which company had the least sale?

6. Monthly salaries of 5 workers are shown in the pictograph given below:

Scale :  **= 1000 rupees**

Worker	**Salary**
Ramesh	
Vilas	
Venkat	
Dinesh	
Sachin	

Answer the following questions:

(i) What is the scale used in the pictograph?

(ii) How much is Sachin's salary?

(iii) Who earns more salary?

(iv) How much is Ramesh's salary more than Vilas's?

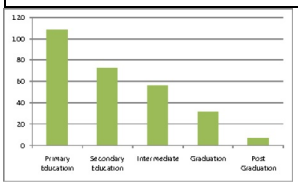
Project Work

Collect as many pictographs as possible from news papers and magazines and study them carefully.

8.4.2 Bar Graph

Akash collected data about the qualifications of 275 people in his locality. He organised the data into a frequency distribution table:

Education Level	Number of People
Primary Education	109
Secondary Education	72
intermediate	56
Graduation	31
Post graduation	7



He tried to represent the data using a pictograph. But he found that this is not only time consuming but also difficult. So he decided to use bar graph, which is shown aside.

Generally bar graphs are used to represent independent observations with frequencies.

In bar graph, bars of uniform width are drawn horizontally or vertically with equal spacing between them. The length of the bars represents the frequency of the data items

From the above bar graph we can observe that most people have not studied beyond school. It also shows that a very few people hold post graduate degrees.

Think, Discuss and Write

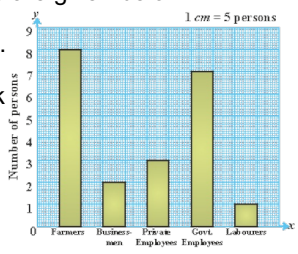
In what way is the bar graph better than the pictograph?

Construction of a bar graph

The professions of people living in a colony are given in the following table:

Profession	**Farmers**	**Businessmen**	**Private Employee**	**Govt. Employee**	**Labourers**
No. of persons	40	10	15	35	5

To represent the above data in the form of a vertical bar diagram, the steps are given below:



(i) Draw two perpendicular lines-one horizontal (x-axis) and one vertical (y-axis).

(ii) Along the y-axis mark 'number of people' and along the x-axis mark 'professions'.

(iii) Select a suitable scale on the x-axis, say 1 cm = 5 persons.

(iv) Calculate the heights of the bars by dividing the frequencies with the scale:

Farmers 40 ÷ 5 = 8 Businessman 10 ÷ 5 = 2

Private Employees 15 ÷ 5 = 3 Govt. Employees 35 ÷ 5 = 7

Labourers 5 ÷ 5 = 1

(v) Draw rectangular, vertical bars of same width on the x-axis with heights calculated above.

Similarly when we make a horizontal bar diagram for the data given above.

Steps of construction:

(i) Draw two perpendicular lines on a graph sheet -one horizontal (X-axis) and one vertical (Y-axis).

(ii) Along the X-axis mark 'number of people' and along the Y-axis mark 'professions'.

(iii) Select a suitable scale on the Y-axis, say 1 cm = 5 persons.

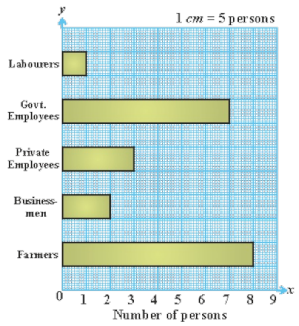
(iv) Calculate the lenghts of the bars by dividing the frequencies with the scale:

Farmers 40 ÷ 5 = 8 Businessman 10 ÷ 5 = 2

Private Employees 15 ÷ 5 = 3 Govt. Employees 35 ÷ 5 = 7

Labourers 5 ÷ 5 = 1

(v) Draw rectangular, horizontal bars of same width on the Y-axis with lengths calculated above.



Exercise - 8.3

1. The life span of some animals is given as follows:

Bear - 40 years, Bull - 28 years, Camel - 50 years, Dog - 22 years

Cat - 25 years, Donkey - 45 years, Goat - 15 years, Horse - 10 years

Cow - 22 years, Elephant - 70 years.

Draw a horizontal bar graph to represent the data.

2. The following table shows the monthly expenditure of Imran's family on various items:

Item House Rent Food Education Electricity Transport Misc.

Expenditure (`) 3000 3400 800 400 600 1200

Construct a vertical bar diagram to represent the above data.

3. Travelling time from Hyderabad to Thirupathi by different means of transport are-

Car - 8 hours, Bus - 15 hours, Train - 12 hours, Aeroplane - 1 hour. Represent the information using a bar diagram.

4. A survey of 120 school students was conducted to find which activity they prefer to do in their free time.

Preferred activity Playing Reading story Watching Listening Painting

books TV to music

Number of students 25 10 40 10 15

Draw a bar graph to illustrate the above data.

Project Work

1. Collect different kinds of bar graphs from news papers, magazines etc. and make an album. Try to interpret each of the bar graphs.

2. Go round your colony. Note how many houses of different kinds i.e. thached houses, tiled housed, RCC slab houses, appartments are there. Tabulate the findings and represent the data as a bar graph.

What have we discussed?

1. We have seen that data is a collection of numbers gathered to give some information.

2. To get a particular information from the given data quickly, the data can be arranged in a tabular form using tally marks.

3. We learnt how a pictograph represents data in the form of pictures, objects or parts of objects. We have also seen how to interpret a pictograph and answer the related questions. We have drawn pictographs using symbols to represent a certain number of items or things. For example,  = 100 books.

4. We have discussed about representation of data by using a bar diagram or a bar graph. In a bar graph, bars of uniform width are drawn horizontally or vertically with equal spacing between them. The length of each bar represents the respective frequency.

P. C. Mahalanobis (India) 1893 - 1972, He is known as Father of Indian Statastics. He is the founder of Indian Statastical Research Institute in Kolkatta. His 'National sample surveys' gained international recognition.