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INFORMATION & COMMUNICATIONS TECHNOLOGY

STANDARD

VII



GOVERNMENT OF KERALA
GENERAL EDUCATION DEPARTMENT

STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING (SCERT), KERALAM

2024

NATIONAL ANTHEM

Jana-gana-mana adhinayaka jaya he
Bharatha-bhagya-vidhata,
Punjab-Sindh-Gujarat-Maratha
Dravida-Utkala-Banga
Vindhya-Himachala-Yamuna-Ganga
Uchchala-Jaladhi-taranga
Tava subha name jage,
Tava subha asisa mage,
Gahe tava jaya gatha.
Jana-gana-mangala-dayaka jaya he
Bharatha-bhagya-vidhata,
Jaya he, jaya he, jaya he,
Jaya jaya jaya jaya he!

PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage.
I shall always strive to be worthy of it.

I shall give my parents, teachers and all elders respect, and treat everyone with courtesy.

To my country and my people, I pledge my devotion. In their well-being and prosperity alone lies my happiness

INFORMATION AND COMMUNICATIONS TECHNOLOGY - VII

State Council of Educational Research and Training (SCERT)

Poojappura, Thiruvananthapuram 695012, Kerala

Website : www.scertkerala.gov.in

e-mail : scertkerala@gmail.com, Phone : 0471 - 2341883,

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PREFACE

Dear Children,

Today it is modern technology that leads us in the path of our progress. Information and Communications Technology has radically changed the modern world. It has influenced every sphere of our life. It is utilised by homes, hospitals, shops, schools and even space stations. It has become an absolute necessity to know this technology in detail for any facility in life is to be gainful. This activitybook is designed to equip you to use the computer and the Internet to achieve that end.

The activities in this book are included for that purpose. They aim not only at drawing pictures, designing book covers and pages, analysing data, and presenting ideas but also at learning through computers maths, science and languages.

At the same time, you also get a chance to be familiar with areas like Computer Programming and Artificial Intelligence (AI). Also, you get to discuss the safe use of the Internet and addressing fake news.

The more you enjoy these activities, the more interesting your learning will be. You may also be able to utilize these lessons to understand further about the IT sector and to profitably learn other subjects.

I wish you very well.

Dr Jayaprakash R. K.
Director, S.C.E.R.T.

TEXTBOOK COMMITTEE

CHAIRMAN

K. ANVAR SADATH
CHIEF EXECUTIVE OFFICER
KITE, Thiruvananthapuram

MEMBERS

Simraj K.S.
Master Trainer
KITE, Palakkad

Shaji C.K.
Master Trainer
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Vasudevan K.P.
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KITE, Kozhikode

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H.S.T. (Rtd.)
Govt Model H.S.S. Kozhikode

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Neelanchery, Malappuram

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Master Trainer
KITE, Malappuram

Nidhin Jose
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Abdul Hakkim C.P.
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KITE, Kannur

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Master Trainer
KITE, Palakkad

Manoj Joseph
Headmaster
G.S.M.T.H.S.S. Chelakkara,
Thrissur

Dr. Shanavas K.
Master Trainer Co-ordinator
KITE, Malappuram

ENGLISH TRANSLATION

C.M. Rajan
Writer & English Language Consultant, Hyderabad

LANGUAGE EXPERT

Dr. P.K. Jayaraj
Senior Consultant (English & Pedagogy)
KITE, Thiruvananthapuram

Illustration

E. Suresh
Cartoonist
Kozhikode

Co-ordinator

Muhammed Aslam A.R.
Academic Co-ordinator
KITE, Thiruvananthapuram

Academic Co-ordinator

Dr. Dhanya G.
Research Officer
SCERT, Thiruvananthapuram



State Council of Educational Research and Training (SCERT)

Vidyabhavan, Poojappura, Thiruvananthapuram- 695 012

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Details of Illustrations



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Assessment



Follow up Activities

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a ¹**[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC]** and to secure to all its citizens :

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the ²[unity and integrity of the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949 do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation" (w.e.f. 3.1.1977)

Chapter 1

Information Analysis

Anu, Ami, Sainu and Vinu are all involved in a serious discussion on finishing the science project assigned by their teacher, Mary. The project is about finding the areas of forests in Kerala as per each district over two different years. As part of doing this project, they have to gather necessary information, analyse it and reach a conclusion before presenting to their class in an easy-to-understand manner. For this, they checked library books, periodicals, Internet and project reports prepared by the students in previous years.

What the Graphs have to say

It was Ami who spotted the graphs shown below in a magazine and brought it to the notice of the project team. See how neat the info presented in the graphs is!

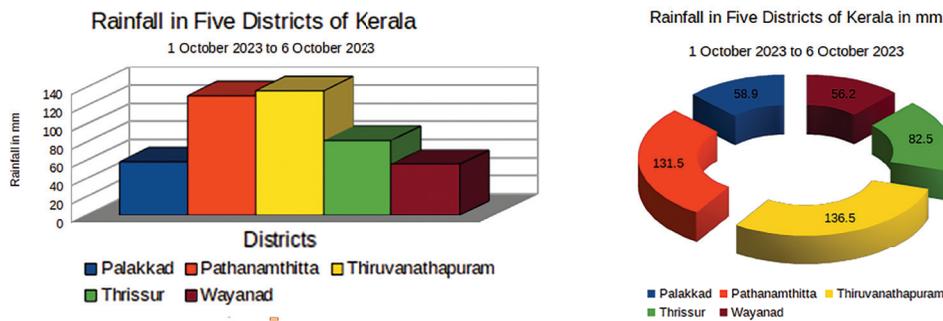


Fig 1. 1 Rainfall in some districts of Kerala in October, 2023

Please make a note of what the graphs have to say.

- The average estimate of the rain received by 5 districts of Kerala in the first week of October, 2023.
- The districts that received the highest and lowest rainfall.
- The estimate of rain received by other districts.
- -----

Graphs makes analysis of info easy and fast, don't they? We can also draw graphs like these, can't we? Why can't we include such an activity in our projects?

The teacher had given Anu and her team several hints about the topics for the project. The team selected the topic, "A Comparative Study of Kerala's Forest Areas per District" as it was a socially relevant one.

The study needs the statistics of forest areas for two years. Do you have any idea where you can get such statistics?



Study Projects in Computer

All learning projects go through a few steps: Info-gathering, analysis, consolidation and conclusions. Computers have made these steps easier. The software for the same is included in our school computers.

Gayatri, one of the team members, had a suggestion: Why don't we search it in the Internet?

So the team used the Internet to find the forest area in each district for the years 2011 and 2021. They promptly recorded it in their Project Diary. See Table 1.1.



District-wise Forest Area in Kerala (in Sq.Km)			
Sl.No	District	2011 Assessment	2021 Assessment
1	Alappuzha	38	81
2	Kannur	641	1669
3	Ernakulum	695	1384
4	Idukki	3155	3930
5	Kasargod	592	984
6	Kollam	1330	1334
7	Kottayam	889	1099
8	Kozhikode	591	1448
9	Malappuram	1209	1984
10	Palakkad	1575	2104
11	Pathanamthitta	1755	1949
12	Thiruvananthapuram	1349	1317
13	Thrissur	931	1166
14	Waynad	1775	1581

Source : kernvis.nic.in

Table 1.1. Kerala's district-wise forest area for the years 2011 and 2021

Using the data in the table, let's see what we can do. Don't forget to take down notes about what we find.

- An estimate of the total forest area in the two years.
- The average forest area in the State in those two years.
- The districts that have the largest and the smallest forest area.
- The changes in the State's forest cover over ten years.
- -----

Now, we have to analyse the data in the Table 1.1. Can we use our computer for that? You have seen that the graphs shown by Ami were prepared by a computer. Computers and their software are therefore making our tasks easier, aren't they?

The team decided to use their computer to analyse the info for their project. They already knew that their seniors had used *spreadsheet* software for data analysis.



Spreadsheet Software

The software that enables us to arrange and analyse data is called *spreadsheets*. Some of its facilities are given below:

- Tabulating data.
- Arranging the tabulated data in different formats.
- Enabling the analysis, comparison and consolidation of the data.
- Arranging the data in graphic forms (charts) to make analysis easier.

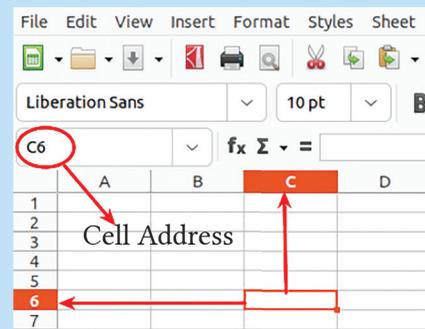
Today, many *spreadsheet* software programmes are available. The *spreadsheet* software included in *IT@School GNU-Linux* is *LibreOffice Calc*. There are also programmes like *Microsoft Excel*, *Gnumeric*, *Calligra Sheets* and *Numbers*.

So the team made up their mind to use the *spreadsheet* called *LibreOffice Calc* in the Lab computers for analysing their data.

LibreOffice Calc

Once you open the *LibreOffice Calc*, you see a worksheet of columns and rows (See the picture).

Columns are labelled A, B, C ... and rows 1, 2, 3 ... The squares you fill in with data are called *cells*. A cell is denoted by the letter of its column and the number of its row. The *cells* in column A will be called A1, A2, A3 and so on. The *cells* in row 1 will be called A1, B1, C1 and so on.



Let's have a look at the various phases of the project Anu and her team had gone through.

Recording Data in Calc

First, the team put the Internet data they collected in the Calc sheet. See Fig1.2.

	A	B	C
1	District	Forest Area 2011 (in sq.km)	Forest Area 2021 (in sq.km)
2	Alappuzha	38	81
3	Kannur	641	1669
4	Ernakulam	695	1384
5	Idukki	3930	3155
6	Kasargod	592	984
7	Kollam	1330	1334
8	Kottayam	889	1099
9	Kozhikode	591	1448
10	Malappuram	1209	1984
11	Palakkad	1575	2104
12	Pathanamthitta	1755	1949
13	Thiruvananthapuram	1349	1317
14	Thrissur	931	1166
15	Wayanad	1775	1581
16			

Fig. 1.2. The districts and the forest area typed into the Calc sheet

The first column shows the names of districts, the second their forest area in 2011 and the third their forest area in 2021.

To Type in Data in the Spreadsheet

- Click the mouse in the cell you need.
- Type in data with the keyboard.
- Name the file appropriately and save it.

- When you type in the numbers where are they positioned in the cell?
- Where in the cell do the texts appear?
- Can we change the position of the texts and numbers? Try and see.

You can also change the size of a cell as required.

To Change the Size of Columns and Rows

Sometimes you will have to change the width of the columns and the height of the rows. Click on the point where the header of the column you want to change and the next column's header join. When the arrow marks appear drag them to get the size you want. In the same way, you can also change the size of the rows. Try it.

A	B
District	Forest Area (in sq.km)
Alappuzha	80.54
Kannur	1668.86
Ernakulam	1384.48
Idukki	3155.32
Kasaragod	983.57
Kollam	1333.78
Kottavam	1099.05

You have now tabulated the forest land in each district. The next step is to find out the total forest cover, using the software.

The change in the formula bar when the tool to find the sum was activated

The cell for displaying the sum

A	B	C
1 District	Forest Area 2011 (in sq.km)	Forest Area 2021 (in sq.km)
2 Alappuzha	38	81
	641	1669
	695	1384
	3930	3155
	592	984
	1330	1334
	889	1099
9 Kozhikode	591	1448
	1209	1984
	1575	2104
	1755	1949
13 Thiruvananthapuram	1349	1317
14 Thrissur	931	1166
15 Wayanad	1775	1581
16 Total Forest Area	=SUM(B2:B15)	

Fig. 1. 3. The method to find the sum of the numbers in the Calc sheet, using the SUM tool

Functions in the Calc

Sum is a function in the LibreOffice Calc. There are many functions like *Average* and *Count* in the Calc. You will learn those in higher classes.

Finding the 'Sum' in the Cells

- Click in the *cell* where you want to display the *sum* (*cell* B16 in this case).
- Click on the symbol Σ left to the cell address (When you click, the *cells* with numbers in that column will be selected).
- Press the *Enter* key to get the *sum* in the *cell* into which you typed.
- Save the file after those changes.

Putting the Function straight into the cell

We need not use the tool Σ to get the sum of numbers.

You can type directly into the cell where you want to display it. E.g. = SUM (B2:B15)

B2: B15 in the function means the cells from B2 to B15.

Finding the Total Forest Area

One of the important special features of the spreadsheet software is the tools that help us to do mathematical calculations. For instance, suppose we have to calculate the total forest area in Kerala. To find it out, we can use the tool for finding the sum in the spreadsheet. Fig.1.3. shows the method to find the total forest area. You can also try it on your own.

Have you found the total forest area in 2011. Now, find the forest area in 2021 in the same way.

- To do the sum, which cell in the spreadsheet (shown in Fig.1.3.) must be first selected?

- What gets displayed on the formula bar when you have found the sum?

Arranging the Districts on the Basis of Forest Cover

Shall we arrange the districts in terms of their forest area? Let's do it in the descending order with the district with the largest area on top and the district with the smallest area at the bottom. The tool we need is *Sort* in the *Data* menu. Fig. 1. 4. shows the arrangement in *Sort window* to list the districts as per their forest area in 2021.

Here, the list of districts as per forest area in 2021 is displayed because we selected Forest Area 2011 (in sq. km) for the box of *Sort Key 1*.

Suppose you want to get the list of districts as per forest area in 2011; which column will you select for *Sort Key 1*?



Sorting the Tables in Calc Sheet

- Select the table to be sorted. (To do so, click on the first cell; press the ‘*shift*’ key and click on the last cell to be selected).
- Click on *Data* on the Menu bar and select *Sort*.
- Select the header of the column you want to sort to put it in *Sort Key 1* (In this case, Forest Area 2021 (in sq.km)).
- Select *Descending* from *Ascending/Descending* options against *Sort Key 1*
- Press ‘OK’

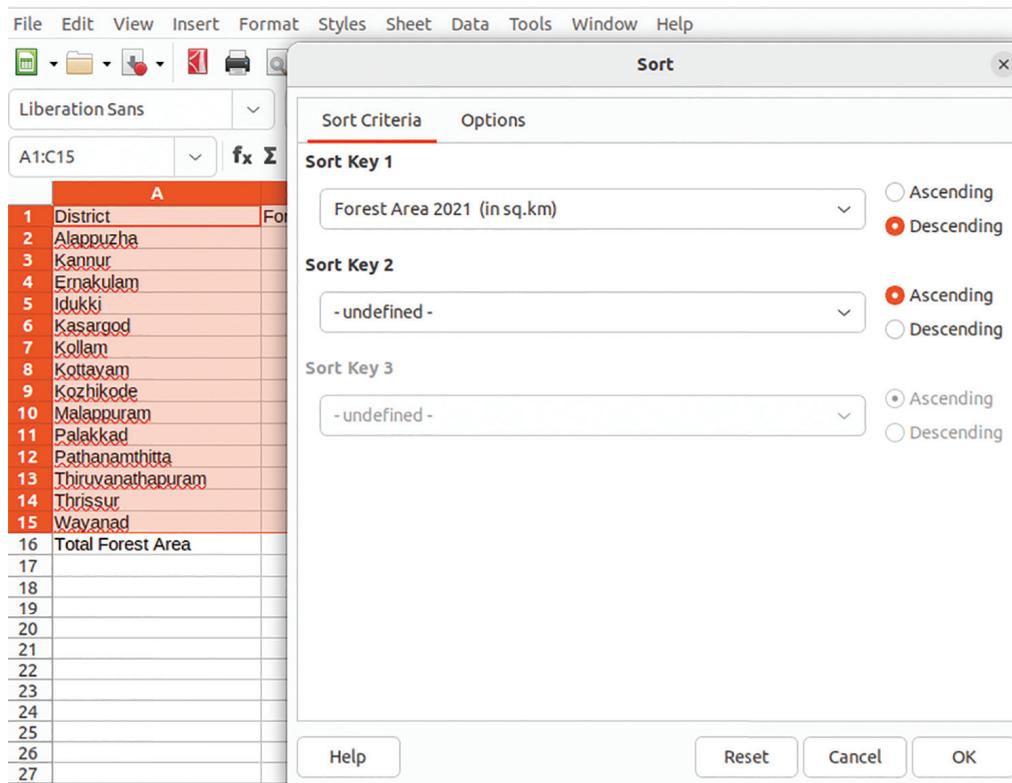


Fig. 1.4. The *Sort* window of the *LibreOffice Calc*

How will you sort the districts with the one having smallest forest area on top?

Graphs for Comparative Study

We can use graphs and charts for the easy comparison of data. Maybe, you still remember how graphs enabled us to easily compare data previously.

Shall we prepare a graph using the data in the Calc sheet?

First, we have to select those items in the table that we need for drawing a graph. Fig.1.5. shows the selected portion in the sheet. Please have a look at it.

A1:C15			
fx Σ = District			
	A	B	C
1	District	Forest Area 2011 (in sq.km)	Forest Area 2021 (in sq.km)
2	Idukki	3930	3155
3	Palakkad	1575	2104
4	Malappuram	1209	1984
5	Pathanamthitta	1755	1949
6	Kannur	641	1669
7	Wayanad	1775	1581
8	Kozhikode	591	1448
9	Ernakulam	695	1384
10	Kollam	1330	1334
11	Thiruvananthapuram	1349	1317
12	Thrissur	931	1166
13	Kottayam	889	1099
14	Kasargod	592	984
15	Alappuzha	38	81
16	Total Forest Area	17300	21255

Fig. 1. 5. The selected portion from the table for the graph

You can see that the row for the Total Forest Area is not selected. What do you think may be the reason? Try to guess, please. Write it down the exact reason in your notebook after finishing the graph.

To Select the Necessary Parts from the Table

- Click on the first cell to be selected (Here, A1).
- Press and hold Shift and click on the last cell to be selected (Here C15)
- There are other ways to do this. Hope you'll find them out.

Once you have selected the portion for the graph, we have to use tool to determine the type of chart we need. The tool is the *Chart* option in the *Insert* menu of the Calc sheet. Once you select the tool, a

new widow will be displayed. See Fig. 1. 6

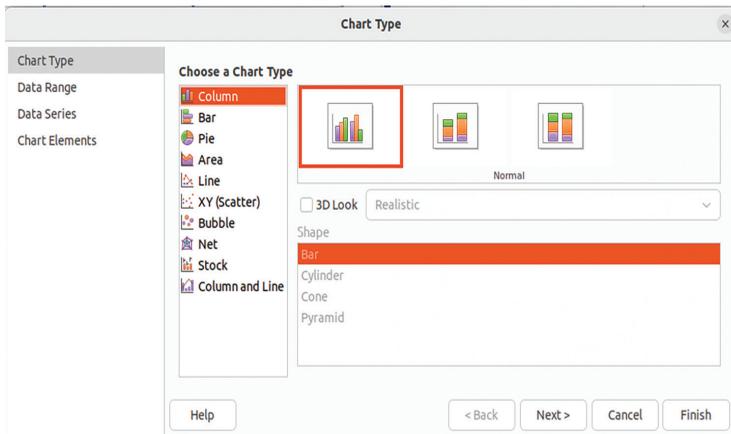


Fig. 1.6. The Chart Type Wizard

- On the left of the window, you can see *Chart Type* selected. There are also other options like *Data Range* and *Data Series*; those you will learn in higher classes.
- Go to *Choose a Chart Type*; you can see *Column* selected.
- Since we are not using options like *Data range*, we can now click *Finish*.

Don't forget to save the file.



Fig. 1.7. shows the graph we obtain, once you finish the task.

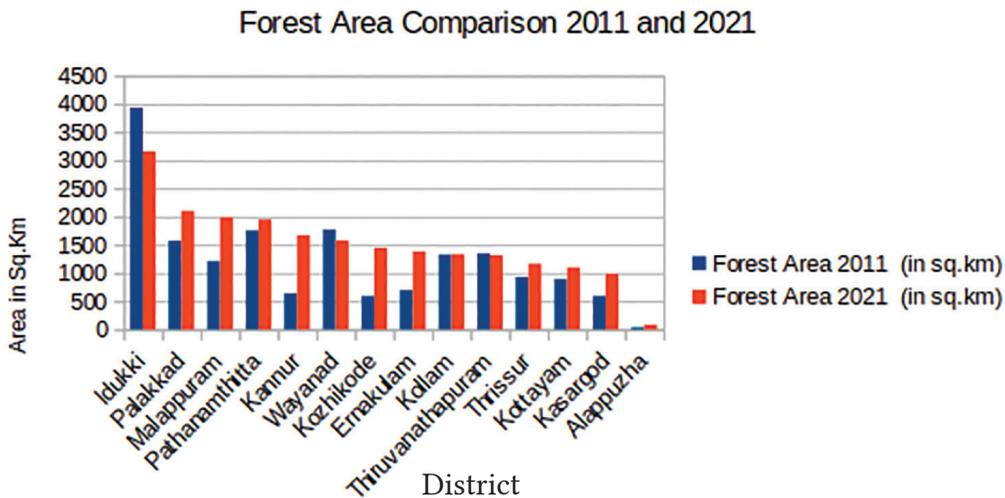


Fig. 1.7. The Graph Prepared

Examine the graph to answer the following questions:

- Which are the districts without any change in their forest land?
- Why did the name of the districts appear in the chart?
- What change would be there in the chart, if we selected the row *Total Forest Area* also at the time of preparing the chart.
- What will be the changes if we omit the headers, ‘District’, ‘Forest Area 2011 (in sq.km.)’ and ‘Forest Area 2021 (in sq. km)’ when we prepare the chart?

Table 1.2. shows the activities we did to draw the chart. Arrange those activities in the order we did it with the first step coming first.

Step 1	Select <i>Chart Type</i> and other options from the window obtained
Step 2	Select only the portion necessary for making the chart
Step 3	Click on the <i>Finish</i> button
Step 4	Select <i>Chart</i> option from the <i>Insert</i> menu

Table 1.2. The Steps to Build a Chart in the LibreOffice Calc



Assessment

- The name of the spreadsheet software in LibreOffice
 - a. Writer
 - b. Impress
 - c. Calc
 - d. Calligra Sheets

- What is the aim of *Sort Ascending* option in LibreOffice Calc?
 - a. To arrange data in ascending order
 - b. To arrange data in descending order
 - c. To shuffle data randomly
 - d. To erase the selected data

- To calculate the ----- of the numbers in cells A1 to A5, we can use = SUM(A1:A5).



Follow-up

1. Collect the number of students coming to school by various modes of transportation and tabulate it in LibreOffice Calc as shown below. Find out the transportation most students use, using the appropriate tool in Calc.

Mode of Conveyance	Cycle	School Bus	On Foot	Public Transport System	Own Vehicle
Number of Students					

2. Below is shown the score secured by some students in first terminal exams. Calculate the total score of each student using LibreOffice Calc.

Sl.No	Name	Malayalam	English	Hindi	Social	Science	Maths
1	Anu	88	90	85	70	75	68
2	Aami	85	80	82	79	78	80
3	Vinu	78	80	81	83	80	79
4	Sainu	57	55	60	75	90	92
5	Joshy	65	70	60	78	88	89

3. Complete the table after collecting data from your classmates. Using the appropriate tools in Calc, compare the data in the table.

Class	Those residing within 1 km. of the school	Those residing within 2 kms. of the school	Others

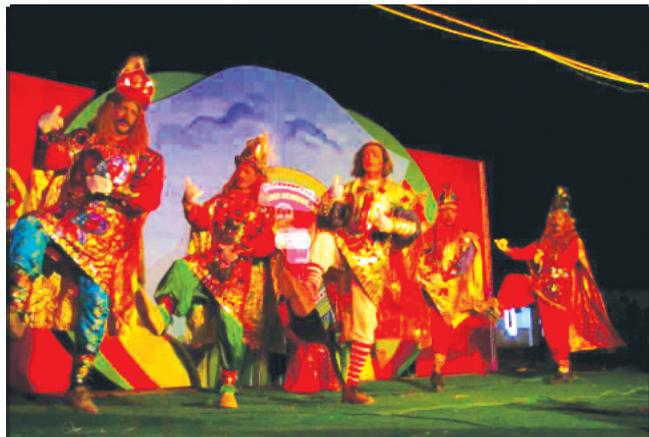
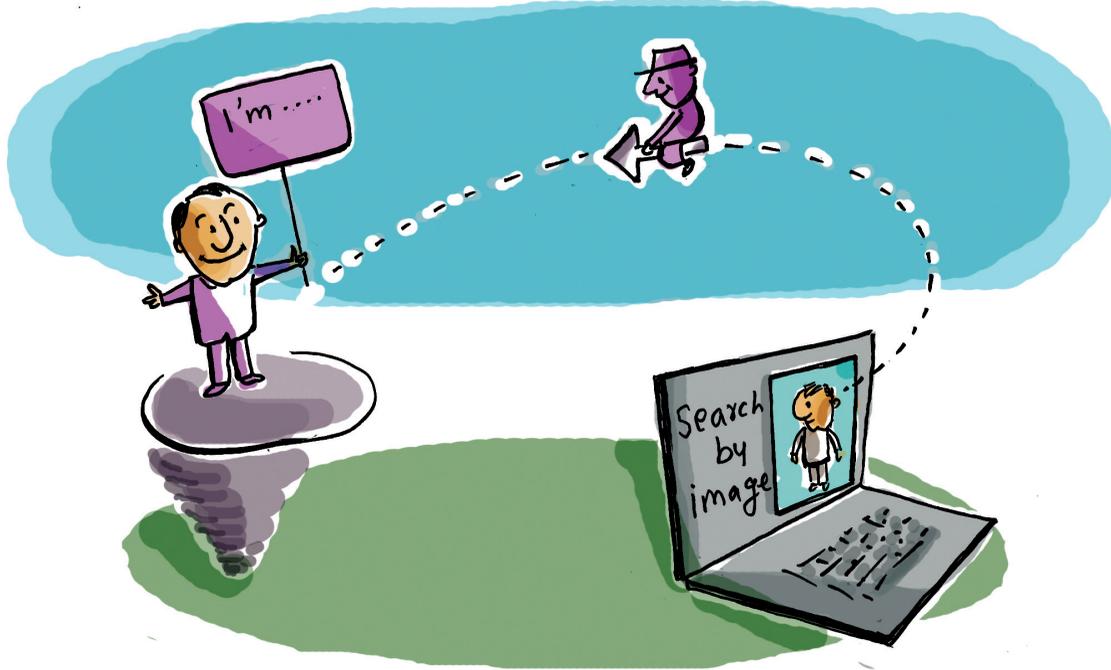
4. Find and list the activities around you that can be analysed using spreadsheet techniques familiar to you.

-
-



Chapter 2

Let's Search and Find



Take a look at the picture above.

It's a picture Ammu secured for her Photo Album about Kerala's art forms.

Could you help Ammu to write a description for her photo to add in her Album?

First, we have to find out which form of art it is.

How do we find it out?

- We can browse through books or magazines on Kerala’s art forms.
- We can search the Internet.
- -----

Which one of the above is the easiest source for search?

Internet facility is widespread today. If one has a computer or a smartphone, one can get data as and when one needs. Indeed, one has always ample data on one’s fingertips.

Internet – A Place for Data-Search

How do we get data from the Internet?

What facilities do our computers need for searching?

- We have to connect our system to the Internet (This can be done with a cable or a wireless device).
- Our system needs a software called web browser to display the data from the server (the master computer in which data are stored).

It is very hard, as you know, to dig up the data we want from the huge collection of data in the Internet. But there are many websites in the Internet itself that can help us



Internet

The Internet is the global system of interconnected computers and computer networks located around the world to communicate between networks and devices in order to perform a variety of services.

Server and Web Browser

A web page is a document or page on the Internet with its own address. A web server is a powerful computer that stores web pages, web server software and other supporting utilities.

Browser

‘Browser’ is the software that needed in the user's system to see the web pages stored in the server.

in this regard. They are called ‘search engines’.

Differentiate between web browsers and search engines in the picture given below.

Can we also use images to search?



	Category: Name:
	Category: Name: Chrome
	Category: Name
	Category: Search Engine Name:

Table 2. 1. Search Engines and Web Browsers

I've so far searched information only by typing words in the search box



Let's search the name of the Kerala art form depicted in the picture Ammu has.

- Go to *Home* and locate *School_Resources*.

You can see the picture in the the folder for Class VII students.

How do we collect from the Internet the information about this picture?

- Open a search engine that can help us to upload the picture.
- Click on the icon, *Search by image*

The window that opens will display *Upload a file*.



Reverse Image Search

Reverse Image Searching is a special feature in search engine that helps us locate the webpage we want from billions of web pages. Almost all search engines have this system. We don't need to type in words in this system; we just have to upload the picture we have to get other similar images and related data.

Let's Find the Details

To find the details about *Chavittunadakam*, you need to type in your browser's search box appropriate words/phrases related to that art form. Those words are generally called key words.

Can you guess the key words to be typed into the search box to get details of *Chavittunadakam* in Malayalam? Write them down after you discuss it with your classmates.

- *Chavittunadakam* in Malayalam.
- *Chavittunadakam* history in Malayalam.
- -----

Fig.2.3. shows the list of websites obtained when *Chavittunadakam* in Malayalam was typed in the search box.

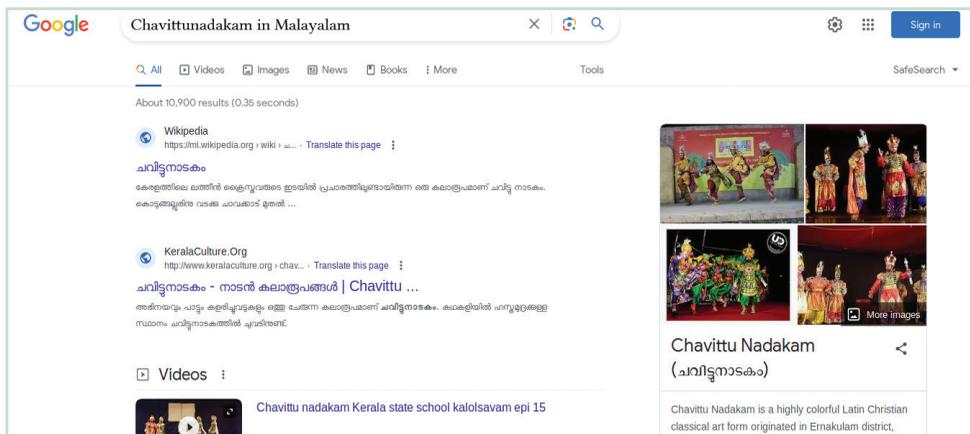


Fig. 2.3. The Web Search Window

Haven't you got enough data to write even an article about *Chavittunadakam*? You can now make a note of the necessary details from the web pages. Alternately, you can copy them into your *LibreOffice Writer* and save them in a folder.



Search Engines and Artificial Intelligence (AI)

When you started to type in *Chavittunadakam* in the search box, you may have noticed the web page automatically display other hints related to it (e.g., *Chavittunadakam* in Malayalam, *Chavittunadakam* songs, *Chavittunadakam* history). It is as though the system knew our search intentions! How does this happen?

It is with the help of Artificial Intelligence (AI) that the search engines figure out our search intentions. The search engines collect all the data of searches that happen all over the world (including our search data). They then analyse these billions of bits of info with the help of AI. That means, the search engines already know what people anywhere in the world are usually going to search! When we start searching, they give us hints based on those previous searches.

Search Filters

Look carefully at the browser window in Fig. 2. 4.

What tabs do you see below the search box?

- All
- Videos
- -----
- -----

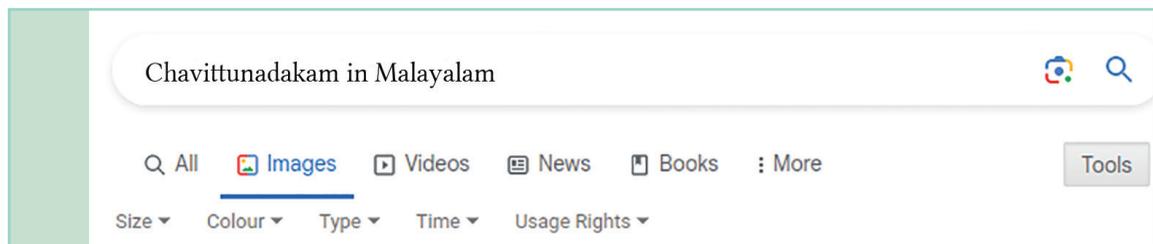


Fig. 2.4. The Tabs in Web Browser Window

Which tab would you use to get more pictures about *Chavittunadakam*?

Which tab is to be used to get videos about it?

Check each tab and find out.

Click on the tab, *Tools* in the search window. You can see new tabs like *Size*, *Color*, *Type*, *Time* and *Usage Rights* popping up. Check those tabs and find out their uses to complete the table below.

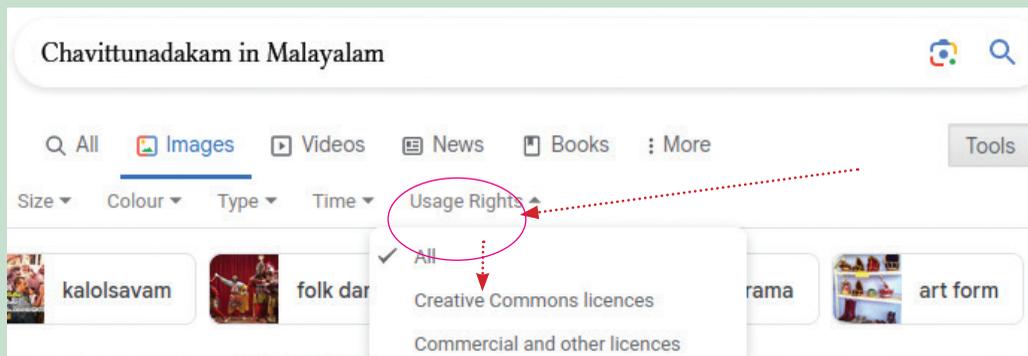
Tab	Use
Size	
Color	
Type	
Time	
Usage Rights	

Table 2.2. Search Filters



Copyright

We cannot download and use free all the resources in the Internet. Some of them are protected by copyright. We have to check that before we download. If you click on the tab, *Usage Rights*, you can see if a picture is copyrighted.



The tab, *Usage Rights* has the option called *Creative Common licences*. We can use free the pictures in that category. If we want to use pictures in other categories, we have to obey their conditions.

Internet in Day-to-Day Life

You have now learned to get texts, images and videos from the Internet in an instant.

What are the other uses of the Internet? Can you make a list?

- Get News. Read online newspapers. Watch TV channels.
- Share messages through social media.
- Buys things online. Book movie tickets.
- Pay utility bills.
- -----
- -----

In general, the Internet has become a part of our daily life. It has penetrated into almost all areas of our life. But, caution! Do NOT trust blindly every bit of info you get from the Internet. Some websites may contain misinformation.

I didn't go to school yesterday as I saw in the Internet that it was a holiday. Only today did I realise that the news was fake.

Our teacher has told us to ensure that the news of holiday is true by checking official websites.



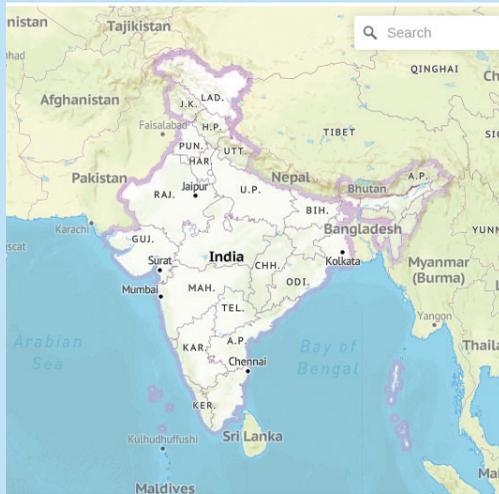
Internet as a Guide

Earlier, travellers and sailors were guided by observing the position of the Sun and the stars. Today, a smartphone connected to the Internet can act as a travel-guide. Maybe, you have seen online maps for distant travels. What are those maps? Can you guess them to complete the list below.

- Open Street Map
- Bing Maps
-
-



Web Mapping



Web Mapping or *Online Mapping* is the platform that can prepare a region’s map using the Internet and satellite technology. Such platforms display not only a region’s map but also the region’s satellite images, distances between places and their routes. Some platforms inform us about the routes with less traffic. Such platforms are also of great help in train travels when we want to locate stations and times of arrival and departure.

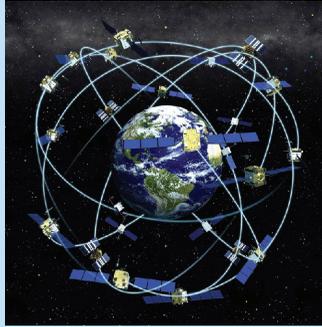
How do these help us in our journey. Just make a list of facilities these maps provide.

- We can share our location.
- We can find the distance to the location.
- We can find the time for travel.
-



Global Positioning System (GPS)

How do these maps on devices like smartphones show us the route to our destination? Have you ever thought about it? How do they inform us exactly about how far we need to travel or at what point we have to take a turn?



The system that enables these facilities is called the *Global Positioning System* (GPS). It is a satellite based system that can determine exactly our position on the Earth. GPS functions with the help of the satellites deployed around the Earth. They are deployed in a such a way that three or four satellites can survey at the same time any place on the Earth.

Cyber World

We have discovered that we can instantly find a lot of info about diverse topics from the Internet. That means, the Internet is a wide world of information. This virtual world of data is usually called the cyber world.

If you share and spread on the net information that defame individuals and institutions, it is considered a crime. The crime perpetrated by means of modern communication technologies like mobile phones and computers is called cybercrime. Almost every country has laws to deal with such crimes and the culprits. The control of and punishment for cybercrime in India falls under the laws of Indian IT Act.



Assessment

- Which of the following is a browser?
 - a. Yahoo!
 - b. Google
 - c. Bing
 - d. Firefox

- Which of the following is an example of online map?
 - a. Mozilla Firefox
 - b. Open Street Map
 - c. DuckDuckGo
 - d. Google Chrome

- Which of the following is a satellite device that can determine the destination and the direction of a traveller?
 - a. GPS
 - b. Search Engine
 - c. Web Browser
 - d. Google Chrome



Follow-up

1. Get the pictures of Indian freedom fighters with *Creative Commons Licence*, from the Internet and save them in a folder.
2. Collect data from the Internet to present a paper on *The Safe Use of the Internet* in a seminar conducted by your IT Club

Chapter 3

A Magazine on the Computer



The editorial board is delighted to have received articles to be published in its school magazine. More students have participated this time around. The board would like to turn the articles into a digital magazine and upload it to the *School Wiki*.

As part of the project, the board examined the digital magazines in the *School Wiki*. Fig. 3.1. shows the two pages they prepared after their research. The pages contain a story and an article on precautions for using social media.

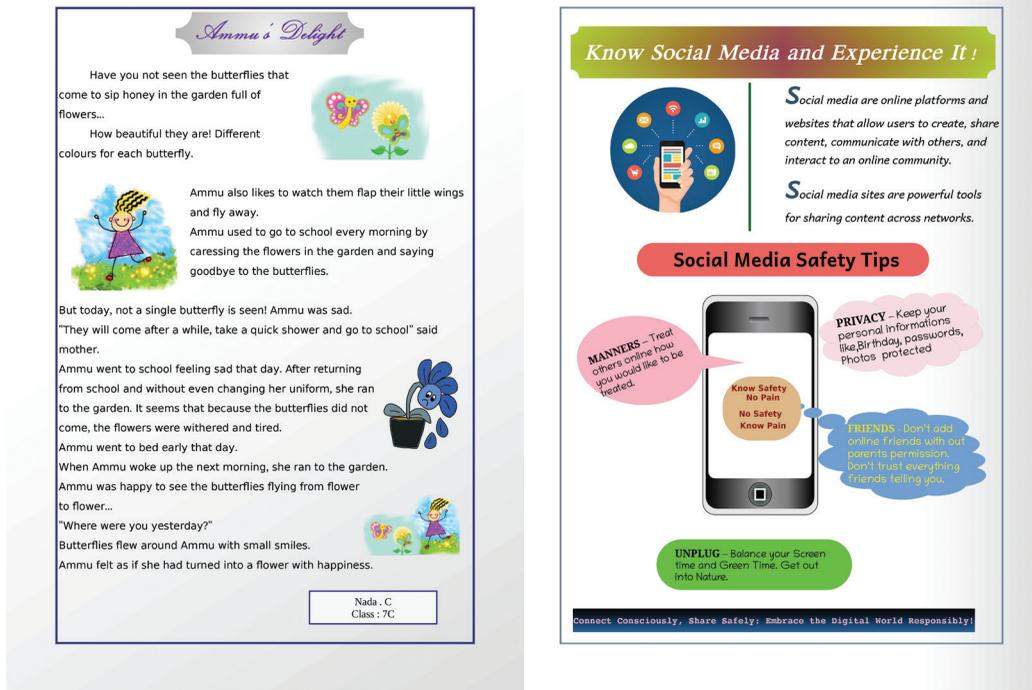


Fig. 3. 1. Digital Magazine pages – models.

What all are included in these pages?

- Arrangements of the text.
- Various shapes have been added.
- Background colours has been given.
- -----

Let's learn how such similar pages can be made using *LibreOffice Writer*.

Let's Make Our Content Nice



We already know how to type our content and its title in *LibreOffice Writer*. You have also learned how to beautify the content typed using *LibreOffice Writer*.

Open *LibreOffice Writer* and type in the following content. Also, make it attractive by using the tools you have mastered.

Ammu's Delight

Haven't you seen the butterflies that come to sip honey in the garden full of flowers?

How beautiful they are! Each butterfly has different colours. Ammu also likes to watch them flap their little wings and fly away.

Ammu used to go to school every morning by caressing the flowers in the garden and saying goodbye to the butterflies. But today, not a single butterfly is seen! Ammu was sad.

"They will come after a while, take a quick shower and go to school," said mother.

Ammu went to school feeling sad that day. After returning from school and without even changing her uniform, she ran to the garden. It seems that because the butterflies didn't come, the flowers were withered and tired. Ammu went to bed early that day. When Ammu woke up the next morning, she ran to the garden. Ammu was happy to see the butterflies flying from flower to flower...

"Where were you yesterday?" Smiling butterflies flew around Ammu. Ammu felt as if she had turned into a flower with happiness.

Nada C.

Class: 7C

Other than typing in, what are the ways by which we can enter content in a document? Hope you'll discuss this with your classmates.

Various Ways of Entering Texts

We already know how to type in content using the keyboard.

But there are also many other ways of entering texts in a document.

- **Speech Recognition:** We can turn data in audio form into texts with the help of a special software.
- **Optical Character Reading (OCR):** With the help of a software, we can turn pages into images (We can either scan these pages or take a snap of them with our mobile) and convert it into texts. The '*gImage Reader*' in our system is a software that can help us in this task.
- **Pointing Tools:** The *Onboard Application* in our system is such a tool. With its help, we can enter texts by clicking on the screen.

The table below shows some of the tools in the Writer software you have mastered. Which of the following tools have you while typing? Complete the table by entering all the tools you used while typing the content above.

Font Size	12 pt	To change the letter-size
Font Name	Liberation Sans
Italics	<i>I</i>
Underline	<u>U</u>	To underline letters
Font Color	<u>A</u>

Table 3. 1. Some Formatting Tool in *LibreOffice Writer*

Entering Shapes

Our pages may contain titles and words/phrases to be emphasised. In the document we have typed, they must look different from the other words in the text. You must have already noticed the titles in the sample given. Look at Fig. 3. 2. to examine their special features.

- The titles are encased in special shapes
- The shapes are given colours.
-
-



Fig. 3. 2. Arrangement of Titles

How do we prepare documents that include such kind of shapes? Let's see.

LibreOffice Writer has several shapes in its Tool bar. We can select from them the shapes we want to include in our document. We can also change their size.

Double click on the shape to type in the text

If you don't see the Drawing Toolbar, tick against *View* → *Toolbars* → *Drawing*



Entering Shapes in the Page

- Select appropriate shapes from the Toolbar.
- Click on the spot in the page where you need the shape and drag the mouse.



Changing the Size of the Shape

- Click on the shape to be changed.
- Click on the squares around it and drag them.

Enter the shapes (as shown in the sample given) in the document you have typed. And don't forget to note down how you have entered the shapes.

You can as well type your content into the shapes you have just included. Try it, please.

When you add shapes or images, the text in that part may get shifted or overlapped. *LibreOffice Writer* also has ways to overcome this problem. The tool *wrap* is meant for solving it. If you click the right button of the mouse on the shape/image, the tool, *wrap* will pop up.

Just drag the shape you have just entered towards the text. What do you see? Now, try the options in the *wrap* tool and complete the table 3.2.

Wrap Off	 <input type="radio"/> Wrap Off	Text can be arranged above and below the shape. In this setting, text will not appear on either side of the image.
Optimal Wrap	 <input type="radio"/> Optimal	Text gets adjusted as the shape moves.
Wrap Through	 <input type="radio"/> Through
Wrap before	 <input type="radio"/> Before	To arrange the text on the left side of the shape.
Wrap after	 <input type="radio"/> After

Table 3.2 Shape / Image wrap features

Adding Pictures to the Text

Sometimes we need to include pictures in our document. To do this, you have to go to *Insert* menu in the *LibreOffice Writer* and select the option, *Image*.

When you include pictures, you may face some issues.

Inserting Pictures in the Document

- Click on the spot where you want the picture
- Select *Image* from the *Insert* menu
- Select the picture from the window and click 'Open'

- You may have to crop the picture according to the space available
- You may have to use only a part of the picture
- You may have to rotate the picture
-

You can change the size of pictures in the same way as you have changed the size of shapes.

Try it in the document you are preparing; use the 'crop' tool as well if you need.

Cropping Pictures

- Right click on the picture
- Select *Crop* from the menu
- The sign to change size will shift to the sign for cropping
- Click on the sign and drag to eliminate the unwanted parts of the picture

To cut a portion from the picture, you have to use image editing software you have used earlier.

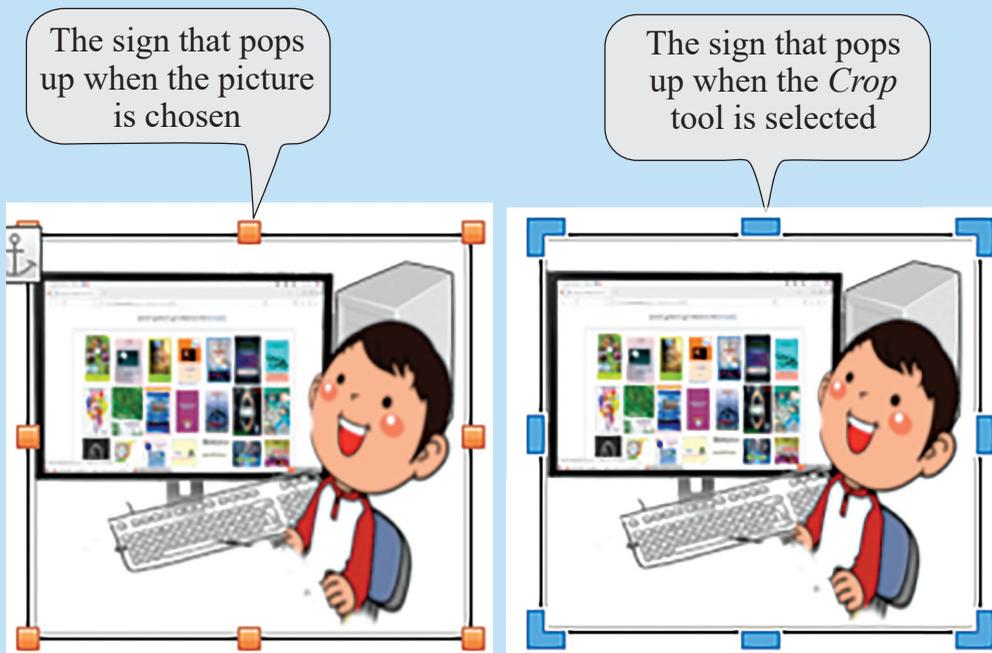


Fig 3. 3. The changes at the borders as you select the picture or use the option, *Crop*, the signs

Hope you will make appropriate changes in the pictures you have entered.

When you selected your picture, you might have noticed some new tools appear. See Table 3.3.

Tool	Use
	to crop
	to flip

	to rotate left



Table 3.3. Tools appear while selecting image

You already know that the first tool is for cropping. What are the uses of other tools? Select the image you just inserted and identify the use of these tools. Then complete the table.

Adding More Style to the Page

We have included in the pages text, images and shapes. What else is there in the sample (Fig.3.1) given to make the page more appealing?



- The whole page has been coloured.
- The page has been given border.

Go to the *Format* menu in the Writer and click on *Page Style* to see what pops up in the window. There are tabs which help us to colour and border the page. Use them to change the document’s style.

We change the background colour of the shapes in our document in the same way. Right click on the

shape and select *Area* from the menu. Use the options there to see what changes you can make.

Save your changes as you make them.

Using the tools you have learned by now, you can make your document as attractive as practicable. There are many other facilities in *LibreOffice Writer*. You will learn them in higher classes.



Assessment

- Which of the following is a LibreOffice Writer file?
 - a. Magazine.ggb
 - b. Magazine.odt
 - c. Magazine.mp4
 - d. Magazine.mp3

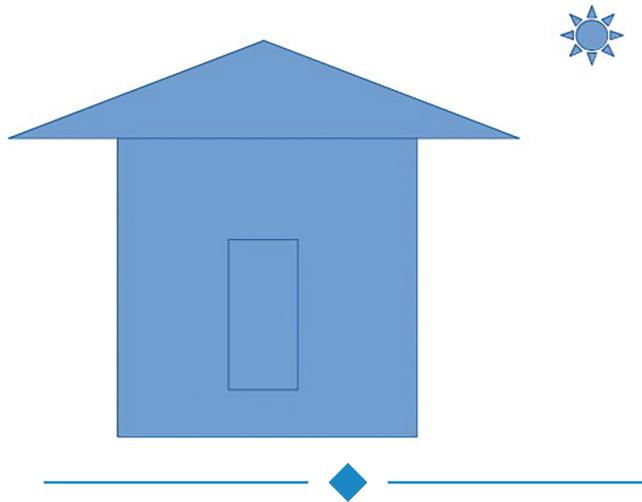
- Which is the LibreOffice writer Toolbar that carries the tools to draw geometric *shapes* including the geometric ones?
 - a. Standard
 - b. Drawing
 - c. Formatting
 - d. Table

- When you add a picture in your document, the text in that place may get displaced. Which tool would you use to solve this problem?



Follow-up

1. The illustrated description of your school excursion needs to be published in your school magazine. Prepare the description using *LibreOffice Writer*.
2. Using *LibreOffice Writer*, prepare a poster to displays the precautions on cyber security.
3. Using the Drawing Toolbar in *LibreOffice Writer*, draw the picture given below.



Chapter 4 Colourful Pictures



Look at the travelogue Hita has written!

Wow! The lighthouse we've climbed up. Was it drawn on the computer?



Ravi was checking his friends' articles for the school magazine, when he spotted Hita's travelogue.

The teacher has told the editorial team to make a digital magazine this time around. They already know how to type the text using computer. But how do they include Hita's hand drawn picture in the computer?

There are a few possible ways given below. Have a look at them, please.

- We can take a snap of the picture using camera and copy it onto the computer.
- We can include the picture in a computer with the help of a scanner.

Besides, we can directly draw or paint the picture on the computer.



If we draw the picture on the computer, we can make it sharper and clearer, don't you think? Not only Hita's picture but also the pictures for other articles too can be drawn thus to make the magazine more attractive.

How do we draw Hita's picture on our computer? Shall we give it a go?

You know, we need a painting software to draw digital pictures. Our computer has more than one such software. You have already learned some of them in previous classes. Which are they?

- Tux Paint
- -----

Our computer has a software called *Krita* for drawing and painting. It is one of the best painting software with many facilities. Let's do this activity using *Krita*.



Krita



Krita is a free graphic software for painting and animation. *Krita* can also help us to create pictures, posters, brochures and ads, and to edit them.

Look at Fig. 4.1. It is a sample of the picture in Hita's travelogue. We need to create such a picture on our computer.



Fig. 4.1. The sample picture to be created on the computer

Hita has painted a seashore in daytime. What are the things you see in the picture?

- The sky dotted with little clouds
- The sea
- The shore
-

One by one, let's draw these things in the list with the Krita software.

Let's Get the Canvas Ready

First, we need a canvas to draw. And, we have to determine the size of the canvas. Let's say we need a canvas with a width for 800 pixels and a height for 500 pixels. Now, open Krita to create a canvas of that size.

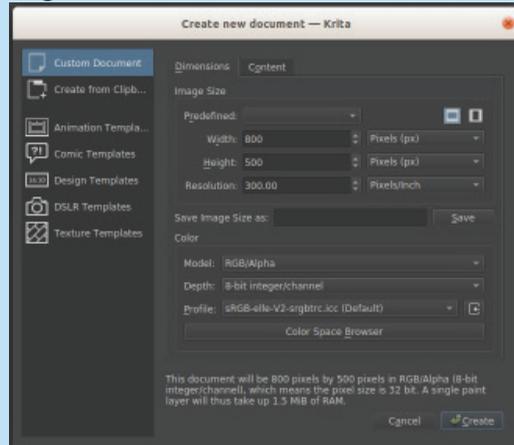


Pixel

In digital imaging, pixel is the smallest addressable element in an image. The word pixel is a combination of *pix* (from *pictures*, shortened to *pics*) and *el* (for *element*). The size of an image is depended by how many pixels make up an image.

Creating Canvas in Krita

- Open *Krita* and click on *New File*.
- Specify in the window the required width and height of the canvas.



- Click on *Create* at the bottom of the window

Once the canvas is ready, you can draw the picture on it.

Let's Familiarise Krita

Look at Fig.4.2. What you see is the main window of Krita.

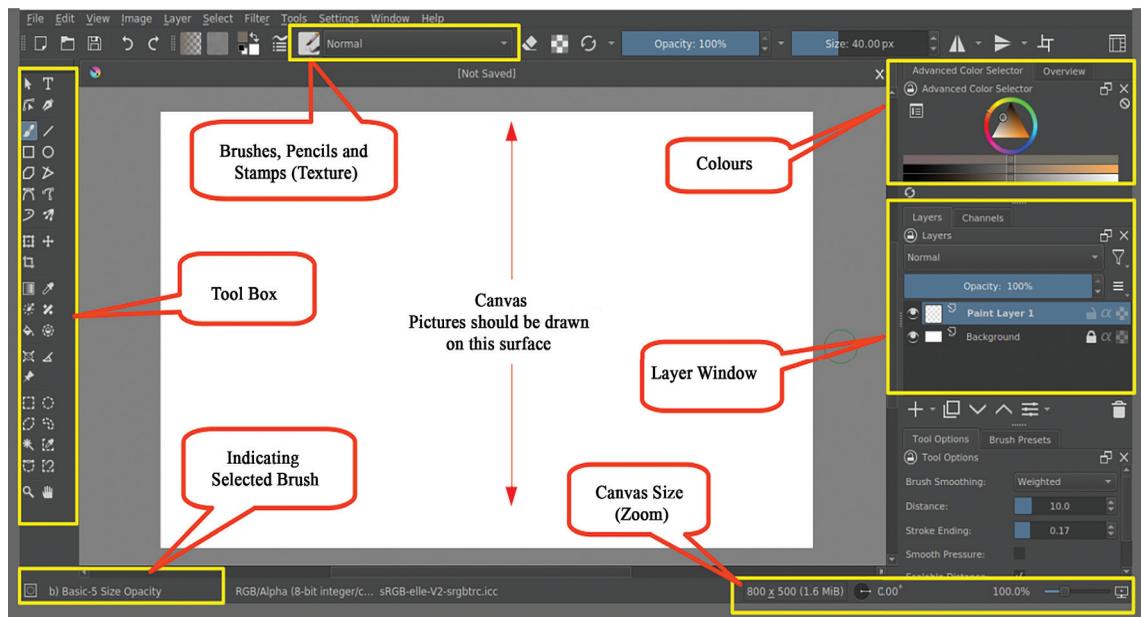


Fig. 4.2. *Krita's* Main Window

Dockers

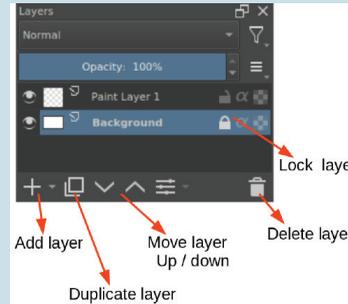
Dockers are small sub-windows found in *Krita* software. It contains useful tools like *color selector*, *layer stack* etc.



Krita Docker window

Layers

Layers are an important feature in image editing software. Layers are transparent skins that can be added on top of an image. It will be convenient for editing later if each part of the image is drawn in different



layers. See the tool for adding a new *Layer*. It is marked in the image.

Layer Window in Krita

You now know the important features of *Krita*. Let's now go to the left of the window. Touch the mouse pointer on each tool in the toolbox. What do you see? You see the names of each tool popping up, don't you? Complete the table below using the names of these tools.

1		Freehand brush tool
2		
3		
4		
5		

Table 4.1. Some tools in *Krita*

Since we have learned about the dockers and tools in *Krita*, let's start drawing the picture that Hita painted.

Let's Draw the Sky

We've already seen that parts of images can be drawn in different layers. This facility is also available in *Krita*.

As we open the canvas in *Krita*, you can see two layers appear – *Background layer & Layer Paint 1*. To draw the picture, we need to select these two layers from the *Layers Docker*.

In our picture, the background has the sea, the sky and the seashore. Other things are drawn as objects. Look at Fig. 4.3 and complete the table 4.2. by finding the appropriate layer for each picture.

When you select the 'Background layer', please don't forget to remove the 'Lock'.

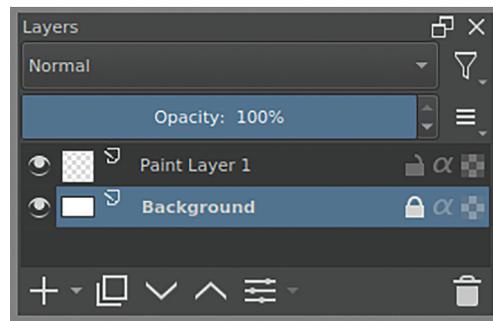


Fig. 4.3. *Krita's* Layer window

Background	Background
Lighthouse	
Grass	

Table 4.2. Layers for Painting

Look at how colour is applied to the sky as in Fig.4.4. The sky is drawn using two colours – blue on the top and white at the bottom. When you want to add two colours in this fashion, you can use the tool, *Gradient (G)* in *Krita*.

See fig. 4.4. Try painting the sky in your canvas as shown in the figure.



Fig. 4.4. When the sky is painted.

The sky is drawn. Now, shall we add the sea?

Let's Draw the Sea

You have to add the sea at the bottom half of the canvas. There are various tools in *Krita* to select a particular portion of the canvas. To get a rectangular shape, you can use *Rectangular Selection* tool. To paint that part, use *Gradient* tool.

The icons of some of the selection tools in *Krita* Tool *Docker* is given here. Find their names.



Now, using the *Gradient tool*, apply the colour of the sea at the bottom-half the canvas. See fig. 4.5.

We have now the sea and the sky in the background. Let's proceed to add the seashore in the same layer.

Using Gradient to Paint

- Select *Background Layer*
- Select a suitable colour from the *Foreground Colour Selector*

(As *Background Colour Selector* already has the colour white, we don't have to select white.)

- Select *Gradient tool(G)* from the *toolbox*
- Drag from top to bottom to fill the canvas with colour

If you are not satisfied with your attempt, go back using *Edit* → *Undo* and paint again.

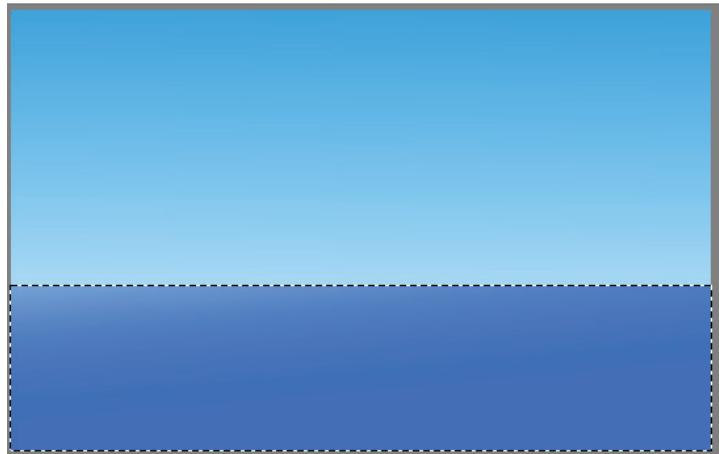


Fig. 4.5. When the sky and the sea are drawn

Drawing the Seashore

The seashore (the beach) is to be drawn at the very bottom of the canvas. To do that, paint that portion after selecting it with the *Polygonal Selection Tool*. See Fig. 4.6.

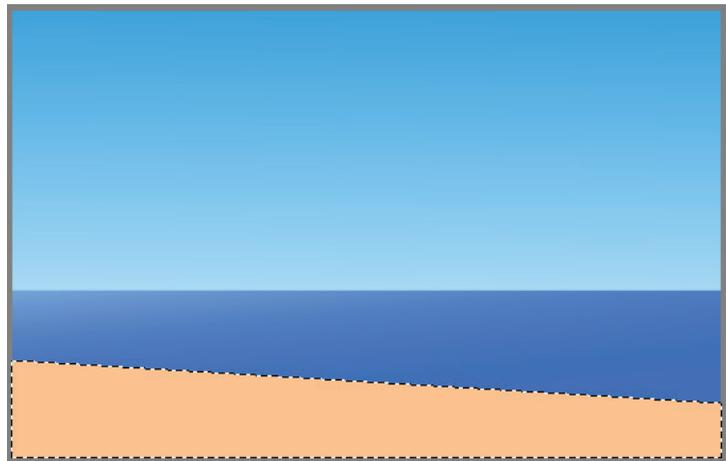


Fig. 4.6. When the seashore is drawn

Drawing the Seashore

- Select *Polygonal Selection Tool*.
- Select only the portion to be painted.
- Apply colour in the selected portion using *Fill a Selection Tool*.
- Use *Deselect* option after right clicking to remove the selection.

So painting the seashore is finished.

Now, using the *Gradient tool* you have learned earlier, join the colours to make it look attractive.

Waves on the Sea

In Fig. 4. 1. We see the sunrays reflected by the waves in the sea. Let’s make our waves also more beautiful by drawing them in the same way.

Krita has many brushes and stamp patterns. We can use these to make our pictures attractive easily. The *Texture Brushes* in the toolbar will help us in the task.



Fig. 4.8. When the sea waves are drawn

Look at fig. 4.8. Using *Texture Brushes*, make the surface of your sea as attractive as in the picture.



You have now drawn the background. So, let’s save the file. After selecting *File* → *Save*, click on *Save* after naming the file.

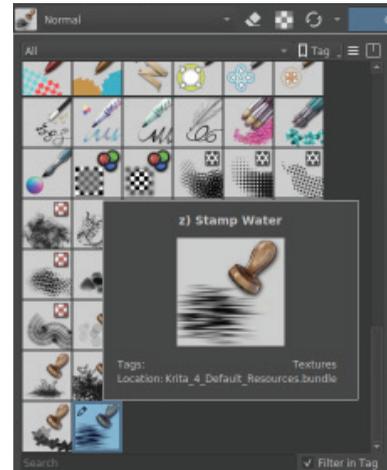


Fig. 4.7. *Texture Brushes*

Drawing the Waves

- Select *Freehand brush tool* from the Tool box
- Select *stamp water* from *Choose brush preset*



- Use *Toolbar* to adjust the length & colour of the brush
- Click on the seawater to draw waves

Hope you’ll remember the Format of the picture you’ve saved



Blender Blur

Use the brush, *Blender Blur* to merge the colors.

Hiding the Layers

To the left of each layer in the *Layer Docker*, there is an *eye* icon. If you click the *eye* icon on and then activate it, you can see the layer. Deactivate it to hide the layer.

See how easy it is to draw the waves! Similarly, you can also draw the clouds in the sky. Use the brush, *Airbrush Soft* to draw the clouds.

The Grass on the Beach

Look at Fig. 4. 1. once again to find out what else is needed to complete your picture.

- Grass
- Lighthouse

First, Let's draw the grass.

You know that all the background elements are drawn in layers.

If you draw the other elements of the picture in the same background, it will be difficult to erase or shift them. So, let's draw them in different layers.

To draw the grass, we can use *Paint Layer 1* from the Layer Docker.

Using the Texture Brush, you can easily add the grass on the canvas in the same way as you have added waves.

Select an appropriate brush from *Choose brush preset* to draw the grass. See Fig. 4.9.



Fig. 4.9. When the picture was completed

Don't forget to save your file after you have completed each step.

Drawing the Lighthouse

We have to draw a lighthouse as well. Let's do it in a layer different from *Paint Layer 1*. How do we include a new layer in *Krita*? On page 44, there is a description and a picture of layers. Read the description to create a new layer, *Paint Layer 2*. See Fig. 4. 10.

Generally, lighthouses are towers with angular shapes. Draw the outline of the tower to paint it and complete the picture.

It may be a little difficult to draw straight lines using brushes. If so, use *Bezier Curve tool* from the toolbox. See Fig. 4. 11.

Drawing the lighthouse is now complete. Now, it is to be given colours.



Fig. 4.11. Lighthouse included in the figure

Let's Paint

Usually, a lighthouse is painted black, or white or red. Sometimes two of these colours are used. Find out which tool we need to use to colour the outline of our lighthouse. Try the tool, 'Fill a selection (F)'. Hope you'll appropriately paint your lighthouse in this way.

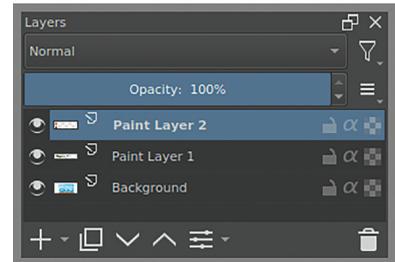


Fig 4.10. After the creation of New layer



Grid Lines

Grid lines on the canvas make it easier to draw.

To get the grid lines, tick against the option, *view* → *show grid* on the menu bar.

(Remove the tick mark after the use).

Making the Picture Attractive

- Using *Blender blur-brush*, merge the colours at the border.
- Using the tools *Move & Transfer*, change the position and the size of the picture.

You have completed your picture, haven't you? But, as you can see, the lighthouse is positioned in the front. Can we try to push it to the back of the grass?

Let's see.

Arranging the Layers

We have drawn our pictures as different layers. Do you remember each picture in each of the layers?

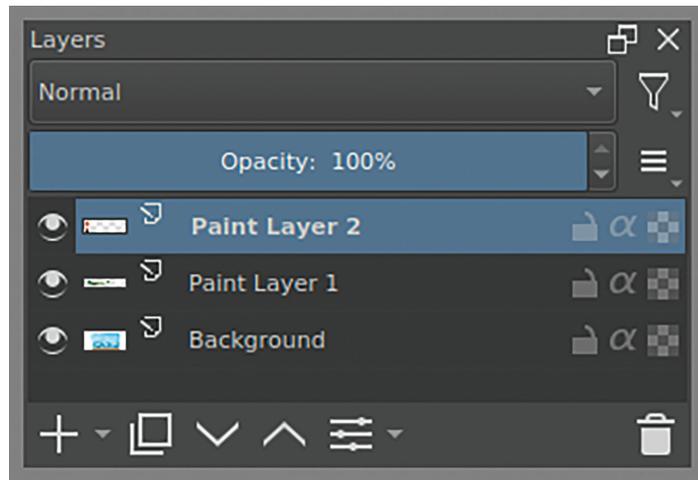
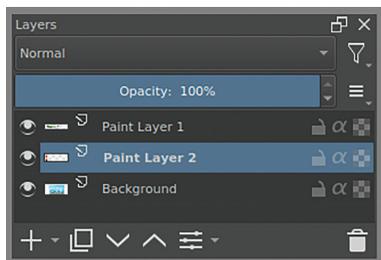


Table 4. 3. The Layers.

Complete the table below.

Paint layer 2	
Paint Layer 1	
Background	The seashore background (the sea, the sky, the beach)



The last picture (the lighthouse) seen as positioned on the grass. But we need it behind the grass. To do that, move *Paint Layer 2* to the layer just below it. Read the note on layers on page 44 and move *Paint Layer 2* in the *Layer Docker* to the layer just below it.

See, the lighthouse is now behind the grass.



Fig. 4. 12. The completed picture

And, let's not forget to save the file.



Exporting the Picture

The picture we have now prepared is saved in the File format of *Krita*. Will this file work in mobile phones and other systems?

Krita's project file format is *.kra*. This file can be opened only in *Krita* or a software that supports the *.kra* format.

If you want to use this picture for any other purpose, you have to convert it into a general picture-file format. The *Export* option in *Krita* will help you do this. The picture-file format, *PNG* can be opened by almost all computers. So, export it to *PNG* format and save it.

- You can export the picture using *File* → *Export* in the menu bar.
- While exporting, remember to select the file format (Here, *PNG* image) in the window, Files of types.

We have created a picture using the *Krita* software. Try creating more pictures using the other tools in *Krita*.

Please don't forget to save.



PNG Images

PNG is the short form for *Portable Network Graphic*. Pictures in this format can be used in transparent/ translucent background.



Assessment

- Below are given a few selection tools in *Krita*. Which of these tools is appropriate for selecting the required parts from a picture?
 - a) Polygonal selection tool
 - b) Select shapes tool
 - c) Move a layer tool
 - d) Line tool
- Which of the following is the project file format of *Krita*?
 - a) kra
 - b) png
 - c) mp4
 - d) odt
- Which brush in *Krita* can be used to merge the colours at the border?
 - a) Dynamic brush tool
 - b) Freehand brush tool
 - c) Blender blur brush
 - d) Edit shape tool



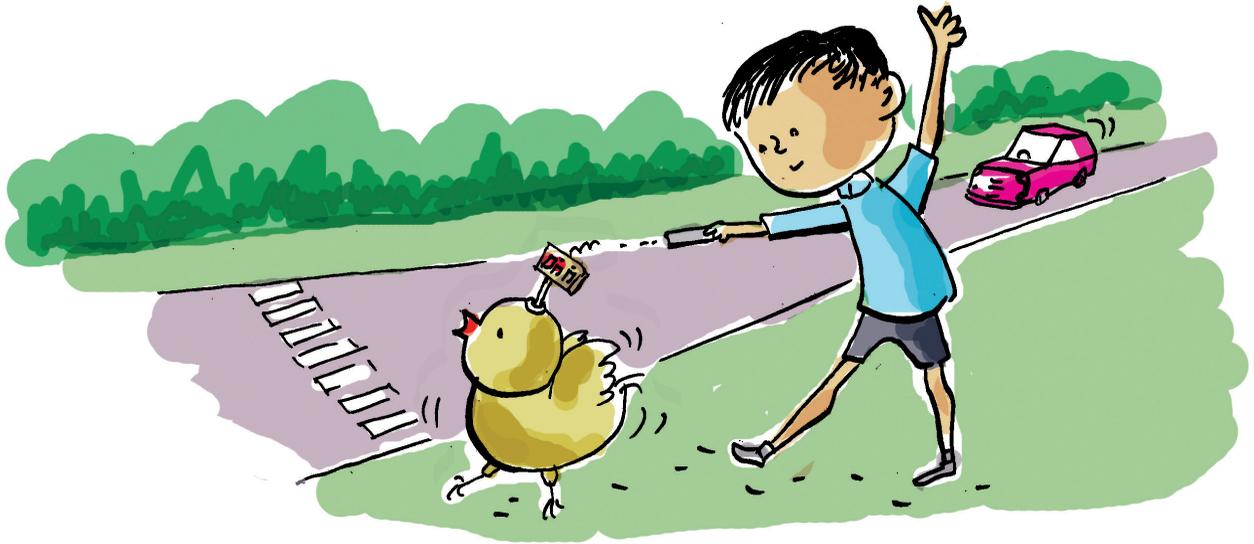
Follow-up

1. Draw a ship far away on the sea in the picture you have already drawn.
2. Your picture is now on your computer. What are the steps you need to take to get a print of this picture? Please find out.



Chapter 5

Creating Computer Games



There are too many games in our mobile phones and computers. How many of them do you know?

- Sudoku
- Chess
- -----

Who created these games?

Can we also create such games?

How are these computer games created?

You know that computers work according to our instructions. The method of putting in instructions for computers to work is called *computer programing*. It is through computer programing that games and applications (apps) are created.



To give instructions into a computer, we need

computer languages. *Scratch*, which you learned in the previous classes, is one such language. Have you come across any other computer languages?

- Java
- Python
- -----



Computer Language

Computer languages are created to control computers. Java, C++ and Ruby are some of them we use today. Usually programs are created by typing instructions in the form of texts. Instead of using texts, we can also develop using *block programming*, in which programmes are developed with code blocks. *Scratch* follows on *block programming* technique.

In our resource folder, there is a game created through Scratch. We may try that game.

To activate the game,

- Go to *School_Resources* on *Home* on your computer and open the folder for Class VII students.
- Double click on the file, *Roadcrossing.sb3* to open the game. See Fig. 5.1.



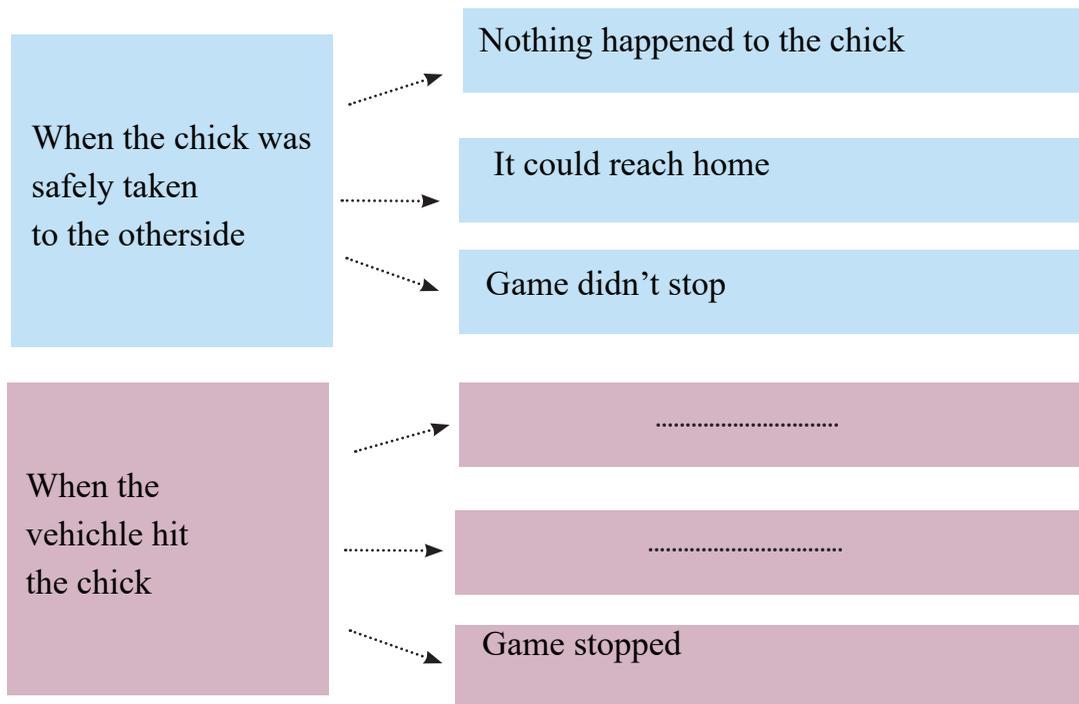
Fig. 5. 1. Road Crossing Game – the main window

Let's take the Chick Home

In the game, there is a chick whose home is on the other side of the road. There is heavy traffic, and the chick has to cross it to reach home.

The game begins as you click on . We can use the keys, (UP arrow) and (DOWN arrow) to move the chick back and forth. Try taking the chick home without it getting into any traffic accident.

Could you always take the chick safely to the other side? What happened to the chick when it crashed into a vehicle? Did the game stop at any time? Repeat the game and complete the timeline below.



Let's Create a Game

Scratch can be used to create games like the one we just played. Shall we create the same *Road Crossing game* using *scratch*? What do you say?

Before we create the game, we must know thoroughly each object in the game. We should understand exactly every object (element) in the game and how they behave at each stage. Complete the table below based on the game we just played.

Objects	Working
The picture with the road	<ul style="list-style-type: none"> • Exists as the background.
The chick	<ul style="list-style-type: none"> • Moves as UP & DOWN when arrow keys are pressed • •
The vehicle	<ul style="list-style-type: none"> • •

Table 5.1. Road Crossing Game - The stage of activity

Now, let's create the game after incorporating these objects.

Creating the Background

As the background, we need the picture with the chick's home (the henhouse). *Scratch library* has many pictures, but not the picture for our background. So, let's take the picture *Village.png* in the resource folder. For this,

click on the *stage* icon 

Select the option, Upload Backdrop



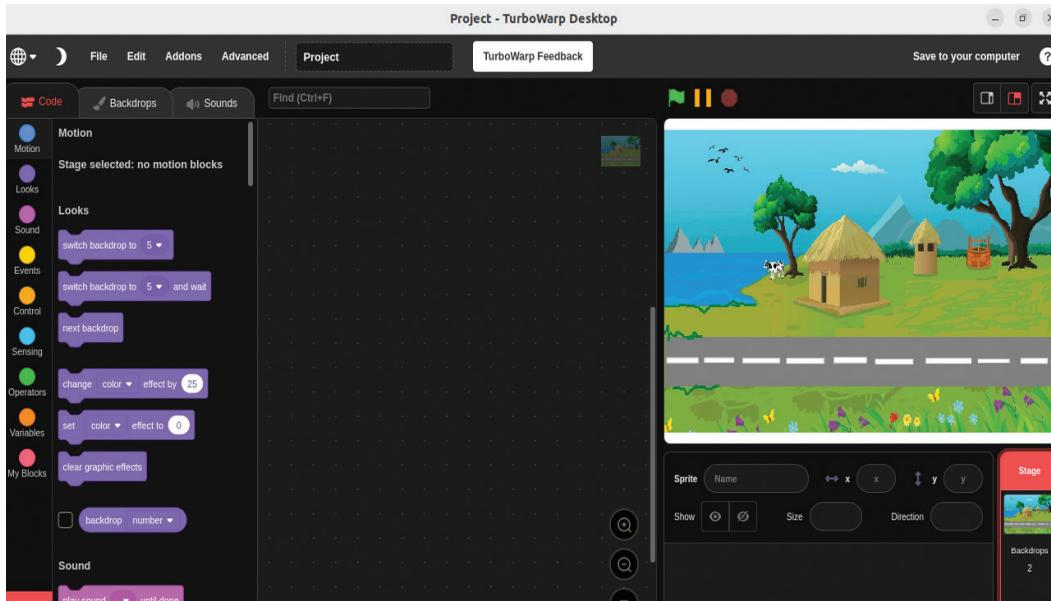


Fig. 5.2. The window with the Background Picture

- Click on *village.png* in the resource folder to add it. See fig. 5.2.

Is there any easy way to locate the picture we want from the Backdrop library? Try it.

The Moving Chick

Who is the main character in the game? Yes, the chick.

How do we move it? Maybe, you remember that we moved it by means of the arrow keys.

We can add the chick as a *sprite* in to the game. Since our *scratch library* has no chick in it, use the one in the resource folder. To add the sprite from the folder,

- Choose the *sprite* icon
- Click on the option, *Upload sprite*
- Find the *School_Resources* folder and select the picture, *chick.png* to add it. See Fig. 5.3.

Stage and Sprites

Characters used in animations and games created in *Scratch* are called *sprites*. The *stage* is the background on which these *sprites* are arranged.

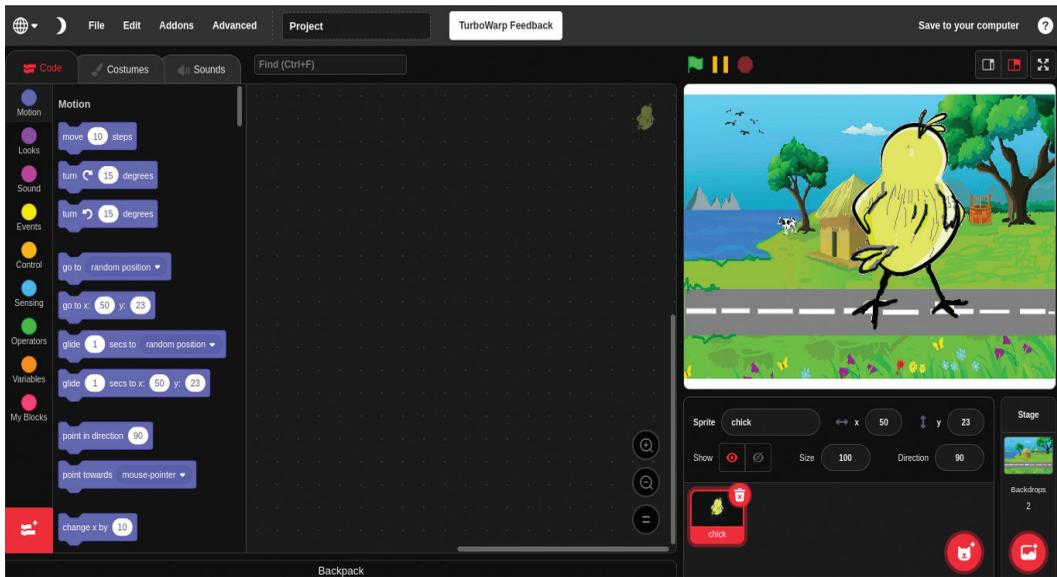


Fig. 5.3. The window with the *sprite*

To adjust the size of the sprite, go to *sprite properties* and enter the size you need in the *size* column. See Fig. 5.4.

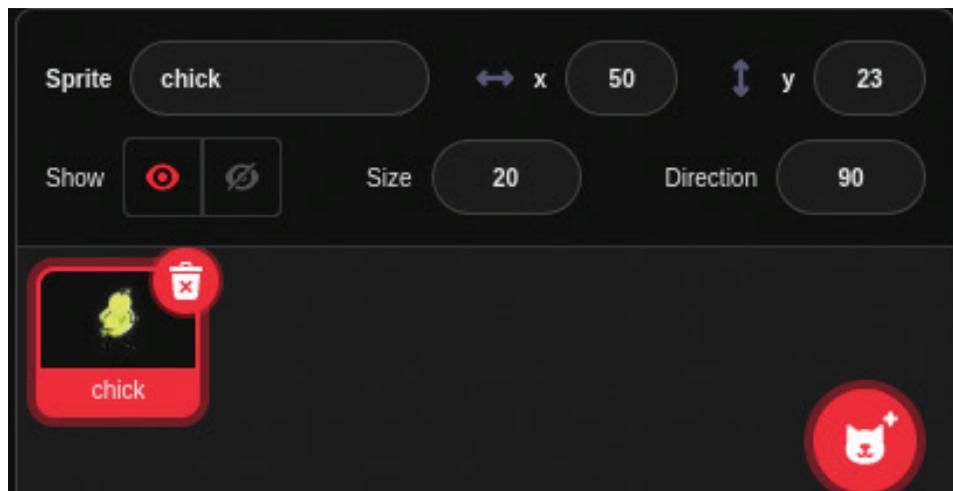


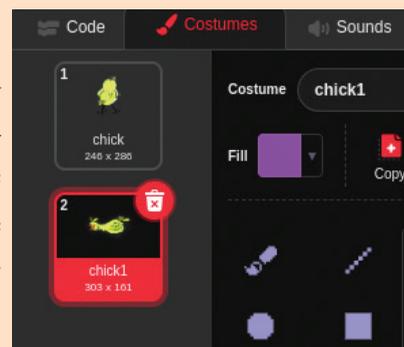
Fig. 5.4. Sprite properties window

Also, please find out what other facilities are there in *sprite properties* to fine-tune the sprite.

When the vehicle/ the car hits the sprite, it has to fall. How do we achieve that? Read the note below.

Costume

To illustrate the motion, emotion and changes in form of a *sprite*. *Scratch* has a method of providing different images. Those images are called *costumes*. Except for the first *costume* of the *sprite*, all other *costumes* are taken from the *costume tab* of that *sprite*.



So, we need another image to change the chick's *costume*.

Check the *Resource_Folder*.

Let's use the picture, *chick1.png* in the resource folder.

How do we add it? Just follow the steps below to include the fallen chick costume (*chick1.png*).

- Select the *sprite* (the chick)
- Select the option, *upload costume* from the icon, *choose costume* in the *costume tab*. See Fig. 5. 5.

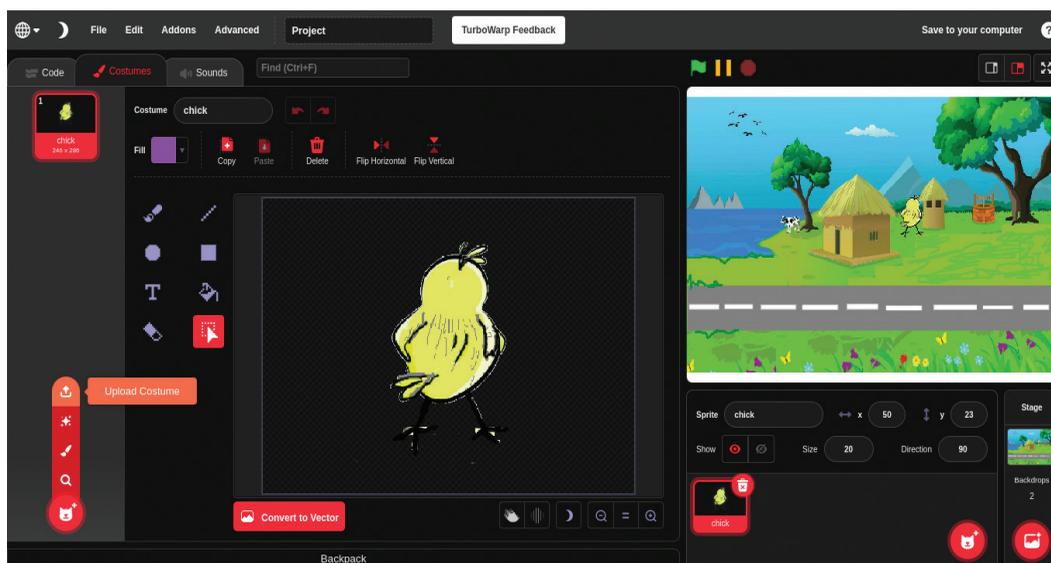


Fig. 5. 5. The window to upload the New Costume

- Select *chick1.png* from the folder and include it. We have now two costumes for our sprite, the chick. See Fig. 5.6.
- When the vehicle hits the chick, you can display the second costume in place of the first.

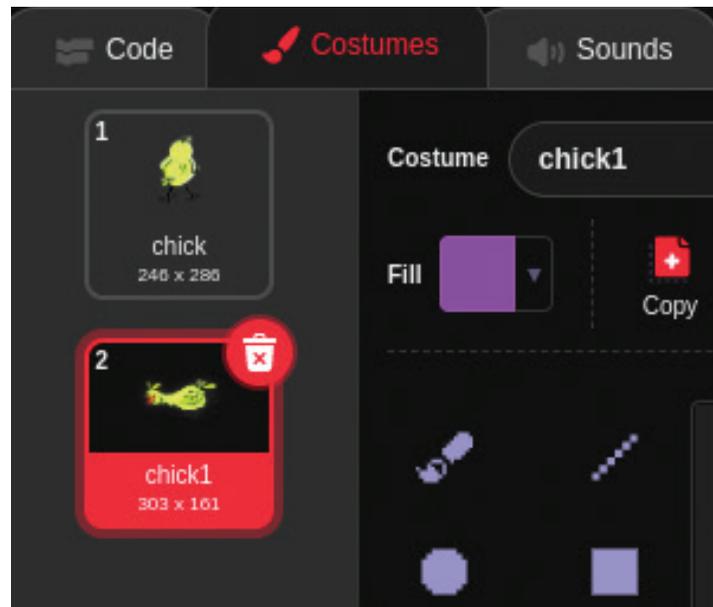


Fig. 5.6.

The change after the new *costume* was applied



Moving the Chick

Let's now consider applying motion to the chick. It moves up when the arrow key, 'UP' is pressed. Let's write down those steps in order.

- Press the arrow key, 'UP'
- The chick's direction is arranged upwards
- The chick moves up

Click the *Do not rotate* option in the *direction box* of the *sprite properties* to prevent the chick from rotating when the direction changes. (See Fig. 5.7)

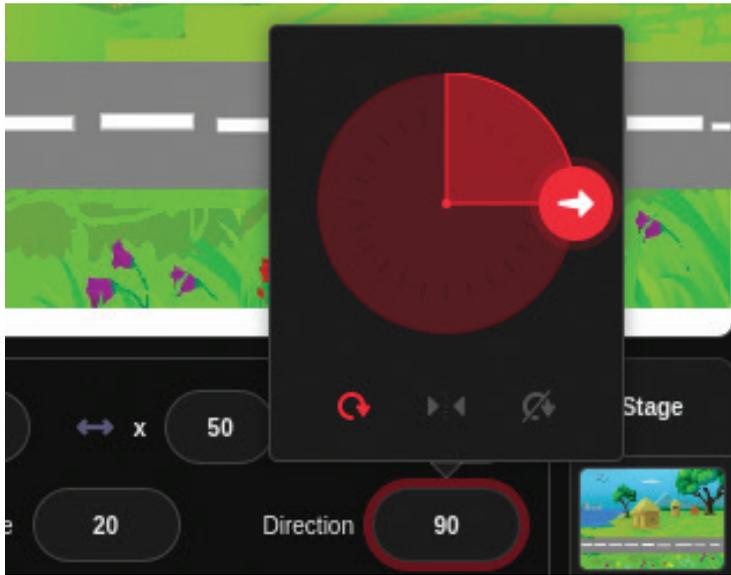


Fig. 5.7. Adjusting the direction of the *sprite*

Now, from the appropriate code blocks, find out the instructions for moving the chick and arrange them in the *script area*. See Fig. 5.8.



Fig. 5.8. The directions for moving the *sprite*

Similarly, we can use the arrow key, 'DOWN' to move the chick down. Hope you'll find the directions for moving it down and try doing so.

- -----
- -----
- -----

Let's Save

To save the activities in scratch click on the option, *Save as...* in the file menu. Type in the window the name of the file and click the *save* button.

When the game starts, there has to be constant traffic on the road. How do we create that?

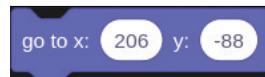
We can use the image of the vehicle in the resource folder as a sprite for this purpose.

Maybe, you remember that there were different vehicles when we played the game. Can we create the effect of having many vehicles with a single sprite? Actually, we can. We just have to use costumes of different types of vehicles as costumes for our vehicle/ car sprite and display them alternatively. Test it by using costumes for our car sprite. At the same time, try to adjust the size of the car sprite as well.

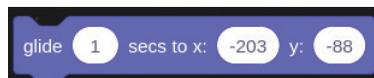


The car is supposed to move from the right of the stage to its left. Shall we write down this movement step by step?

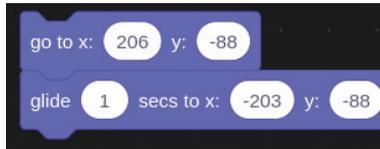
- As we click the , the action starts.
- The car arrives at the assigned spot (right of the stage).
- The car moves to the assigned spot on the left of the stage.
- Once it reaches there, its costume changes.
- The movement is repeated.
- To achieve this, position the car sprite on the right of the stage and find the code



from the motion block; then, move the sprite to the extreme left of the stage and find the code



and arrange the codes appropriately.



Now, click on this *code block*.

What happens? The car moves from the right to the left.

This activity has to be repeated from the start of the game to its end. Every time we must feel that a new car is appearing. What are we supposed to do to make that possible?

Arrange the codes as shown in Fig. 5. 9.

Now, we can click on the  to start the game.

Later on, you can change the values in the code and see the changes that happen.

Hope you have understood the changes to be made in the code to alter the speed of the *car sprite*.

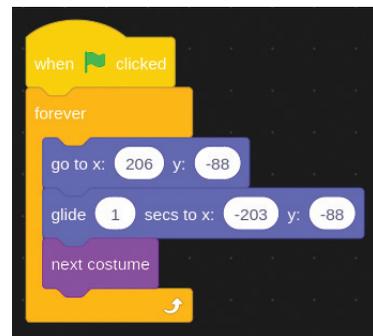


Fig. 5. 9. The Code for moving the vehicles

When the Car Hits the Chick

Let's review our activities so far.

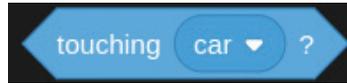
- We entered the background picture
- We moved the chick
- The vehicles are on constant move
- The vehicle keeps on changing each time

What else do we need in our game?

To complete the game, we need to include the changes that happen when the car hits the chick. Let's make a list of those changes.

- The shape of the chick must change
- The vehicle must stop
- -----

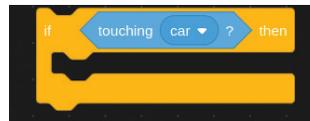
We can add together the code



in the *sensing block* and the code



in the *control block* to design the instructions to recognise the car hitting the chick.



Now, the instructions for the changes as the car hits can be arranged inside the *script* as given below.

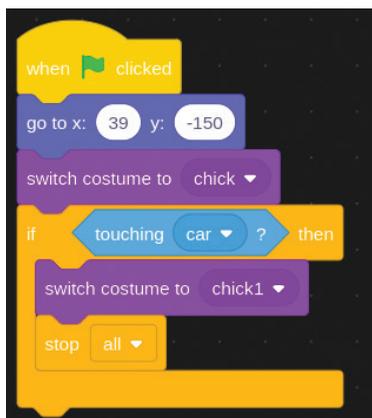
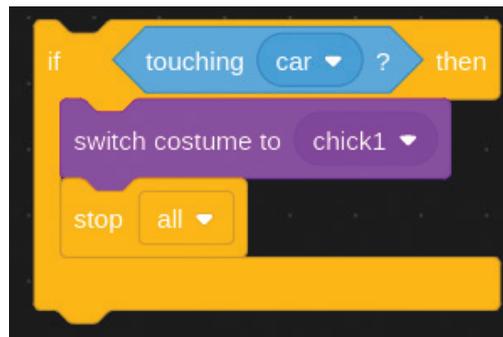


Fig. 5.10. The code for changing the *sprite's costume* as the car hits.

As the car may hit the chick at any time during the game, this script is to be repeated throughout the game. Hence, we have to add the instruction, *forever* also in the *script*. At the same time, we also have to add the *script* for moving the chick to its beginning position as *costume chick 1*. See Fig. 5.10.

We have now completed all the elements and

scripts for the game (Fig. 5.10). You can now test the game and see what happens. And, don't forget to save the file in your folder.

New Sprite

If the chick reaches home, we need to show that the game is won and that the game is over. We can use the picture of a henhouse in the resource folder for this purpose. We need to create a new sprite that shows the text “YOU WON”, when the chick touches the henhouse. Take a look at Fig. 5.11.

How do we create a new *sprite*? Draw a *new sprite* with the help of your teacher and expand the scope of the game.

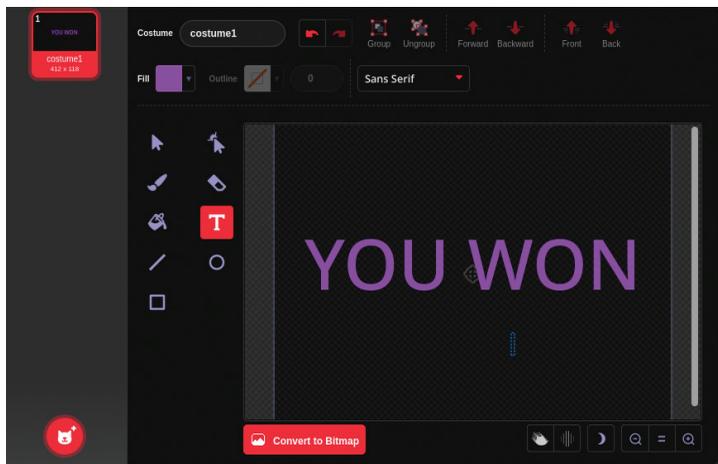
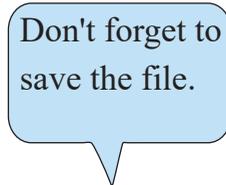


Fig. 5.11. The window that creates text as a sprite.



Assessment

- What do you call the images that lend motion, emotion and change of form to a *sprite*?

a. Script	b. Costume
c. Background	d. Sprite 2

- Which of the following is NOT related to the *block programming* language?
 - a. Instructions are available in the form of code blocks
 - b. Programmes can be created by dragging the codes
 - c. Instructions are available in text-form
 - d. Computer programmes can be created.



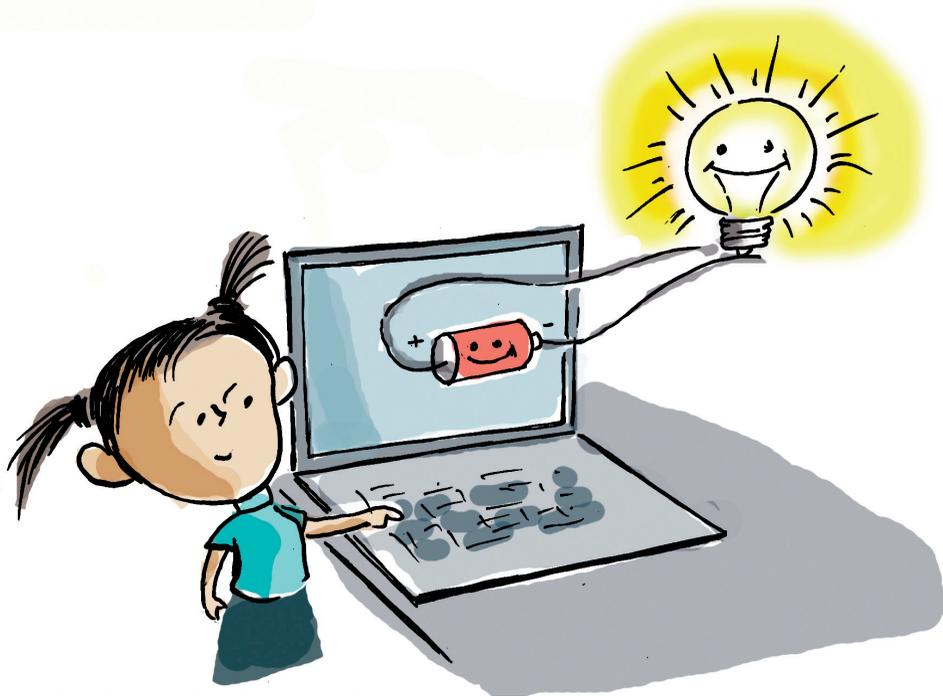
Follow-up

- We prepared the message “YOU WON” to be displayed when the chick crossed the road safely. Now, expand the game by including another sprite that shows the message “TRY AGAIN” when the car hits the chick.



Chapter 6

Virtual Circuits



Ashwin and Hita are busy preparing the *Electrical Wiring* project for their School Science Fest. However much they tried, the bulb in the prepared circuit remained unlit. What may be the reason for the failure?

- The circuit is not proper.
-
-

What do we need to do for the bulb in the circuit to be lit? Without physically making a circuit, can we create a circuit on our computer using the necessary parts to test whether it works? If that is possible, we can easily understand the making of even complex circuits.

Today, there are many software that help us to arrange the parts in a circuit and test its working. The *D. C. Virtual Lab* in our computer's PhET is such a software.

Making a Circuit In Phet

Let's open the *PhET – Circuit Construction Kit: DC – Virtual Lab* and create a circuit to virtually test its working.

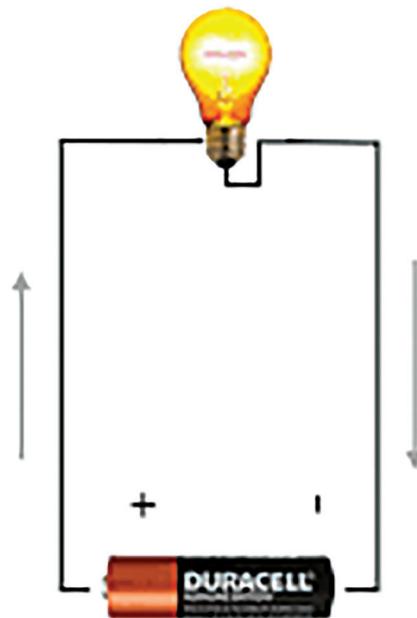


Fig. 6.1. A circuit with a cell



PhET – Physical Education Technology

PhET interactive simulations is a non-profit project operating at the University of Colorado Boulder. The project is mainly meant for teaching and learning. One can access *PhET* online through the website <https://phet.colorado.edu/>

Fig. 6.2. shows a circuit with one cell prepared in the *Circuit Construction Kit: DC - Virtual Lab* of the PhET software. Please have a look at it.

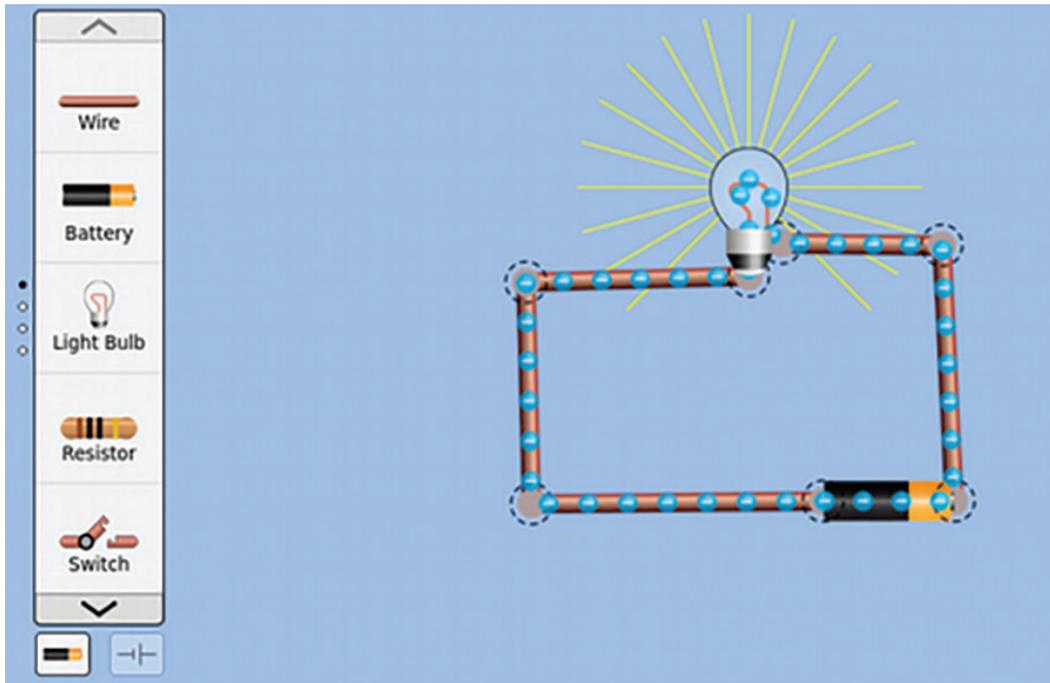


Fig. 6.2. A circuit with a cell prepared in circuit construction kit:

DC- Virtual Lab

Could you write down the steps required for making this circuit in DC - Virtual Lab?

- Find out the required parts of the circuit from the *Component Box*.
- Drag those parts from the *Component Box* to the main window.
- Connect the parts in the proper way.

Entering the Parts in the Circuit Window

- Drag the required parts from the *Component Box* to the window
- Use the circular connector at the end of each parts to connect the parts to each other.

Once we complete the circuit connections, we can see the bulb lighting up.

More Circuits

Now, as shown in Fig. 6.3., make a circuit to see the bulb light up.

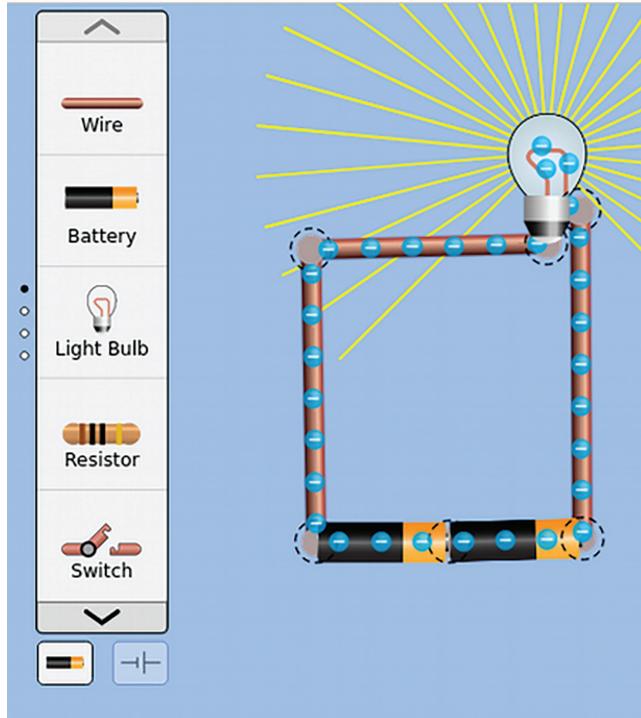


Fig. 6.3. A circuit with two cells prepared in the DC – Virtual Lab

How is this circuit different from the previous one?

- The number of cells increased
- -----

Controlling the Circuit

In both the circuits we have seen, the bulb always remains lighted. If we can include in the circuit a device to switch on and switch off the light, the circuit will be in our control. See Fig. 6.4.

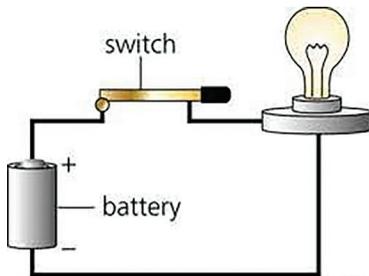


Fig. 6.4.
A circuit with a switch

Now, try making the circuits shown Fig. 6.5. and Fig. 6.6. in the DC – Virtual Lab

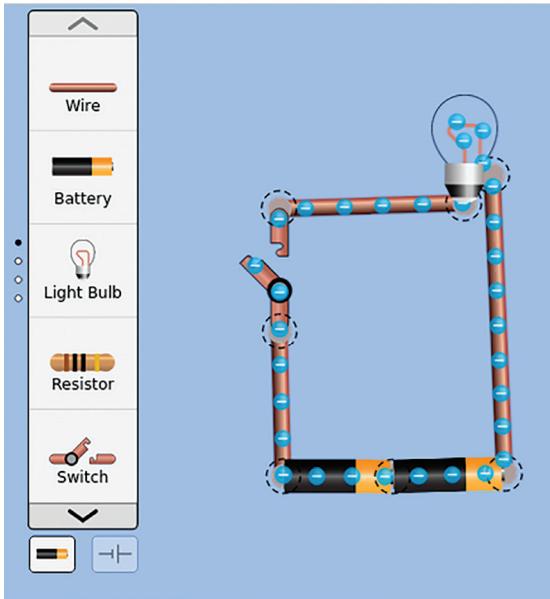


Fig. 6. 5. The circuit in switch-off mode

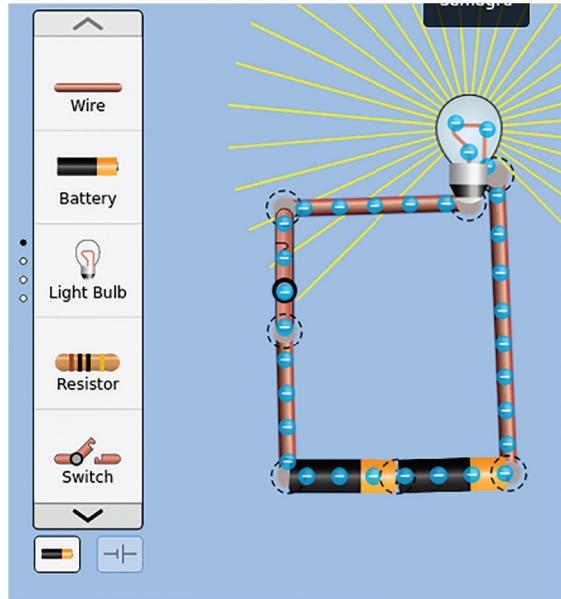


Fig. 6.6. The circuit in switch-on mode

Now, after writing the steps needed for adding a switch in an existing circuit, add it to the first circuit we prepared.

- Cut off the connection at a convenient place in the circuit
-
-

Disconnecting the Components

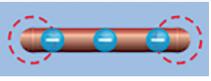
The parts needed to be connected to form a circuit in the *PhET* window are called *components*. To disconnect a part, we just need to click on the *icon, scissors* that appears when we click on the part.

Hope that you would prepare the various circuits in your lessons using the *DC – Virtual Lab* simulations and examine them closely.



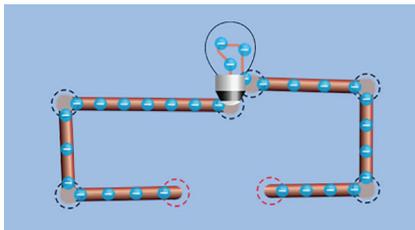
Assessment

- Match the parts and their names given below

Parts	Names
	Cell
	Switch
	Wire
	Fuse

- Which of the following parts is to be used to light the bulb in the given circuit?

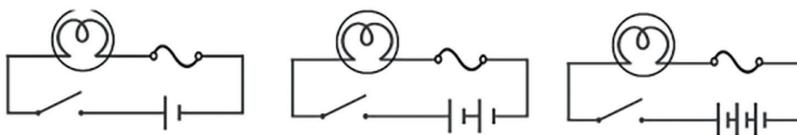
- a. Wire
- b. Fuse
- c. Switch
- d. Cell



Follow-up

1. Make a new circuit adding a fuse in the circuit you previously prepared. Then, add more cells and examine the circuit closely. What do you conclude?

2. Open the *PhET → Circuit Construction Kit: DC-Virtual Lab*; Create circuits as shown in the picture given below; switch on the circuit and watch the intensity of the light in the bulb.



Chapter 7

Making the Presentation Vivid

What you see above is a poster on the *Chandrayan Mission* made by Nandita as part of poster-making competition conducted by the Science Club. The club's next main activity is a science seminar on *India's Moon Missions*. The programme notice has announced that the topic-related information and the images may be digitally presented.

The children's exploration of making their computer presentation in the seminar excellent, led them ultimately to the *Presentation Software*. They finally made up their mind to use the *Impress* software in the school lab.



LibreOffice Impress

LibreOffice Impress is a presentation software made and maintained by the organization, *Document Foundation*. *Impress* helps us to present texts/images/audios/ videos cutely and clearly. There are other presentation software programs as well – like *Microsoft's PowerPoint* and *Apple's Keynote*.

Getting Ready for Presentation

Each group in the Science Club was asked to present different stages of India's lunar missions in the seminar. Appu's group was asked to present *Chandrayan*-related activities. Do you know things to be included in a computer presentation of *Chandrayan Mission*?

- Images related to *Chandrayan*
- Animation video of its landing on the Moon
- Other important matters about *Chandrayan*
-

Appu's group gathered the images and the videos of *Chandrayan* from the Internet, and important data about it from *Wikipedia*.



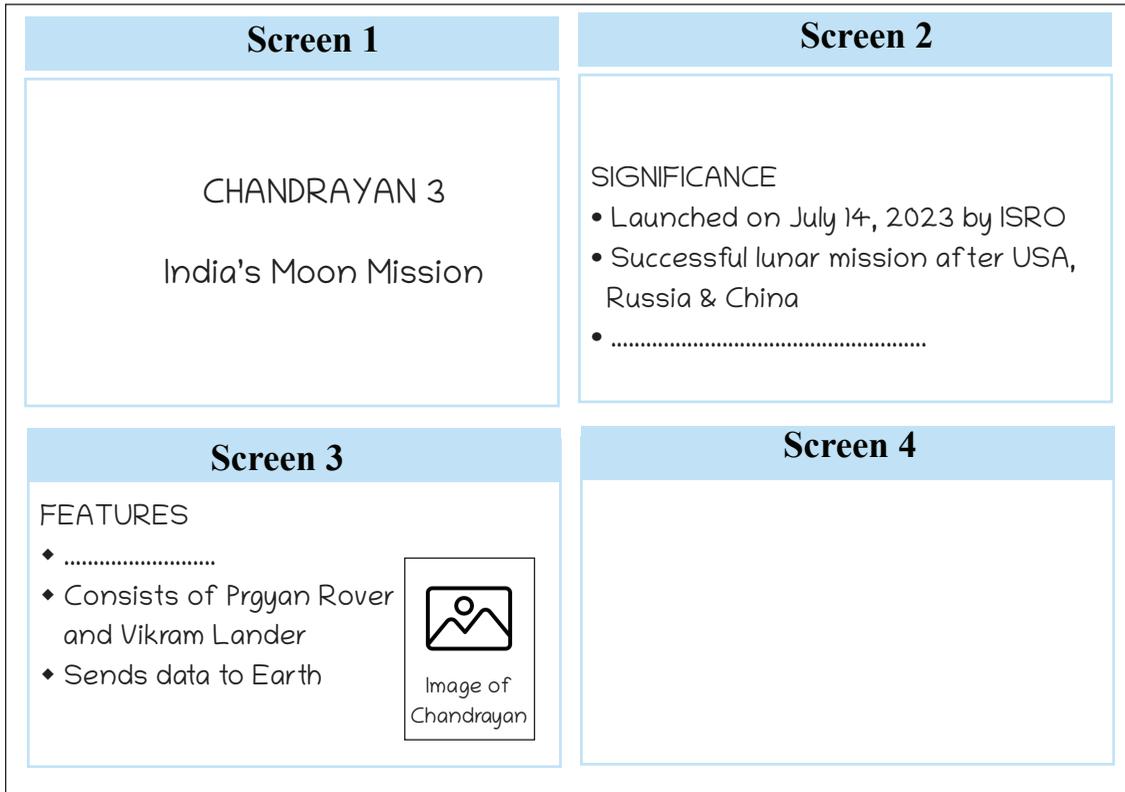
The texts, the images and the videos for the presentation are now all ready. The next task is to prepare the presentation with the material gathered. How do we go about it? Shall we give it a try?

In a presentation, the data are presented on different screens. So, let's write down in a notebook the data for presentation for each screen. That will make it easy for us to enter the data into the computer.

Appu and team wrote down the content for each screen in the way given below.

You know that the content is displayed by means of a projector. So it has to be regulated in proportion

to the size of the screen. Images and others should be positioned keeping in mind where on the screen they have to appear.



The arrangement of the content for presentation

The content to be presented on screen has to be modelled in the same way as shown above. Hope you have written it down.

Let's now open the software, *LibreOffice Impress* in our computer, to prepare the presentation.

When you Open Impress

If it is *LibreOffice Writer*, we can start typing the content as soon as we open it. But when we open *Impress*, what we get is a window asking us to *Select a Template*. See Fig 7. 1. This window gives us the

design templates which form a part of the *Impress* software. If we want to use any of these readymade designs, we can select it to open it. Otherwise, we can close the window and proceed.

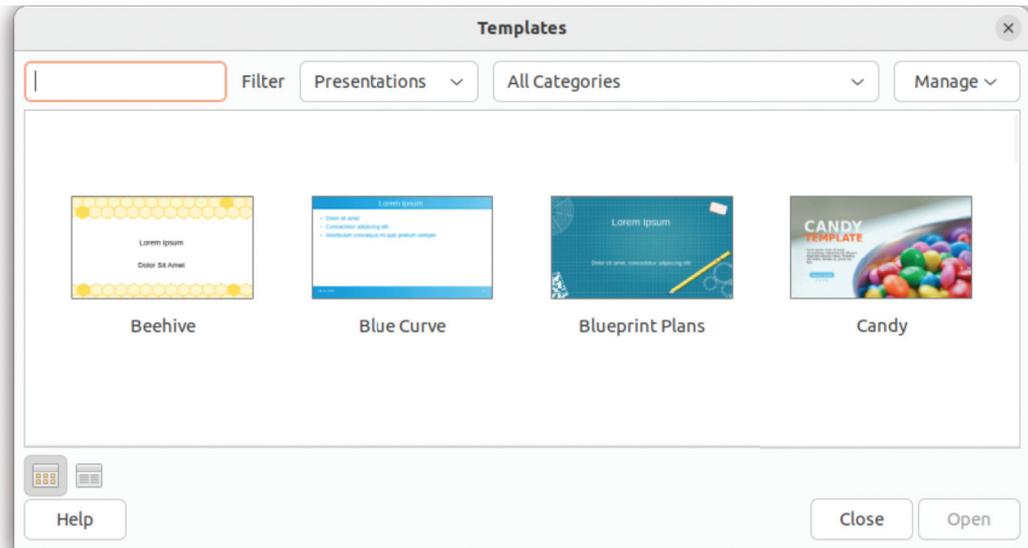


Fig. 7.1. The window that opens when *Impress* is opened.

Once we close this window, we get the main window of *Impress* (Fig. 7.2.). You can see that it is different from the *Writer* window.

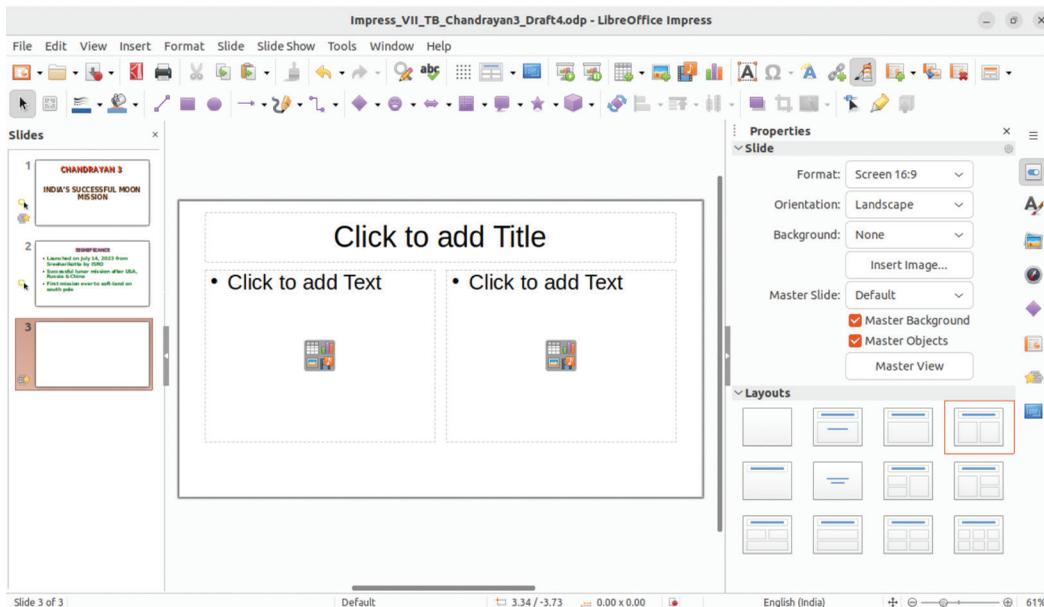


Fig. 7.2 The *Impress* main window

What differences do you see between the *Writer* and the *Impress*?

Write them down.

- In the *Writer*, we can type in the content directly. But in the case of *Impress* it is not possible.
- In place of *Page* in the *Writer*'s status bar, we have *Slide* in the *Impress*.

Slide

In the presentation software, the content is arranged in -- . During the presentation, the content is displayed screen by screen.

The *Impress* slides can be regulated as per the screen size and presented in the required order.

Preparing the Slides

Have you noticed the *Layouts* that appear when you open the *Impress* window (Fig. 7.3)? Such layouts are there as part of presentation to make slide-making easier.

Look at Fig. 7.3. What all can be included in a slide using the layouts?

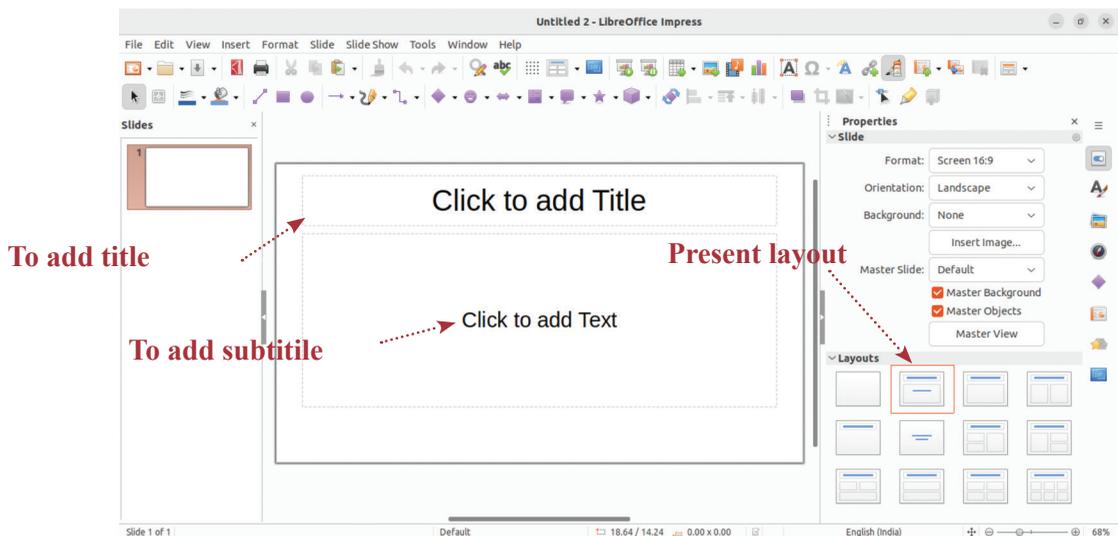


Fig. 7.3 The Layouts in the *Impress*

- We can include headings
- -----

Can we use the selected layout to include the content we have prepared for *Screen 1*?

After clicking respectively on *Click to Add Title* and *Click to Add Text*, can we type in the heading *Chandrayan 3* and the subheading *India's Moon Mission*? Try it.

Now, make the text we entered nice and neat by applying proper size and colour to it. To do this, we have to make necessary changes in the *properties* window we get (Fig. 7. 4.), when we select the text. Make those changes to make the text appealing.

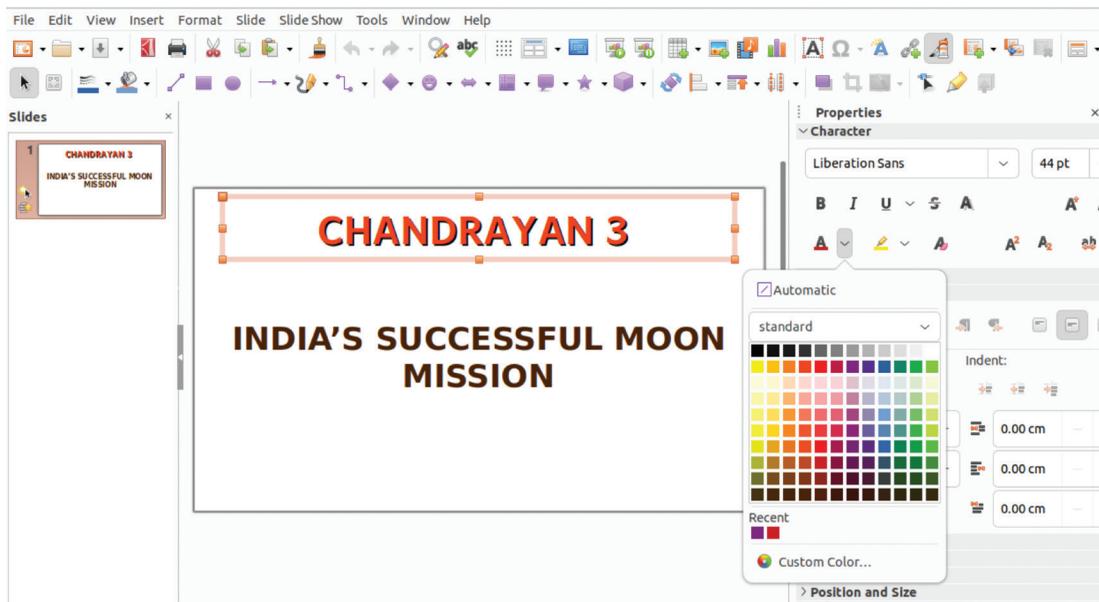


Fig. 7.4. The *properties*' window that pops up while selecting the text

Adding New Slides

We have now entered the content for the first slide. In the *Writer software*, we automatically move to the next page, once the first page is over. But how to add a new slide in *Impress*? For that, we go to the *Slide menu*, select the required option and add the new slide. Please find out the difference between the

use of the *New Slide* option and that of the *Duplicate Slide* option to complete Table 7. 1. Also, find an alternative to add new slides after examining Fig. 7.5.

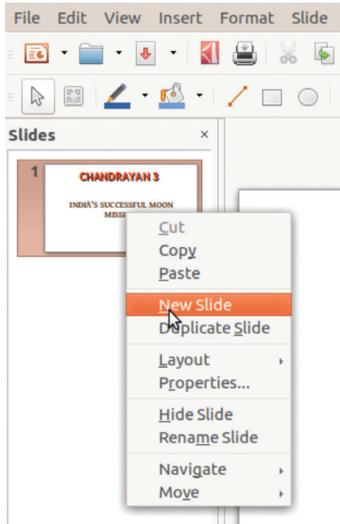


Fig. 7.5. The Dropdown Menu for adding New Slides

Device	Use
New Slide	
Duplicate Slide	

Table 7.1. Uses of slides

We can add as many slides as we want in the way shown above. Once we have added the slides, we have to locate appropriate layouts for their content.

Now, select the layout, '*Title, Content*' and include the content for *Screen 2* in the new slide. See Fig. 7. 6.

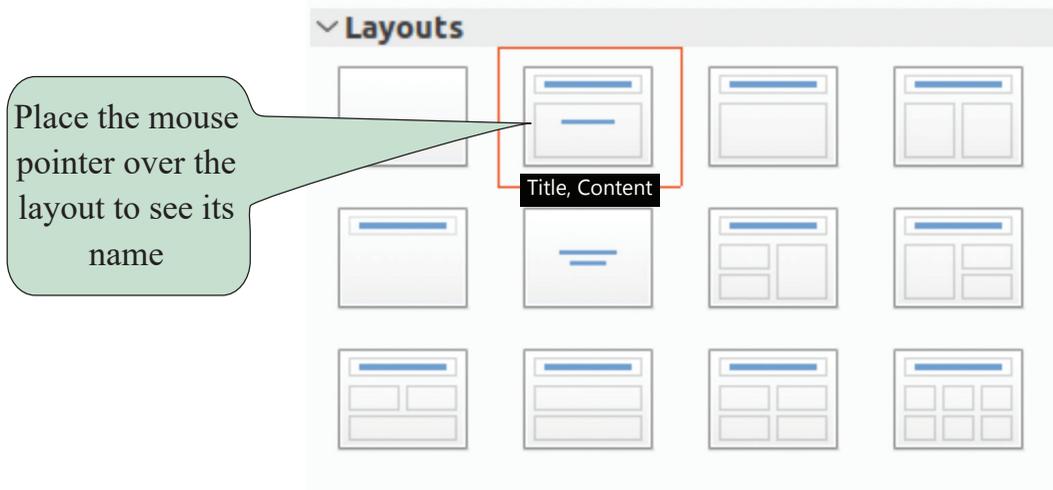


Fig. 7.6. The window for selecting layouts

What are the advantages when we prepare a slide like this?

- We can add the heading separately.

The font size of the heading -----

- We can also add content separately
Font size of the content-----
- We can make appropriate changes in the font’s size and colour
- -----

The table below shows the details of layout Appu and his team had suggested for the third screen design they prepared. Check whether they are fitting. Also, design two more slides and find an appropriate layout for them to complete Table 7.2.

Screen Design	Selected Layout	Fitting Content
Screen 3	Title and 2 content	Title and two-column content. Image in column1 & text in column 2
Screen 4		
Screen 5		

Table 7.2. Details of Layout

Beautifying with Pictures

As per the design above, in the third slide, we have to add the image of *Chandrayan* along with the listed info. We have to find a layout that is appropriate for that. Check the layout for *Title and 2 content* in Table 7.2. Here we can enter the content in two columns. Suppose we enter the basic facts in column 1 and the picture in column 2; how will it be?

We already know that we can type into the box after clicking on it, if we want to type in the content.



Fig. 7. 7. The facility to enter Image, Video, Table and Graph

However, this box has facility to easily enter pictures. See Fig. 7.7

Besides typing, this facility allows us to include four types of content. Take the mouse pointer to the top of this facility and locate the method to include images. Also, find the use of the other methods and complete Table 7.3.

No	Tool	Use
1	
2		to include graphs as content
3	
4	

Table 7.3.
Details of including content in slides

We have now entered the picture.

Having included the picture in the third slide, we now need to design a fourth screen. In the fourth screen, we can include a video in the same place where we included the picture in the third screen. Hope you will write down the steps needed for that.

- Prepare the screen design of the slide
- Select the required Layout
- Type the title after clicking box.
- Type in the content text in the space for content.
- Enter the presentation-related video in the next column.

To enter the video, click on the right bottom part of the icon 

So far, we have learned the method of preparing slides using layouts. We can also make slides using the blank slide that is displayed in the beginning of the layout section. In such situations, we have to include the content in the slide using the *Text Box* tool we learned in the *Writer software*. If that is the case, which are those familiar options in the *Writer* that we can use to include pictures in a blank slide?

- *Insert* → *Image*
- Using Tool Icon 
-

All the slides we have designed are now ready. In the same way, we can add any number of slides. Include as many slides as required for presenting your data. And, never forget to save your changes every time you make a change.

How Easy is Presentation!

Is it enough to make slides? Don't we have to present them? The presentation software programs have facilities for that. They can easily handle any number of slides, if you click on the option, *Start from first slide* in the *Slide Show* menu. See Fig. 7.8.

We can see now our presentation on full screen. To go to the next slide, we can press *Enter* on the keyboard or use the *Right Arrow*.

Suppose we want to go back to a previous screen? What can we do? Hope you will find a way to do so, while working with your presentation.

Including the Picture in the Slide

- Click on the *Insert Image* icon in the *Content Box* in the layout.
- With the *Dialog Box* you get, include the picture.

Save the file, please...

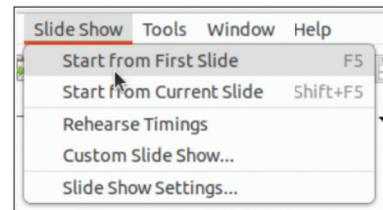


Fig. 7.8. The facility to display the presentation prepared



Assessment

- Which of the following technique in *LibreOffice Impress* helps to add new slides?
 - a. Edit slide
 - b. Add new slide
 - c. New slide
 - d. Insert slide
- Which tool is to be used to include images and videos in *LibreOffice Impress*?
 - a. 
 - b. 
 - c. 
 - d. 



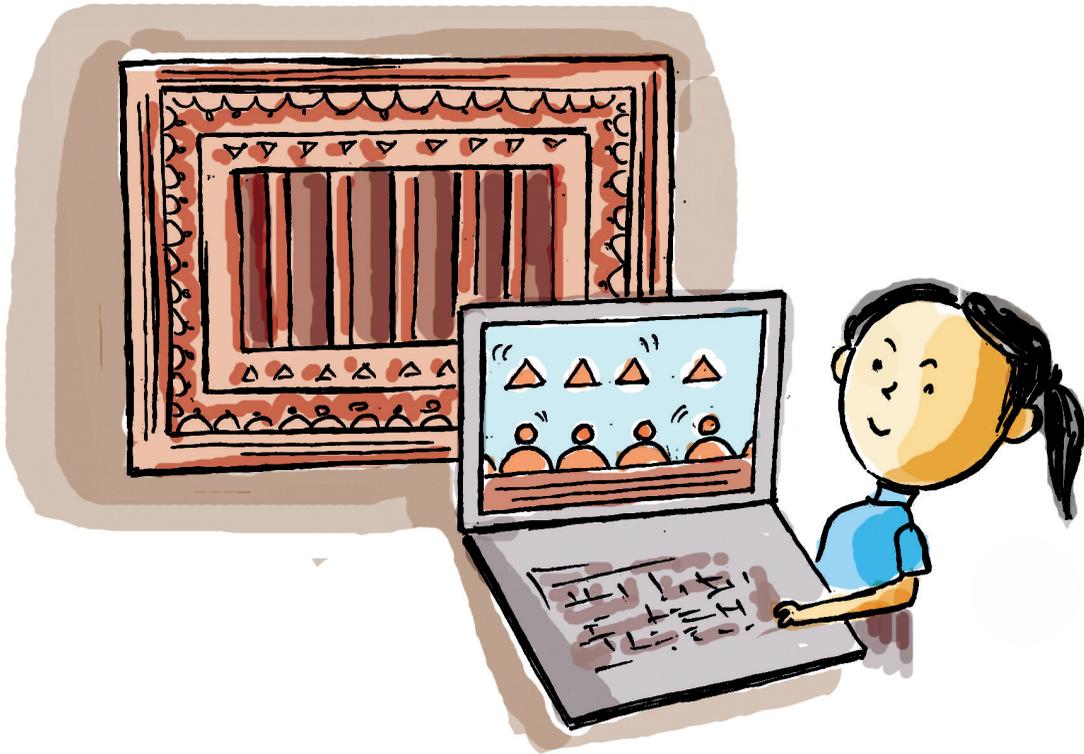
Follow-up

1. Prepare a presentation in memory of India's freedom fighters by including the pictures and information of them.
2. Prepare a presentation in *LibreOffice Impress*, to explain Dr. A. P. J. Abdul Kalam's contribution to India's space exploration.



Chapter 8

Recurring Pictures



Appu's mother bought a sari – a yellow and red sari. The border of the sari had pictures sewn on it. It was these pictures that caught Appu's attention.

“How is the sari?” Mother asked Appu.

“It is the pictures on its border that I like. They are patterns. I have such patterns in my math book to learn”

Appu made his stand clear.

Friends, haven't you noticed the picture pattern on the sari? You may have made such geometric patterns in your notebook. And, you have seen many other similar patterns. Take a look at the pictures given in Fig. 8. 1.



Have you ever watched how these patterns are drawn?

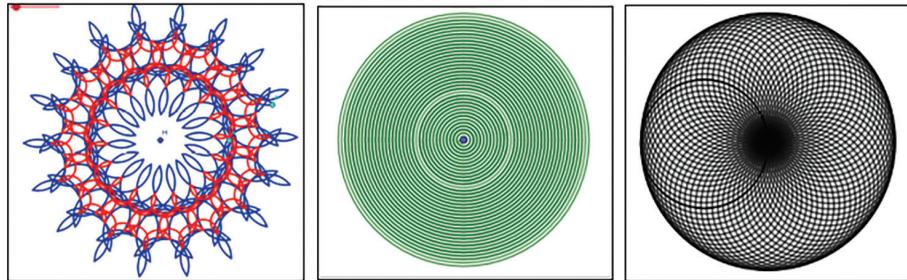


Fig. 8.1. Geometrical patterns

These patterns are made when the same shape is drawn over and over again.

You know that recurring activities can easily be done by computers. But what you see here is not just repetition. You also have to draw geometrical shapes and maintain precise mathematical laws.

How do we draw such pictures on the computer?

Which software can we use for this purpose?

- GeoGebra
- CaRMetal
- -----
- -----
- -----

Rose Window

In Catalonia, Spain there is a St. Mary's Church. The picture above is that of a window in the church. It is well-known over the world as the 'Rose Window'. Take a look at the pattern in the window.



Geometric Figures (Patterns) on Computers

We can draw patterns using software programs like *Krita* and *KolourPaint*. But if we want to create shapes according to strict mathematical rules, we need to use software programs like *GeoGebra*, *CaRMetal* and *Cinderella*. These programs can be used not only to build geometric forms but also to test mathematical rules. We can also use programming languages like *Scratch* and *Python* to create geometric shapes.

Drawing Equilateral Shapes

Open the *GeoGebra* window and draw a triangle. You are already familiar with the tool for drawing triangles, aren't you?

Polygon Tools

We can find the *Polygon tools* among the fifth toolset in *GeoGebra*. We can use the tools, *Polygon* and *Regular Polygon* to draw *Polygons*.

Find the special features these tools to complete Table 8.1.

Tool	Name of the Tool	Use
	Polygon
	Regular Polygon	It has the facility to suggest the number of vertices in an equilateral shape.

Table 8. 1. Polygon Tools

Now, try drawing an equilateral triangle using *Regular Polygon*. Before that, write down in order the steps for drawing.

- Select the *Regular Polygon tool* from the *GeoGebra* window.
-
-

Drwaing an Equilateral Triangle

- Select *Regular Polygon* tool from the fifth toolset in *GeoGebra* window
- Using the tool draw one side of the polygon.
- In the window that opens, provide the number of vertices for the polygon.

Using the same tool, can you draw other equilaterals like the square and the equilateral pentagon?

What changes do we need to make in our action plan?

- When we use regular polygon to draw a square, we have to specify the number of vertices as four (4).
- The number of vertices for an equilateral pentagon is -----
- The number of vertices for an equilateral hexagon is -----
- -----

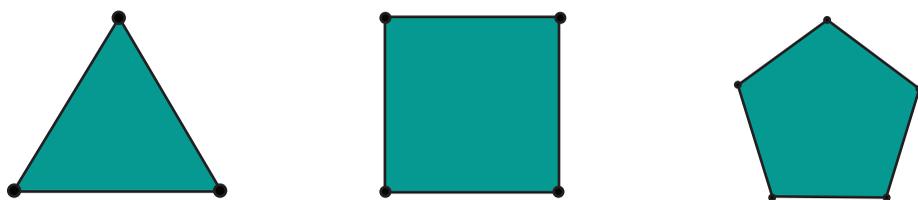


Fig. 8.3: (a) Equilateral Triangle (b) Square (c) Equilateral Pentagon

Flexible Pictures

The equilateral polygons we have drawn above are drawn separately using *Regular Polygon* tool. But don't you think it would be nice if we can change a polygon's number of *sides* or vertices as required, after we have drawn an equilateral shape?



GeoGebra has the facility to control the geometric shapes by changing their measurements. The tool for this purpose is called *Slider*. This tool can change the number of sides, the length of lines, and the degree of angles by means of a sliding scale.

Let's see how we can control geometric shapes using a *slider*.

Remote Control

First, Let's make a slider.

- Select the 'slider' tool  Slider from the tenth toolset of *GeoGebra* window.
- Click on the canvas. In the window that opens, give attribute values as Min: 3 and Max: 10. See Fig. 8.3.

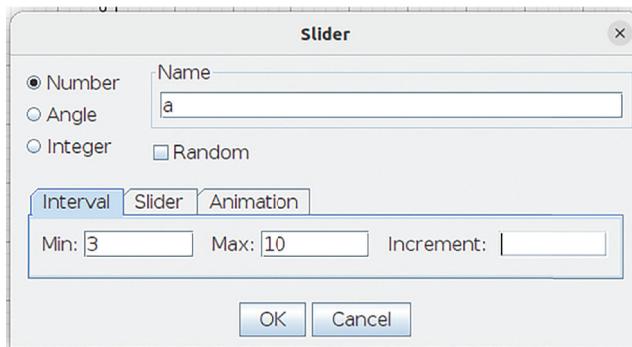


Fig. 8.3. The Slider window

Now draw an equilateral shape based on the slider and using the *Regular Polygon tool*. Observe its difference from the one we have drawn without the slider.

When we draw with the slider, we have to provide the name of the slider in place of the number of sides. See Fig. 8.4.



Fig. 8.4. The number of Sides

Now put the slider to use.

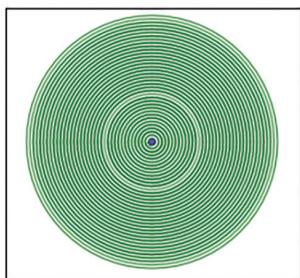
What happens to the equilateral shape when we change the value of the slider?

You also try equilaterals with more sides (like 30,50, 100 and so on). Can you now confirm the difference you have seen earlier?

Slider

- The slider controls a number (For e.g., the radius of a circle).
- The slider is called 'a'. (If we add another slider, what will be its name? 'b'? Try adding a slider and check.)
- The slider's minimum and maximum values by default are -5 and +5.
- We can change the values as we like.

Shall we now create the patterns we discussed in the beginning?



The Beauty of Recurrence

Let's create the pattern of the second picture in Fig. 8.1.

Can you guess the difference between the circles in the pattern?

- -----

If things are so, let's draw concentric circles of different radii.

What are the tools we can use?

- *Circle Center and Radius*
- -----

Now, note down the action plan for pattern creation.

- Make a slider with the minimum value 0 and the maximum value 10.
- Draw a circle using the '*Circle Center and Radius*' tool.
- Specify the value for the radii.

Now put the slider to use. What do you see?

You see only circles of different radii.

What can we do to see all the shapes separately?

It can be realized by using the device called *Trace*.

Place the mouse on a circle drawn with the slider and click the right button. From the window that opens, select *Trace On* (See Fig. 8. 5.). Now, use the *slider* again. Is the pattern formed?

Don't forget to save the file.



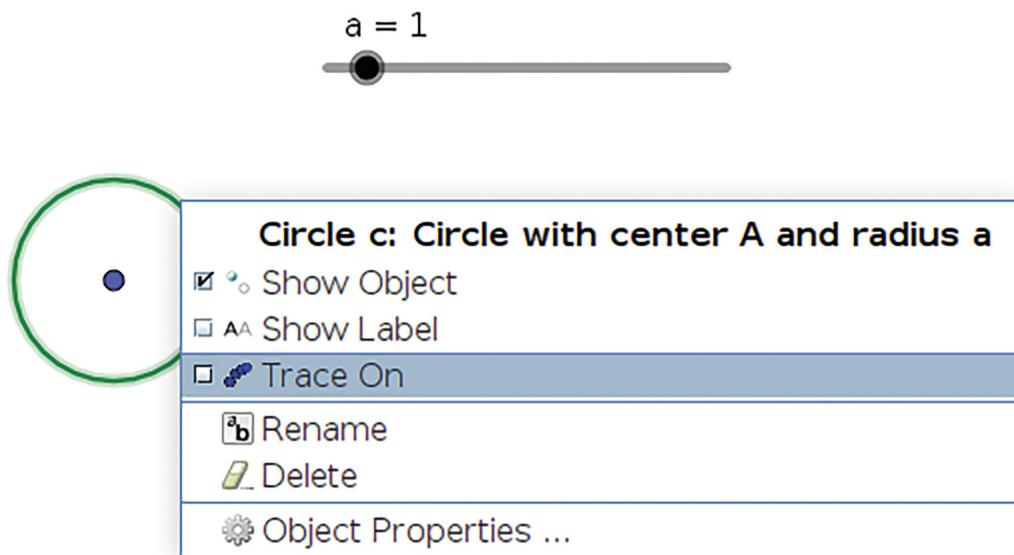


Fig. 8.5. The window providing trace

Try to create more patterns by changing the value for the slider.

Assessment

- When we make a slider in *GeoGebra* to draw regular polygons, why is the minimum value three (3)?
- Complete the table below after finding the tools for doing the following activities in *GeoGebra window*.

Activity	Tools to use
To draw a square	
To draw a circle that passes through the three vertices of a triangle	
To draw a circle the radius of which can be altered by a slider	
To draw a circle with unspecified radius or centre.	



Follow -up

1. Open the *GeoGebra software* and prepare a picture according to the action plan given below.

- Draw a circle with a radius of 2 units (Tool: *Circle Center & Radius*)
- Mark a point in the circle (Tool: *Point*)
- Make an Angle Slider with 0° to 360° (Tool: *Slider- Angle*)
- Create an angle that includes the point marked on the circle and the centre of the circle. The value of the angle must be the value of the *slider*. (Tool: Angle with given size)
- Draw a circle with the point now made in the circle as the centre and its distance to the first point you made as the radius (Tool: *Circle with Center through Point*)
- Provide '*Trace On*' to the new circle
- Move the *Slider*.

2. Find the name of the pattern obtained by the above activity and its features.

(Take the help of your teacher to take a screenshot of the pattern and find out about it from the Internet through *Image Search*)



Chapter 9

Computer Vision



Surprise! How did the computer know that Ammu looks sad? Does it have eyes to see her sadness? Which part of it enables it to see things? Is it the camera?

Do you have a camera in your laptop? Check it.

What do we usually use the computer (web) camera for?

Of course, we use it for online meetings and video calls.

We can also use the web camera for taking photos and videos.

It was through the camera, wasn't it, that Ammu's laptop identified Ammu. How do computers identify things that they see through their camera?

You may have also read or heard the news of AI cameras identifying traffic violators. How do these cameras work? Have you ever thought about it?

Look at Fig. 9.1. Who is hiding in the picture?

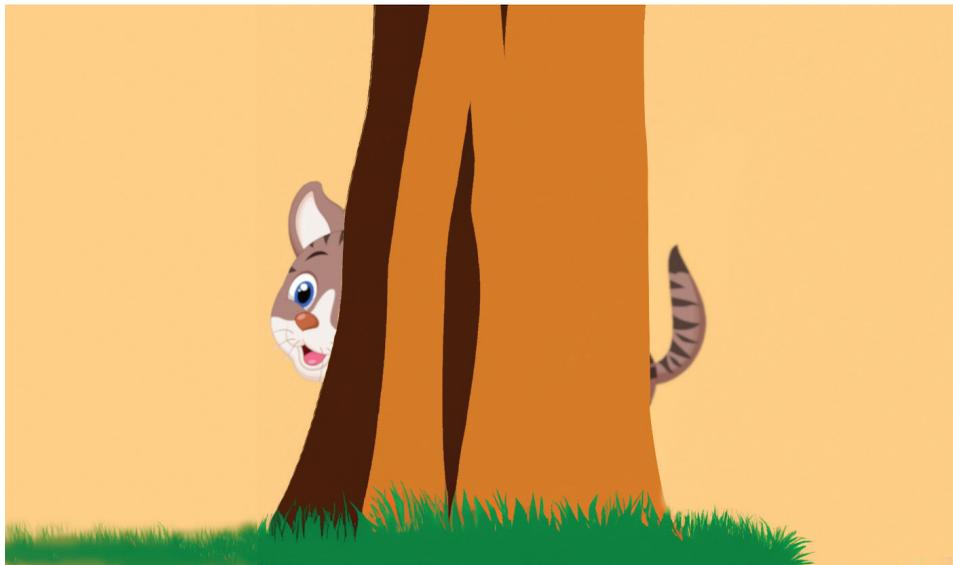


Fig 9. 1. Who is hiding?

It is a cat, isn't it? But you didn't see the whole body of the cat, did you? Then, how did you identify it as a cat?

Suppose we have never seen a cat. Will we be then able to identify a cat as cat?

But we have seen enough cats of various types in our surroundings as well as in pictures and videos. And our brain, having understood the special properties cats share, has stored in its cells the form and features of a cat. It is this stored knowledge that helps us to identify the hidden cat.

It is in the same way that we recognize our surroundings and act according to the situation we are in. When a new situation arises, we behave in tune with our past knowledge. And, through that experience, we learn new things. This knowledge, in turn, we apply again in a further new situation.

Suppose the computer acquires this kind of ability. If so, it will also store its experience/data as knowledge. Today we, human beings, can program computers to create the kind of intelligence to use their acquired knowledge to use in new situations. This intelligence that the computer artificially gains through programming is called *Artificial* (or Created) *Intelligence* (AI, for short).

Today AI technology influences every sphere of our life. It has grown so much so that it can now not only understand but also recreate images, videos, audios, human languages and the like.

Now you know which technology helped the laptop to read Ammu's sadness, don't you?

Recognising Facial Expressions

Let's make a computer program that will help our computer to recognize facial expressions in just the



Artificial Intelligence (AI)

The term *Artificial Intelligence* was coined in 1956 by an American Computer Scientist called John MacCarthy.

same way as the program that helped Ammu's laptop to detect her sadness.

Computer programs, as you know, are created with the help of programming languages. Write down below the programming languages you already know.

- Scratch
- -----
- -----
- -----
- -----

We have already seen in our previous classes how programs are written using *Scratch*. There is a piece of software based on *Scratch* called *PictoBlox* - an improved software program which enables us to make computer programs based on AI.



Block Programming

Block programming is a method of creating a computer program using pre-prepared codes. In this kind of programming, codes are given as separate blocks which can be dragged and placed as required to make programmes.

Go to your computer and open *PictoBlox* to see its main window (See Fig. 9. 2.)

The software, *PictoBlox* is almost the same as the software, *Scratch*. It also has *sprites* and their *stage*, and the *code blocks* for programming.

Click on the 'Add Extension'  icon in the *PictoBlox window*.

Do you see more facilities in it than in *Scratch software*?

You can see buttons in the *Choose an Extension* window for additional blocks for doing AI activities.

We are onto making a program that enables us to detect human facial expressions, aren't we?

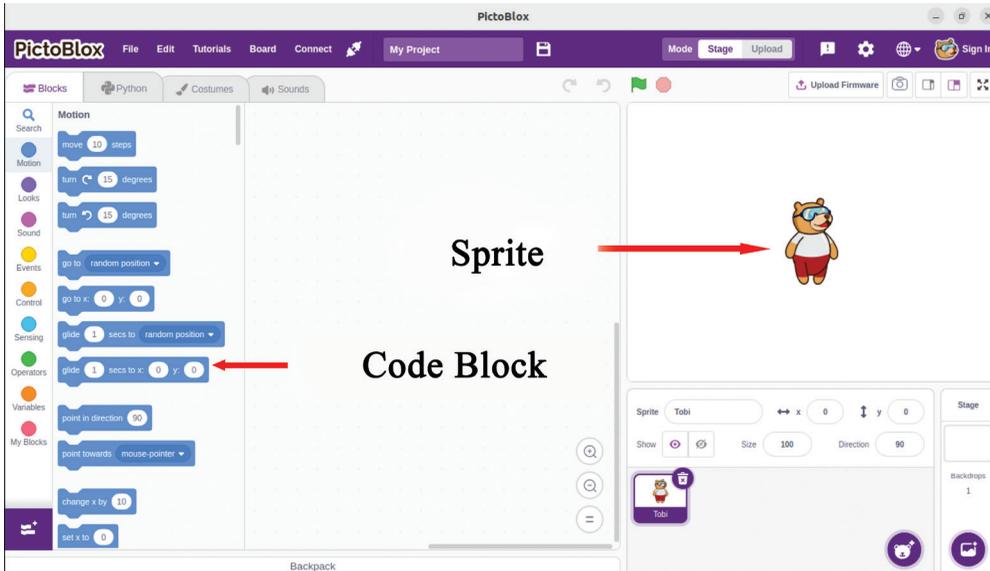


Fig. 9.2. The main window of PictoBlox

Do we have a button for this activity in the window?

Maybe, you see a button, *Face Detection* you?



 **Some Facilities in Pictoblox**

- It has block programming as in *Scratch*.
- It has the facility to write programs with *Python*.
- It has extensions to do activities of *AI* and *Robotics*.

Click on that button, and there it is! The required code blocks are now there in our code window. These are the codes for the programming of *Face Detection*.

Do you understand the use of these instructions?

Examine the code blocks. You can take the help of Table 9.1.

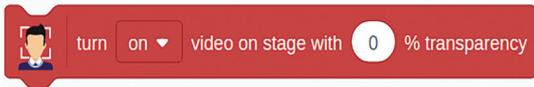
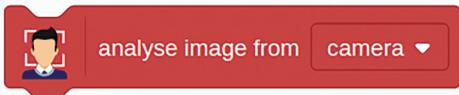
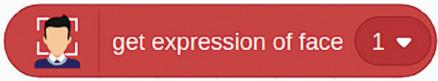
No	Block	Use
1		To take to the <i>stage</i> the picture snapped by the web camera
2		To analyse the picture for detecting faces and their expressions
3		To get the expression of the first face among the detected faces.

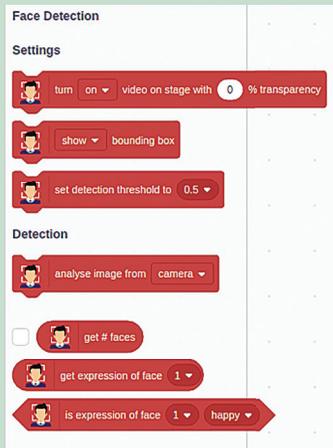
Table 9.1. Some Code Blocks related to face detection in the PictoBlox

We recognise an object, as you already know, by comparing it with our past knowledge. The computer also recognises an object in the same way. The only difference is that we have to train our computer to do so.

So, let’s see all those phases through which the computer has to pass in order to recognise facial expressions. Can you make a guess?

- We have to keep the computer camera on.
- The picture captured by the camera is to be analysed.
- Once the face is detected in the picture, based on the previously analysed faces, its expression must be recognised.
- There must be a reaction in accordance with the recognised expression.
- The activity has to get repeated.

Code Blocks to detect facial expressions



We can make a programme to detect faces and facial expressions using the *code blocks* in the picture. The computer is already trained with the help of thousands of different faces and their expressions. The code blocks are made by using *model files* obtained while training. With these, almost ten faces can be detected at a time.

The code blocks in *PictoBlox* can prepare programmes that can recognise 7 expressions like *neutral, happy, angry, sad, disgusted, fear* and *surprised*.

. The facial expression detected by the computer can be displayed with a smiley in the program we are making.

Costumes for Expressions

Using PictoBlox, we can give different costumes to a *sprite* for detectable expressions. For this purpose, we can use the smiley icons in our computer’s folder for class VII students. We have to see that we make no mistake while labelling the costumes with names such as *neutral, happy, angry, sad, disgusted, fear* and *surprised*.



Fig. 9. 3. Some Smiley Icons

Adding new Costumes in PictoBlox

- Delete the existing *sprite* and add a *new sprite* (the first *costume*) through *Upload Sprite*.
- Select the tab, *Costumes*
- Select ‘*Choose a Costume*→*Upload Costume*’ at the left bottom.
- Add the other *costumes* for *sprite* selected from the computer.



Preparing the Program

We have now added the costumes of smiley icons.

Now, activate the program that displays smileys in keeping with the expressions caught in the camera (See Fig. 9. 4.).

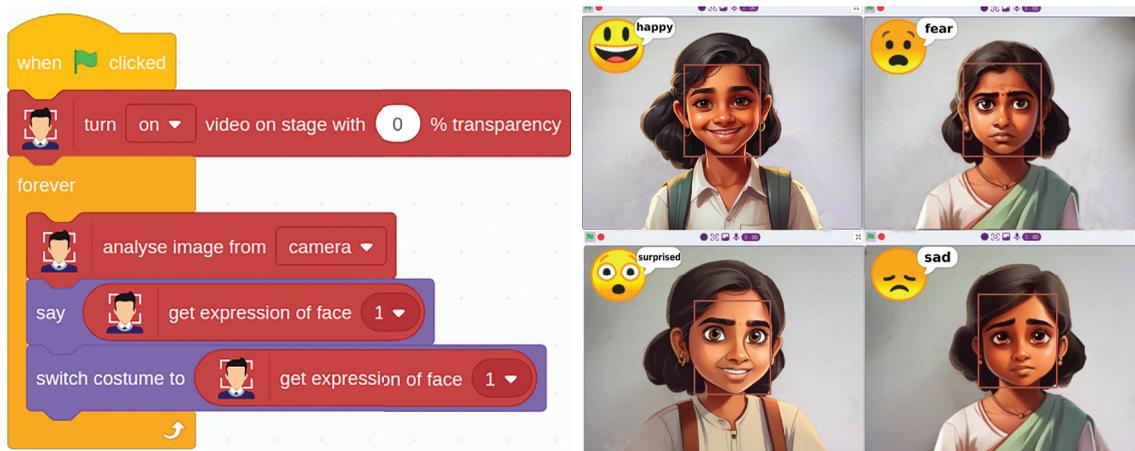


Fig. 9.4. The PictoBlox Program to detect expressions and the sample output

Let's Save

To save your work in *PictoBlox*, click on the save option in *File menu*, and type in the window the file name and click on save.

Have you tried the program? Good! You have now shown that you too can prepare a program like the

one that detects facial expressions with AI technology after it has analysed the sights caught by the camera.



Assessment

- You prepared the computer vision programm that reacts after detecting facial expressions. List some situations where computer vision can be used.
 - *Face Unlock* in mobile phones
 - -----
 - -----
 - -----



Follow-up

1. Making changes in the programm you prepared, detect the expressions in two faces at the same time and, as shown in the picture below, express them with two smileys.



Chapter 10

Reading and Recording Stories



Atul and Fida are very busy. They have been selected to present a programme on the World Meteorological Day for the school radio station. The programme is meant to commemorate the eminent Indian Meteorologist, Dr Anna Mani.

What are the things to be planned for this occasion?

- Data about Anna Mani are to be collected
- A brief profile of her is to be prepared
-

While collecting the details about Anna Mani, Atul and Fida were told by their teacher about an interesting story about her in the E³ English Language Lab. Shall we also listen to that story?

E³ English Language Lab (ELL)

ELL is a software for improving the English language proficiency of students. Its content is arranged into four levels with interesting stories to promote learning English. The activities for standard VII can be found in the fourth level. Any student can access the programme with a username and a password. For example, the username as well as the password for the first student of class VII will be 7a1. Once the student accesses the software, he or she can do all the activities in the ELL.

Listening to the Stories

Why don't you open the fourth level of the ELL with the help of your teacher? As you open, you can see a list of ten interesting stories. You can see Anna Mani's story in it. Locate and open it. If you would like to listen to the story, click on the button , Play Story (3.2). See Fig. 10. 1.

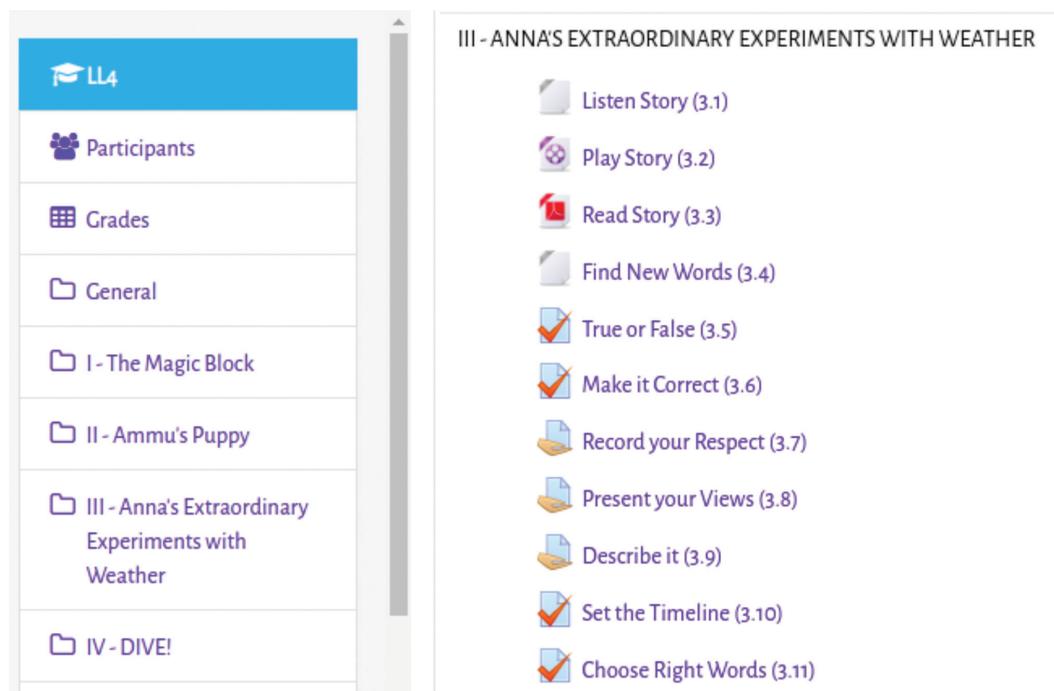


Fig. 10. 1. E³ English Language Lab – the window for selecting stories

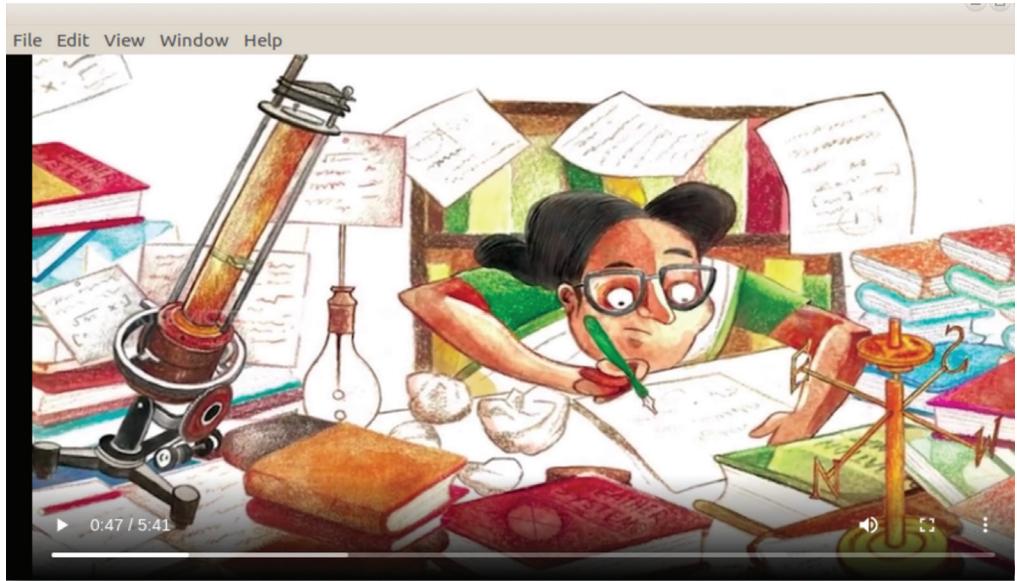


Fig. 10.2. ELL - The video window of Anna Mani’s story

Did you listen to Anna Mani’s story? And, did you like it?

Can you list the special features of storytelling?

- Voice modulation
- Appropriate body language
-



Just check the activities related to the story of Anna Mani in the ELL. In the activity, *Make it Correct* (3.6), you can see a sample of a commemoration note similar to one Anu and Fida are going to present. Following the instructions, shall we also try this activity?

Completing the Note Of Commemoration

As you click on the button,  *Make it Correct* (3.6), you can see the first part of the commemoration note on Dr Anna Mani. It is also a brief profile of hers. What are its special features?

- Important facts and events
- Organisation of ideas
- -----

Hope you'll follow the instructions and complete the note of commemoration.

To do *Make it Correct*

- Click on the button,  *Make it Correct*
- Drag and drop the different portions of the note appropriately in the window that opens up to complete activity. See Fig. 10.3

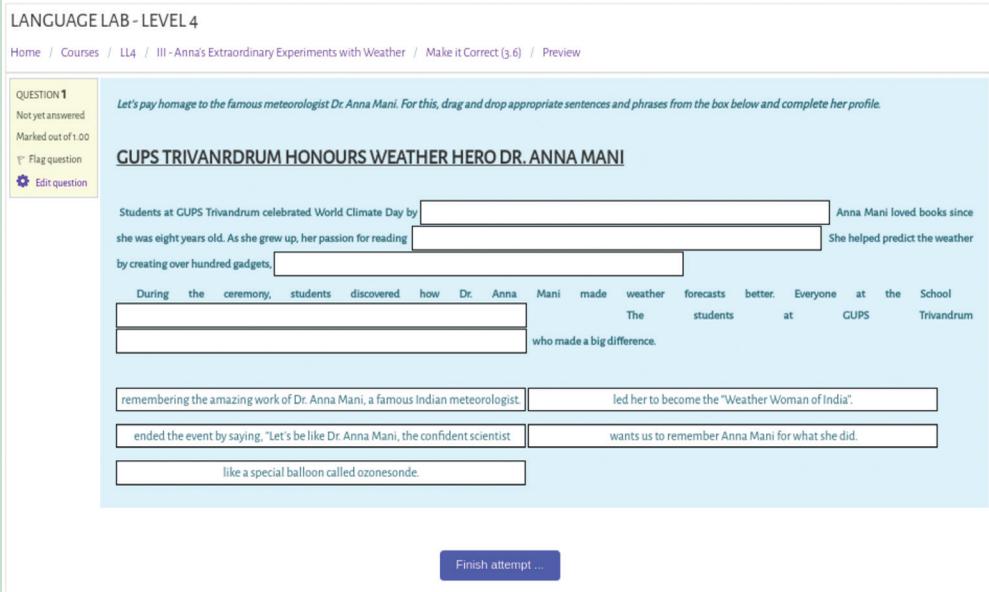


Fig. 10.3. The *Drag and Drop* activity window

- Click on *Finish Attempt* when the commemoration note is complete.

Recording

Hope the note of commemoration is completed. We can now read it to the computer for recording. The Language Lab has the facility to record too.

Voice modulation, as you already know, is very important while recording. Finish this activity by opening the button 🗂️, *Record your Respect (3.7)*.

Recording the Audio

- When you click on 🗂️, *Record your Respect (3.7)*, a window with add submission opens. Click on that to record your audio.
- Select the button, 🎤 in the Editor window that emerges
- Start recording clicking on *Start Recording* button in the *Record Audio* window. Press on the button, *Stop Recording*, when the recording is over. See Fig. 10.4.

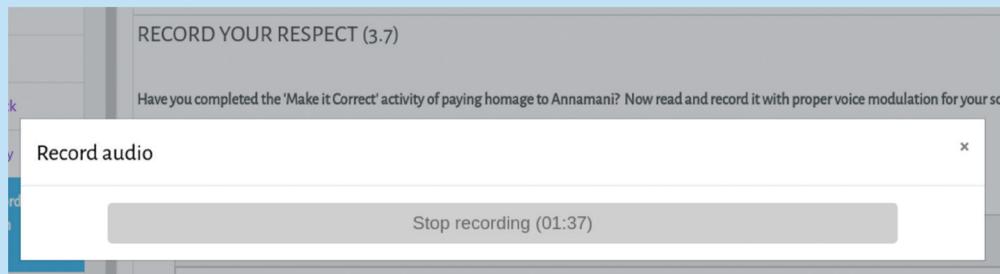


Fig. 10.4. The Window for Recording

- To save the recorded portion, click on the button, *Save Recording*
- To submit, click on the button, *Save Changes* in the *Editor window* that appears. See Fig. 10. 5

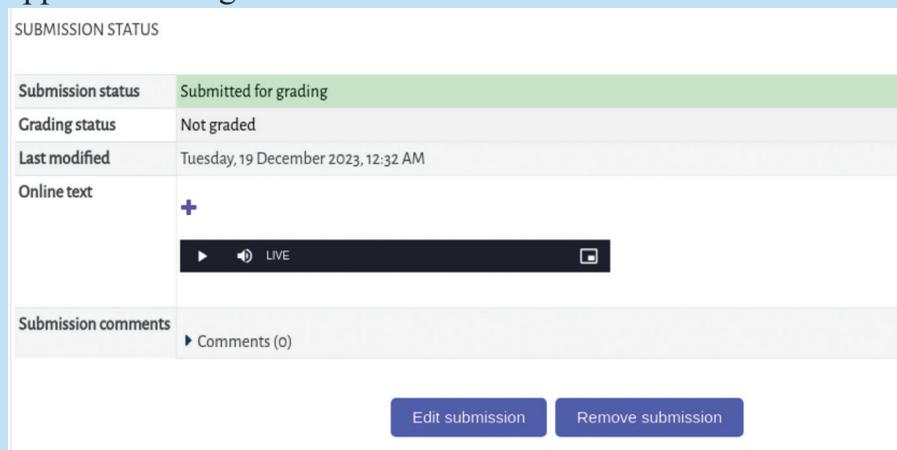


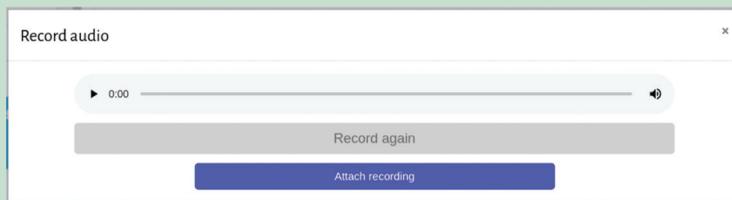
Fig. 10.5. The *Submit* Window after Submission

Improving the Recording

Our first attempt at recording may not be perfect. But, before submission, we can rerecord our story after listening to it.

Making Changes in the Audio

- Play the recorded portion and select *Record Again* for improving it.



- Save after rerecording if there is no further correction
- If you want to correct after submission, click on *Edit Submission* and save it after corrections. (Fig. 10.5)

Find out the remaining activities in Anna Mani's story and complete them with your teacher's help.

Story Listening and Letter Writing

You can see that E³ English Language Lab has other interesting stories like Anna Mani's. *Ammu's Puppy* is one such story. Just listen to that story. Ammu in this story is a girl of great imagination, isn't she?

Like Ammu, why can't you imagine that you have a pet and, then, write a letter to your friends? There are different sorts of letters. What are they? What do you call a letter you write to your friends? What is the structure of such a letter? Would you write it down?

- Salutation
-
-



AI generated image

In the *E³ English Language Lab*, along with the story, *Ammu’s Puppy*, there is an activity called ‘Write a Letter’. Hope you’ll read the story and complete the letter.

 **Assessment**

- Which facility should be selected to make corrections after submitting the audio recorded in the *E³ English Language Lab*?
 - a. Record Again
 - b. Edit Submission
 - c. Remove Submission
 - d. Record Submission

- Some of the things to be noted in voice modulation while recording the audio of the commemoration note are given below. Find the odd one out.
 - a. Speaking with feeling to express emotions.
 - b. Speaking at a fast pace
 - c. Speaking with pauses wherever necessary
 - d. Speaking warmly and in a friendly manner.



Follow-up

1. Listen to the other stories in *E³ English Language Lab*. There is this story of Rinki who goes to her elder brother's room in his absence and is surprised to find the *Magic Block*. Do you like that story? Narrate this story in your own style and record your narration.

2. Do you like the world of wonder under the sea in the story, *Dive*? Have you gone on any such adventure? Write a note on such an experience and upload it to the follow-up activity in the story.



CONSTITUTION OF INDIA

Part IV A

FUNDAMENTAL DUTIES OF CITIZENS

ARTICLE 51 A

Fundamental Duties - It shall be the duty of every citizen of India

- a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievements;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between age of six and fourteen years.

CHILDREN'S RIGHTS

Dear Children,

Wouldn't you like to know about your rights? Awareness about your rights will inspire and motivate you to ensure your protection and participation, thereby making social justice a reality. You may know that a commission for child rights is functioning in our state called the Kerala State Commission for Protection of Child Rights.

Let's see what your rights are:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Right to freedom of speech and expression. • Right to life and liberty. • Right to maximum survival and development. • Right to be respected and accepted regardless of caste, creed and colour. • Right to protection and care against physical, mental and sexual abuse. • Right to participation. • Protection from child labour and hazardous work. • Protection against child marriage. • Right to know one's culture and live accordingly. | <ul style="list-style-type: none"> • Protection against neglect. • Right to free and compulsory education. • Right to learn, rest and leisure. • Right to parental and societal care, and protection. |
|--|---|

Major Responsibilities

- Protect school and public facilities.
- Observe punctuality in learning and activities of the school.
- Accept and respect school authorities, teachers, parents and fellow students.
- Readiness to accept and respect others regardless of caste, creed or colour.



Contact Address

Kerala State Commission for Protection of Child Rights

'Sree Ganesh', T.C.14/2036, Vanross Junction
 Kerala University P.O., Thiruvananthapuram-34, Phone : 0471 - 2326603
 E-mail : childrights.cpcr@kerala.gov.in, rte.cpcr@kerala.gov.in
 Website : www.kescpcr.kerala.gov.in

Child Helpline - 1098, Crime Stopper - 1090, Nirbhaya - 1800 425 1400
Kerala Police Helpline - 0471 – 3243000/44000/45000

online R.T.E Monitoring : www.nireekshana.org.in