

**INFORMATION AND
COMMUNICATIONS TECHNOLOGY**
Standard IX



**Government of Kerala
Department of General Education**

**State Council of Educational Research and Training (SCERT), Kerala
2016**

THE 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-IX

Prepared by :

IT@School Project

Poojappura, Thiruvananthapuram-12, Kerala
for **State Council of Educational Research and Training (SCERT)**
Poojappura, Thiruvananthapuram - 12, Kerala

Website : www.itschool.gov.in, www.scertkerala.gov.in
email : contact@itschool.gov.in, scertkerala@gmail.com
Phone : 0471-2529800, 0471-2341883, Fax: 0471-2529810, 0471-2341869
Type setting : IT@School Project
Layout : IT@School Project
Printed at : KBPS, Kakkanad, Kochi-30
First Edition : 2016

© Department of General Education, Government of Kerala

Preface

Dear learners,

The Information and Communications Technology textbook for Standard IX is prepared and presented to you with the firm conviction that the ICT textbook for Std VIII was successful in guiding you across the marvellous and ever advancing world of information and communications technology and in providing you with various innovative learning experiences.

You have already learnt the basic lessons of Graphic Designing. This textbook has been prepared with the intention of providing you with practice in using graphic software for designing posters and pictures by yourself for curricular and extracurricular activities, familiarizing you with the various possibilities of word processor, equipping you to use software like spreadsheet, presentation, etc. for doing various activities including projects.

The activities included in this textbook are designed using various interactive software like GeoGebra, RasMol, GPLates, Stellarium, etc. which will help you to get a deeper understanding of the various concepts. The textbook also initiates you into the world of computer languages by providing opportunities to prepare programs using Python. In addition to familiarising the various services provided through internet, the textbook also offers practice in handling Wiki software.

This textbook that provides you with interesting and novel learning experiences will prove to be a good companion to you in the learning of other languages and subjects.

Dr P.A.Fathima
Director
SCERT, Kerala

Textbook Development Team

Information and Communications Technology-IX

Chairman

K P Noufal

Executive Director, IT@School Project

Experts

V K Adarsh

Manager (Technical),
Union Bank of India, Kozhikode

Nikhil Narayanan

Technology Expert,
Cognizant, Bangalore

Kori Sanjay Kumar Gurudin IPS

Deputy Commissioner of Police,
Thiruvananthapuram City

Viswaprabha

Administrator,
Wikipedia

Members

Abdul Hakeem C P

Master Trainer,
IT@School Project, Kozhikode

Girish Mohan P K

Master Trainer,
IT@School Project, Kannur

Jayarajan V V

Master Trainer,
IT@School Project, Kannur

Joseph Antony

District Coordinator,
IT@School Project, Ernakulam

Kannan S

Master Trainer,
IT@School Project, Kollam

Mohammed Abdul Nazar

Master Trainer,
IT@School Project,
Kozhikode

Pramod K V

Master Trainer,
IT@School Project,
Kozhikode

Renjith Kumar A V

Master Trainer,
IT@School Project, Kannur

Sabarish K

Master Trainer,
IT@School Project,
Malappuram

Sankaran K

Master Trainer (Coordination),
IT@School Project, Kasargode

Sony Peter

Master Trainer,
IT@School Project,
Pathanamthitta

Sudev Kumar

District Coordinator,
IT@School Project,
Pathanamthitta

Sunil Kumar M V

Master Trainer,
IT@School Project,
Thrissur

Vasudevan K P

Master Trainer,
IT@School Project,
Thrissur

Yahia P

GGMGHSS, Chalappuram,
Kozhikode

Illustrations

Suresh E

Cartoonist,
Programme Producer,
Victers Channel

English Translation

Jose D Sujeev

HSA English,
GHSS, Neduveli,
Thiruvananthapuram

Rajalakshmi Syamala

HSA English,
GHSS, Vengannoor,
Thiruvananthapuram

Reshmi Reghunath

HSST English,
GHSS, Karakulam,
Thiruvananthapuram

Dr. Manju C. R

Asst. Professor of English, Govt. Arts College,
Thiruvananthapuram

Ganesh Kumar M

Academic Officer, IT@School Project

Academic Coordinator

Dr Meena S

Assistant Professor, SCERT

Coordinator

Hassainar Mankada

Master Trainer, IT@School Project

Contents

1	Layout of Pictures.....	07
2	Setting the Page.....	20
3	The Infinite World Within Our Grasp.....	30
4	Programming.....	42
5	The Practical Lab in Computers.....	55
6	Analysing Data in the Computer.....	74
7	Making an Impressive Presentation.....	86
8	Making a Web Page.....	97
9	Video Editing.....	110
10	Inside the Computer.....	123

Icons used in this book for easy reference



For further reading
(Not to be evaluated)



Significant learning outcomes



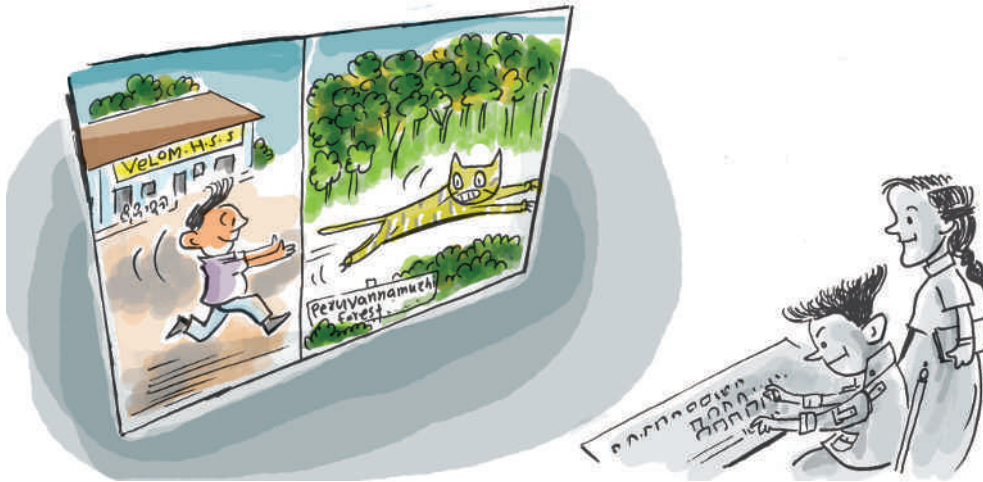
Let's evaluate



Follow-up activities

Chapter 1

Layout of Pictures



“Imagination is the source of every form of human achievement.”

Don't you have to include more than one picture in the poster?

- Ken Robinson



Every year June 12 is observed as the World Day against Child Labour as per the directive of the International Labour Organisation which is an agency of the United Nations. Varsha and Saleena are having a discussion on the Poster Designing competition to be held in the school in connection with the World Day against Child Labour. They decide to design a poster with the help of their computer highlighting the slogan “Education for All”.

You can also design attractive posters using pictures, logos etc. with messages against child labour. You may be aware of the fact that numerous graphics software are available which will help you in this. We have already learnt in the chapter *The Wonderland of Pictures* in Standard VIII how the image editing software GIMP can be used to prepare cover page, logos, etc.

What all features of the graphic software GIMP do you know? Let's list them.

GIMP helps to;

- ◆ Create copies of images.
- ◆ Separate the parts of images.
- ◆ Include letters in the picture.
- ◆
- ◆

Shall we design a poster using GIMP software? What are the preparations to be done before designing a poster?

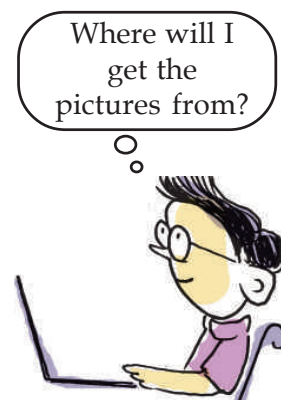
- ◆ Collect pictures required for preparing the poster in your computer.
- ◆ Provide suitable background colour for the poster.
- ◆ Include all the pictures/images or parts of the images based on the topic, on a canvas in such a way that they communicate the idea.
- ◆ Make the poster attractive using the provisions in Image Editing.
- ◆ Include a message in the poster.

Activity 1.1 Let's collect pictures

Download the pictures necessary for the poster from the Internet and save them in the Images folder of your class folder. Ensure that your class folder is there in *Students_Work_9* folder in *Home*.

Image editing

The process of making changes in an image with the help of a software is called image editing. Today, it is possible to create your picture as standing fearlessly in the deep forest with wild animals around. Such pictures are prepared using Image editing software. Software like this can be used to crop images, resize them, change the colour and to combine images. The same image editing software can also be used to create characters for animation. GIMP, Photoshop, Krita, Picasa, Image Magic, etc. are some Image Editing software.



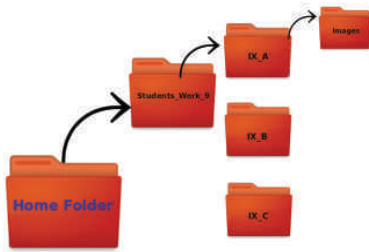


Illustration of the structure of the folder in which the file is to be saved

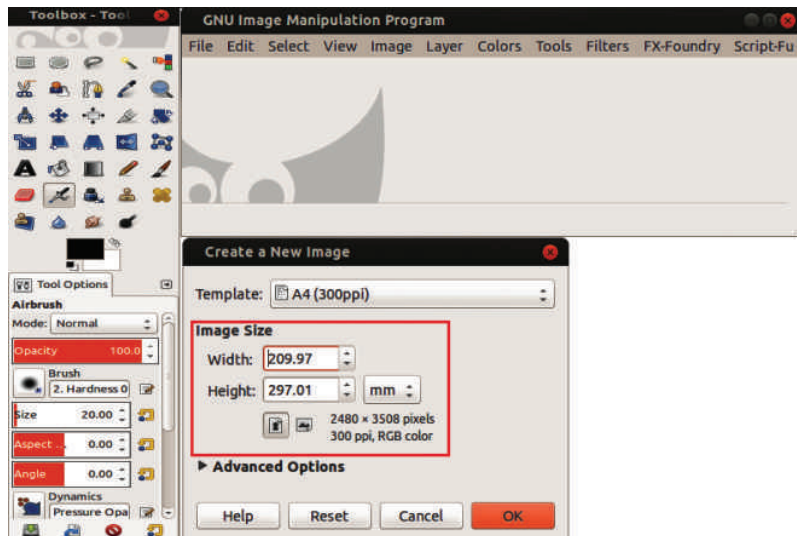
What are the other methods in which you can collect pictures? Let’s list some of the methods you have learnt in your previous classes.

- ◆ Capture pictures using digital camera and save them in the computer.
- ◆ Scan pictures and news clippings that appear in newspapers and magazines.
- ◆
- ◆

A poster that creates awareness/communicates a message can be designed suitably by arranging the words and images appropriately. A canvas is essential in GIMP to arrange the images and letters. So you can open GIMP and create a canvas. Don’t you remember how a canvas is created using GIMP?

Size of the canvas


In GIMP, the size of the canvas is measured in pixel units. In addition to pixels, you can also select canvas in other units like centimeter, millimeter, inch, etc. from *Create a New Image* window. Here (in Pic. 1.1), a canvas of A4 size is created. There are many templates prepared and stored in GIMP in the similar manner. You can also create a canvas by providing values in *Width* and *Height* boxes in the window.



Pic. 1.1 Window and toolbox to create a new canvas in GIMP

Activity 1.2 - Let’s colour the canvas

Imagine that the poster you are going to design, should contain a background colour which is a combination of two colours. Using the hints given, provide a suitable background to the canvas you have created.

- ◆ Select the suitable foreground and background colour using the *Foreground & Background Colors* tool. 
- ◆ Click on *Blend* tool and then drag and apply colour to the canvas.


Save your Canvas with the file name *Poster* in your folder.

Activity 1.3 - Arrange pictures on the canvas

The poster is designed using one or more pictures. So, you will have to bring the pictures one by one to the GIMP canvas. Open the picture you would like to include in the canvas first from the pictures you have already collected. Don't you remember how pictures can be opened in GIMP? Now, do you need the whole picture or only a part of the picture for your poster? You can use the *selection* tool to select either the whole picture or part of the picture. Open GIMP and observe the various *selection* tools in it (Pic. 1.2).

Now, let's see how a part of the picture is selected and pasted on the canvas.

Don't you see a white logo in Pic. 1.3? The areas in the image with the same colour can be selected on the basis of colour using the *Select by Color* tool. You may follow the steps given below:

- ◆ Open the picture in GIMP.
- ◆ Click on the *Select by Color* tool  in the toolbox to activate it.
- ◆ Click on the colour you wish to select from the picture. (Here the picture is the logo of *ILO*). You can see that all the white coloured areas have been selected.
- ◆ Click on the *Edit* menu of the picture window and select *Copy* (Pic. 1.3).
- ◆ Click on the *Edit* menu of the canvas window you have prepared for the poster and select *Paste*. (It is better to keep the canvas window open right from the beginning).

Selection tools



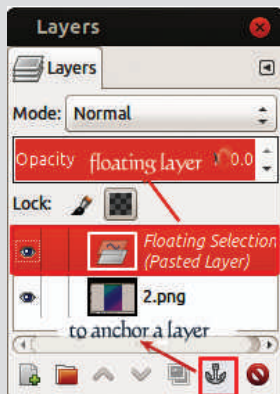
Pic. 1.2
Toolbox in GIMP



Pic. 1.3 Edit Window

Floating layer/ Floating selection

Floating layers/floating selections are temporary layers that have the same features of a normal layer. A *floating layer* persists only till layer editing is done or till you begin the next layer editing. To anchor the image pasted on the *floating layer* to the background or the selected layer click on *Anchor* tool in the *Layer* menu.



Pic. 1.4 -
Floating layer

Now, you have pasted the pictures on the GIMP canvas. When the pictures are pasted on the canvas, they appear on the canvas with a *floating layer* or *floating selection*. (Pic. 1.4) By clicking on the *Anchor* tool in the *Layer Palette*, you can avoid the *floating selection* and fix the picture to the background.

Now, try to move the picture you have pasted on the canvas. You can use the *Move* tool.

Were you able to change the position of the pasted picture? Does the background move along with the picture?

What may be the reason for this? Here, the picture is pasted on the background.

*If you wish to skip the last action and go back to an earlier action, click on **Edit** → **Undo** of the canvas.*

To edit the pictures we have pasted on the canvas, it is better to use the provision of *Layer* in the Image Editing software. To understand more about layer, read the note on Layer editing.

Now, you might have understood that the pictures moved freely because they were not pasted using layer.

Shall we try to do this activity by pasting the previously copied image on a new layer according to the instructions given below?


- ◆ Paste the copied image on the canvas of the poster.
- ◆ Click on *To New Layer* in the *Layer* menu.

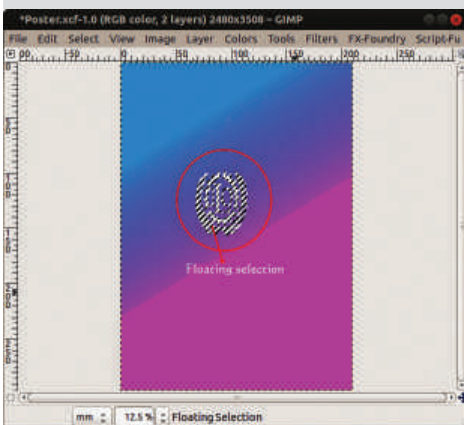
Now, what change has taken place in the *Layer palette*? You can see that the picture is pasted on a new layer.

You must specially note that in this case, there was no need to anchor the picture.

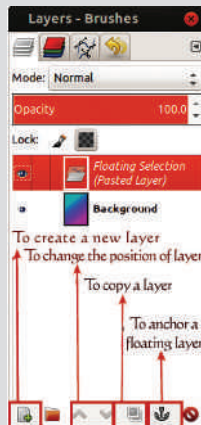
Layer editing

Layers are an inevitable part of any Image Editing software. Each layer exists independently. Usually, in image editing we have to process several images at the same time. In such circumstances, if each image is arranged in a separate layer, they can be edited independently.

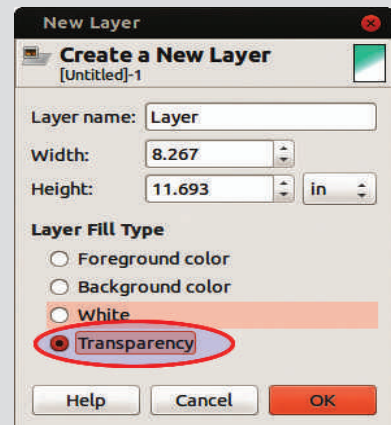
To add new layers, click on the icon  in the *Layer Palette* (Pic. 1.6). The portion which has the tools required for creating and copying layers is the *Layer Palette*. Duplicate layers can be prepared and the position of layers can be changed using the various tools available in the *Layer Palette*. Normally, transparent layers are used in GIMP to create new layers (Pic. 1.7). If the *Layer Palette* is not visible in GIMP then, select *Dockable Dialogs* from the canvas *Windows* menu and click on *Layers*.



Pic. 1.5 GIMP canvas



Pic. 1.6 Layer Palette



Pic. 1.7 Layer Properties window

You are already familiar with the *Select By Color* tool.

Now, open the pictures you have collected and with the help of the selection tools, select the parts of the picture required. Using the *Copy* and *Paste* tools, insert the pictures as various layers in the poster window.

Observe the uses of other *Selection* tools in GIMP and complete Table 1.1. When you place the mouse pointer on each tool in the selection box, the features of the tool will appear as tool tips.

Selection tool	Short cut key	Uses
Rectangle select	R	To make a rectangle shaped selection
Ellipse select
Free select
Fuzzy select
Select by colour
Scissors select
Foreground select

Table 1.1 Short cut keys and uses of selection tools

You can create a new layer just before pasting the copied picture. For this, click on *New Layer* on the *Layer Palette* after pasting the picture. (Pic. 1.6)

You have included all the pictures required for the poster, haven't you? Now, using *Move* tool, arrange the pictures in suitable places.

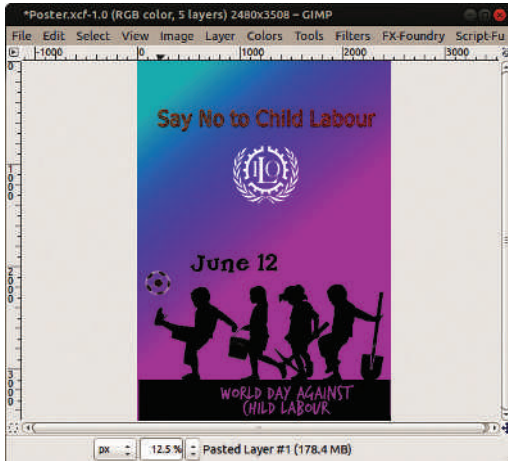
Do not Forget!!!

After each action do not forget to click on the Save button in the poster window to save your work.

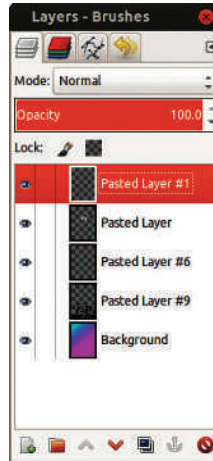
Changing the size of the picture as required will make the poster more beautiful and attractive. To change the size of the picture, activate the *Scale* tool and then click on the picture. Now, provide the necessary measurements as length and width and click on the *Scale* button.



After arranging the required pictures for the poster on the canvas, observe the *Layer Palette* (Pic. 1.9). You know the layer in which the background is pasted. But, what about the other pictures? Can you make out on which layers they are placed? Providing names related to the picture to each layer will make image editing easier. To find out how a new name is given to a layer, do the following activities.



Pic.1.8 Poster



Pic. 1.9 Layer Palette

Activity 1.4 - Let's rename the layer

- ◆ Open the *Layer Palette*.
- ◆ *Right click* on the layer to be renamed. (You can also double click on the layer.)
- ◆ Select *Edit Layer Attributes*.
- ◆ Type a new name in the place of the existing name in the window that opens up.
- ◆ Click on the *OK* button.

How can we find out in which layer is each picture pasted?

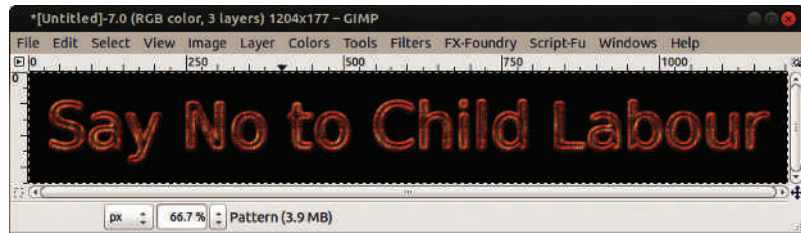


Activity 1.5 - Place a logo in the poster

By including a suitable message, we can make the poster more communicative and catchy. Did you notice that the message 'Say No to Child Labour' in the poster (Pic. 1.8). This has been done using the provision of Logo in GIMP. You have learnt how to create logos in your previous class, haven't you?

Amil faced a difficulty when he tried to include the logo in the poster using *Copy, Paste* features. The problem was that he could not paste all the parts of the logo on the canvas. Why did this happen? Let's find out.

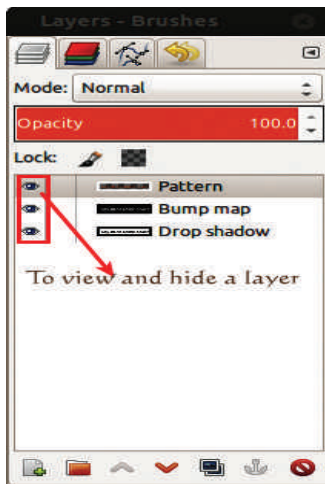
Observe the *Layer Palette* in the Logo window. (Pic. 1.11) Can't you see more than one layer? When we copied the logo, only the active layer was copied.



Pic. 1.10 Logo

The facility to copy all the layers that are visible in a logo is available in GIMP. This tool is termed as *Copy Visible* (*Edit*→*Copy Visible*). Try to copy the logo and paste it on the canvas using this facility. Now, the completed Logo will be visible on the poster.

In that case, how can we paste the text of the logo on the poster?



Pic. 1.11 Layer Palette

Don't you see an eye shaped icon (*Eye Icon*) on the *Layer Palette* of the logo (Pic. 1.11)? What happens if you click on this icon? When the picture of the eye disappears, the layer on the logo window gets hidden. Try to copy after hiding the layers other than the text layers. Don't forget to use the *Copy Visible* tool when you copy the text. Use the *Move* tool to arrange the pasted logo in the suitable position. Click on the *Save* button to save the changes made to the poster.


Haven't you come across many instances in which a layer once created on the poster had to be avoided? For this, right click on the particular layer of the *Layer Palette* and select *Delete Layer*.

GIMP is the graphic editor that includes many tools which help in Image Editing. Let's learn about some of these tools that help in making the poster more attractive.

Activity 1.6 - Paths tool for selecting a picture

Paths tool is a tool that helps in selecting a part of an image according to a fixed shape. *Paths* tool can also be used to create different types of *Patterns* and also to select a certain part of the image.

Suppose you have to separate only a part of the picture (Pic. 1.12) and include it in the poster, how will you do it? Follow the steps given below.

- ◆ Open the picture in GIMP.
- ◆ Select *Paths* tool  from the toolbox.
- ◆ Click on the edges of the picture as shown in Pic. 1.12 Step 1.
- ◆ Press the *Ctrl* key and click on the point where you start to complete the marking.
- ◆ Select *From Path* tool from the *Select* menu to mark the path of the selected portion (Pic. 1.12 step 2).

Thus, the selection is completed.

- ◆ Use the *Copy* → *Paste* tool to insert the picture in the poster.
- ◆ Adjust the size of the image to suit the poster and save it.



Do you know?

If the default settings in GIMP is changed, there are provisions available in GIMP to reinstate the default settings.

The following steps will help you.

- ◆ Click on the *Edit* menu in the GIMP window and select *Preferences*.
- ◆ Click on *Window Management* in the window that opens.
- ◆ Click on *Reset Saved Window Positions to Default Values* and give *OK* command.
- ◆ Restart GIMP.



Pic. 1.12 Various steps/stages while using Paths tool

During image editing, remember to close the picture windows which you have finished working.



Flip images

Provisions are available in GIMP to flip the images to either sides. Follow the process given below to do the activity.

- ◆ Make a copy of the layer that includes the picture to be flipped.
- ◆ Using the *Move* tool, arrange the copied image on the canvas.
- ◆ Click on the *Flip* tool in the toolbox and activate it.
- ◆ Click on the image you intend to flip.

Activity 1.7 - Change picture clarity

Imagine that you want to improve the clarity of a picture you have selected to be included in the poster.

For this, first open the picture in GIMP and follow the steps as given below.

- ◆ Make a the duplicate of the picture of which you would like to change the clarity.
- ◆ Click on the *Colors* menu of the GIMP window and open the *Brightness - Contrast* sub-menu.
- ◆ Move the slider in the window that opens. Change the brightness and contrast of the picture. Observe what happens.

Imagine that the picture of a boy who is engaged in child labour is to be included in the poster. But the face of the boy should be blurred. This was the problem faced by Rithu. You might have faced the same problem. Let's do the activity given below.

Activity 1.8 - Filter tools

To make the face of the boy blurred in the poster you have prepared, use the *Blur* tool in the *Filter* menu in GIMP. Follow the steps given below.

- ◆ Select the layer which includes the picture that you have to blur. (Click on the layer which has the picture in the *Layer Palette*.)
- ◆ Using the *selection* tool, select the portion of the picture to be blurred.
- ◆ Select a suitable blur tool from the *Blur* menu that appears when you click on the *Filters* menu.

Now we can observe that the part of the image we have selected is in a blurred manner.

Many filter tools are included in GIMP. Hope you will use the other features available in the *Filters* menu.

Now, you have almost finished the poster. To include the completed poster in a presentation, export it in jpg format and save it in the concerned folder. You have learnt how to export a file in your previous class.



Significant learning outcomes

The learner:

- ◆ identifies the uses of the various *selection* tools and prepares a table.
- ◆ creates new layers on a canvas and designs a poster including pictures, logos, etc. and saves it.
- ◆ lists the process to create paths for images using *Paths* tool.
- ◆ changes the brightness and contrast of an image and includes it in the poster and saves it.
- ◆ uses the *Blur* tools in the *Filters* menu to blur the selected portions of an image, includes it in the poster and saves it.



Let's evaluate

1. Open a canvas in GIMP, paste a picture and anchor it. But, when you try to move the pasted image, it moves along with the background. What could be the reason for this?
 - a) The picture did not get pasted on the canvas.
 - b) The picture was pasted on the background of the canvas.
 - c) The Move tool did not function properly.
 - d) The picture format did not support the process.
2. Prepare a banner to be held in a rally to be organised in connection with the proclamation procession of the *World Environment Day*. Include the details given below and save it in your folder.

Hints:

- Use Logo tool and include the slogan *No forests No Man* in an attractive manner.
- Include pictures that depict causes for the destruction of the environment.
- Save the banner in *xcf* and *jpg* formats in your folder.

Chapter 2

Setting the Page



Vipin and Varsha are getting ready for a paper presentation at a seminar to be held in connection with the Vidyarangam Literary Fest. They are about to type the written matter with the help of the computer and take a print of it. Which software can they use for this?

You are familiar with the preparation of such files in the word processor. Files prepared in this manner can be arranged in various ways, edited, enriched and printed. Just like Vipin and Varsha, we can also prepare a seminar paper in the word processor in an attractive way.

The first step is to type the seminar paper in the word processor. You have practiced typing in the mother tongue using word processor in your previous class. Some of you may face difficulty in typing chillu letters (*chillaksharangal*) and compound letters (*koottaksharangal*). Let's try to recollect how it was done.

Find out the letters which combine to form the following *chillaksharangal* and *koottaksharangal* and complete the table (Table 2.1).

Now, type these chillu letters and compound letters in the computer.

My seminar paper is ready



Now, we shall type this in the computer and get a print.





Letter	Compound letters
ക	ക + ൃ + ക
മ്പ	
ക്ഷ	
ത്ര	
ഞ്ച	
ർ	
ൻ	
ശ	
ൺ	
ൽ	

Table 2.1 Cillaksahrangal and Koottaksharangal

Activity 2.1 – Let’s digitize the seminar paper

Open the word processor and type the content of the paper. Don’t forget to save the typed document. You have learnt in the previous class how files prepared in the word processor are given a name and how they are saved in the concerned folders.

The picture (Pic. 2.1) shows the first page of the seminar paper prepared and saved by Vipin and Varsha just as you did. Doesn’t your seminar paper also follow the same model? Now, observe the next picture (Pic. 2.2). Here you will see that they have made many improvements to the paper. What improvements have they made? Note down your observations.



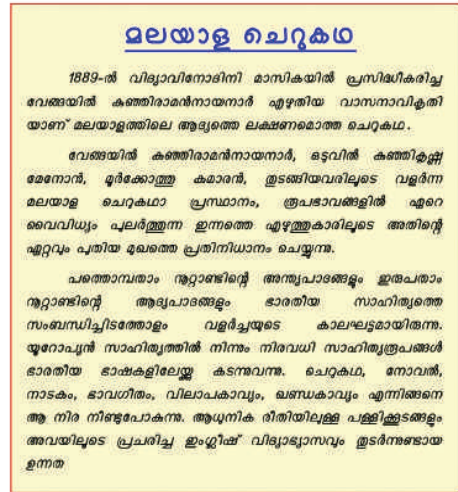
Pic. 2.1 An unformatted page

- ◆ Adjusted the size of the font.

- ◆ Changed the font.
- ◆ Adjusted the spacing between the paragraphs.
- ◆ Provided background colour and borders to the page.
- ◆
- ◆
- ◆

You might have learnt in the previous class, various methods to edit letters and paragraphs.

Now, in the seminar paper you have typed and prepared, adjust the font colour, font size, font style, line spacing, etc. so as to make it attractive (as shown in Pic. 2.2) and save it.



Pic. 2.2 A formatted page

Superscript and Subscript

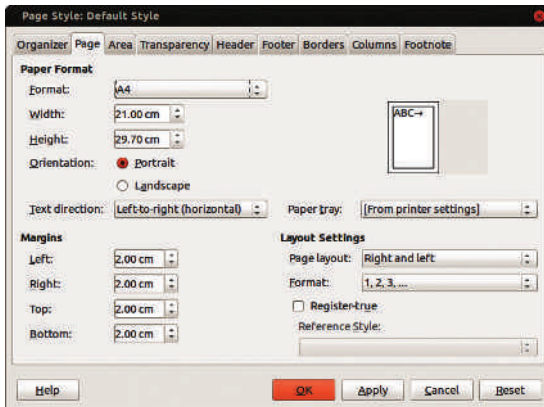
You may come across situations where you have to type mathematical equations and chemical formulae like $a^2+2ab+b^2$, H_2SO_4 . Have you noticed that in the terms a^2 and b^2 , 2 is placed a little above the other letters? This is called superscript. Likewise in H_2 and O_4 , 2 and 4 are placed slightly below the other letters. This is called subscript.

To type numbers or letters as subscript or superscript, first select the number or letter. Then, from the *Position* tab in the *Character Format* window, select subscript or superscript.

Activity 2.2 - Let's layout the page

Just as the letters and paragraphs were formatted in an attractive manner, the page also can be made attractive. Open the *Page Style* window (Pic. 2.3) and examine the facilities available there (*Format* → *Page*).

- ◆ Click on *Page* tab and type suitable values in the *Margin* box to adjust the page margin.



Pic. 2.3 Page Style window

- ◆ You can select the page size from *Paper Format* on *Page* tab. (Since our seminar document has to be printed, selecting *A4* size is preferable.)
- ◆ Select either *Portrait* or *Landscape* from *Orientation* to set the page orientation vertically or horizontally.

Now, provide background colour to the page to make it look attractive. For this, click on *Area* tab in the *Page Style* window. From *Fill* option select the required colour.

Activity 2.3 - Let's provide borders

Don't you think that the seminar paper will look more attractive if we provide page borders? How can we do so?

- ◆ Click on the *Borders* tab in the *Page Style* window.
- ◆ From the *Line Arrangement* option you can select the portion where you wish to provide borders.
- ◆ From the options given below the *Line* option, select the *Style*, *Width*, *Color*, etc. of the border.

Shall I make the page more attractive?



You can also adjust the spacing between the border and the words here. For this you can select *Spacing to Contents* and make necessary changes in the values in *Left*, *Right*, *Top* and *Bottom*. By selecting a suitable style from *Shadow Style*, you can also give a shadow to the border.

Activity 2.4 - Let's insert header and footer

Open your textbook and look at the top and bottom portion of each page. Have you noticed the page number, name of the book, name of the unit, your standard, etc. appearing repeatedly on each page? Can we also include such repeatedly appearing details (name of the seminar paper, page number, etc.) in the pages of our document?

It will be convenient to include such repeatedly appearing details in the Header and Footer. The header appears at the top of each page and footer at the bottom. Let's see how the page number is inserted as a header.

- ◆ Click on the *Header* tab of the *Page Style* window. Put a tick mark in the *Header* option and click *OK* button. Now, the header will appear at the top of the page.
- ◆ Click on the header and insert the page number. (*Insert* → *Fields* → *Page Number*).

Now, examine the pages. Does the page number appear on each page? In the similar manner, insert as footer the title of your document on one page and the name of your school in the next page.

Did you face any difficulty in inserting different contents as footer in the pages?

Click on *Footer* tab and remove the tick mark on *Same Content Left/Right*. Now, insert the title of the seminar in the first page and the school's name in the second page as footer. Doesn't the footer of the left and right pages appear as you wished?

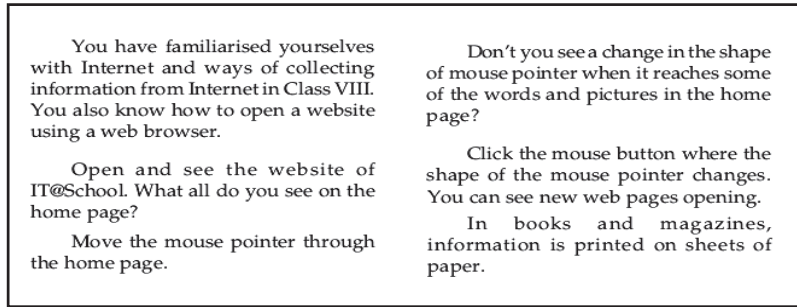
Activity 2.5 - Let's arrange in columns

Observe how the content of the old IT textbook of Class 9 is presented (Pic 2.4). The information is arranged in two columns. Doesn't this arrangement look more attractive and impressive? Shall we arrange our seminar paper also in this manner? What should we do for this?

- ◆ Click on the *Columns* tab of *Page Style* window.
- ◆ Provide the number of columns required in the *Columns* seen in *Settings*.
- ◆ Adjust the width and spacing of the columns using the *Width and Spacing* option.

Picture as page background

Just as we gave a colour as the background, we can also give a picture as the background. For this, select *Bitmap* from the *Fill* option in *Area* tab. Click on *Import Graphic* and select the picture to be included as background. Click on *Open* button and the picture appears as the background of your page.



Pic. 2.4 A portion of ICT textbook

How can I set the text in columns?



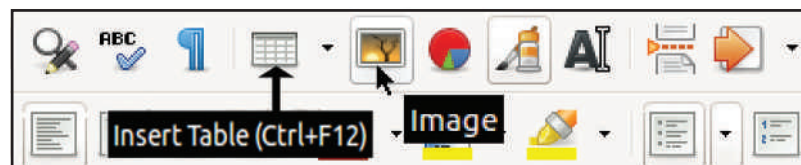
- ◆ Column width will be adjusted equally if there is a tick mark against *AutoWidth*. But, if we remove the tick mark we can adjust the width and distance of the columns according to our requirement.

Now, arrange the text of the seminar paper in columns and save it.

Activity 2.6 - When pictures are inserted

Don't you think you should include pictures in your seminar paper? You have learnt in earlier classes how to insert pictures. Try to insert pictures in the same manner. You can use the *Image* tool in the Tool bar for inserting pictures (Pic 2.5).

Did you face any difficulty when you tried to insert pictures in this manner? What was it?



Pic. 2.5 - Word Processor toolbar

- ◆ Size of the picture is not suitable for the page.
- ◆ When pictures are inserted the position of the words and sentences change.
- ◆

How can we overcome such difficulties?

- ◆ Select the picture and bring the mouse and click on the squares that you see around the picture. Now, click and drag the mouse to adjust the size according to your requirement.
- ◆ To move the picture to the required position, click on the picture and drag the mouse.

While inserting a picture, some words or sentences may get displaced. This can be rectified using the *Wrap* tool. For this, right click on the picture and select a suitable *Wrap* style from the *Wrap* menu. If you wish to place pictures between words, it is preferable to choose *Page Wrap* or *Optimal Page Wrap* options.

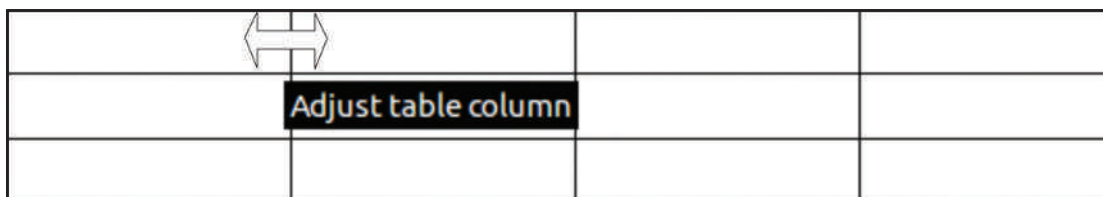
You may have to include information related to the seminar topic in a tabular format in your document. How will you insert a table?

Activity 2.7 Let's insert a table

You can use the *Insert Table* tool in the Tool bar (Pic. 2.5). Click on the *Insert Table* tool and provide the required number of rows and columns. Now, haven't you inserted the table? (You can also insert a table in the order *Table* → *Insert Table*.) But, you will find that in the table you have inserted, all the cells are of the same size. How can we format the cell size according to our need?

To adjust the width of the column,

- ◆ Bring the mouse pointer to the point where two columns meet.
- ◆ The mouse pointer changes to a two sided arrow (Pic. 2.6).



Pic 2.6 Adjusting column space

Adjusting the size of the picture

Select the picture and bring the mouse pointer to the squares you see around the picture. Click on the mouse and drag it. On doing this, the height and width of the picture is proportionately changed. If you want to change only the height or the width, press and hold the shift key. Then, click on the squares and drag the mouse as required.

- ◆ Click and drag the mouse and adjust the width as required.

Now, try to adjust the height of the row in the same manner.

Shall we merge the cells at the top of each column in the table we have prepared and type the title in it? At times, we may have to merge more than one row or column and add information in it. How can we do it? We can use the *Merge Cells* tool for this purpose. Select the cells which we wish to merge and click on *Merge Cells* in the *Table* menu. You will find that all the selected cells have merged together. Now, you can type the title there.

How can I insert new columns and rows in the table?



Now, you can insert tables, according to your requirement, in your seminar paper. You may have to add more rows and columns in the table that you have inserted. Do you know how to insert rows and columns in the table?

Follow the steps to insert new columns,

- ◆ Click either to the left or right of the active cell. Select *Table → Insert → Columns*.
- ◆ The number of columns to be inserted and its position, whether to the left or right of the selected cell can be entered here.
- ◆ Then, click on the *OK* button.

Now, you have inserted new columns. In the same way, new rows can also be inserted and the matter can be typed in it.

The seminar paper is now ready. Now, don't you want to take a print of it?

Your teacher has suggested that the print out can be taken from a computer centre in front of the school. But you found it difficult to open the file in the system of the computer centre. How can this problem be solved? If you export the file in the PDF format you will be able to open it in any system that has the PDF viewer. How can we change the document into pdf format?

Activity 2.8 - Let's convert and export as PDF

- ◆ Click on *Export as PDF* in *File* menu.
- ◆ In the *Range* tab, from the window that opens select whether you want to convert all the pages into PDF (All) or only a few pages.
- ◆ Click on *Export* button.
- ◆ Select the place where you wish to save the file. Name the file and save it.

Try to open the file in other computers. Can you open it? Now, you can take the print out of the document and present it at the seminar.



Significant learning outcomes

The learner:

- ◆ provides borders, background colour, etc. to a page in the word processor and makes it look more attractive.
- ◆ adjusts the page margin, paper size, paper orientation, etc. in a suitable manner.
- ◆ inserts header and footer and provides page numbers.
- ◆ arranges the information in columns.
- ◆ inserts pictures and adjusts its size and position.
- ◆ inserts tables and adjusts the column width, row height, etc., merges more than one cell and adds new columns and rows.
- ◆ exports the file prepared in the word processor to PDF format.



Let's evaluate

1. Identify the features of the terms given below and match them.

a) $x^3 + y^3$	Header
b) Insert Page Number	Subscript
c) HNO_3	Superscript

2. Prepare a show card in the word processor including the mathematical equations $(a+b)^2 = a^2+2ab+b^2$, $(a-b)^2 = a^2-2ab+b^2$ to be exhibited at the Mathematics corner of your school. Make it very attractive by giving page borders and background colour.
3. You have to insert the author's name at the bottom of all the pages of an article prepared in the word processor. Which of the following tools is the most suitable for this?
 - a) *Footer* b) *Merge Cells* c) *Insert Rows* d) *Header*
4. Prepare in the word processor a notice for the inauguration of the school IT Club and save it.
5. You have to merge the first three columns of a table in a file prepared in the word processor and type a title in it. Which of the following tools can be used for this purpose?
 - a) *Delete Cells* b) *Merge Cells*
 - c) *Insert Columns* d) *Delete Columns*



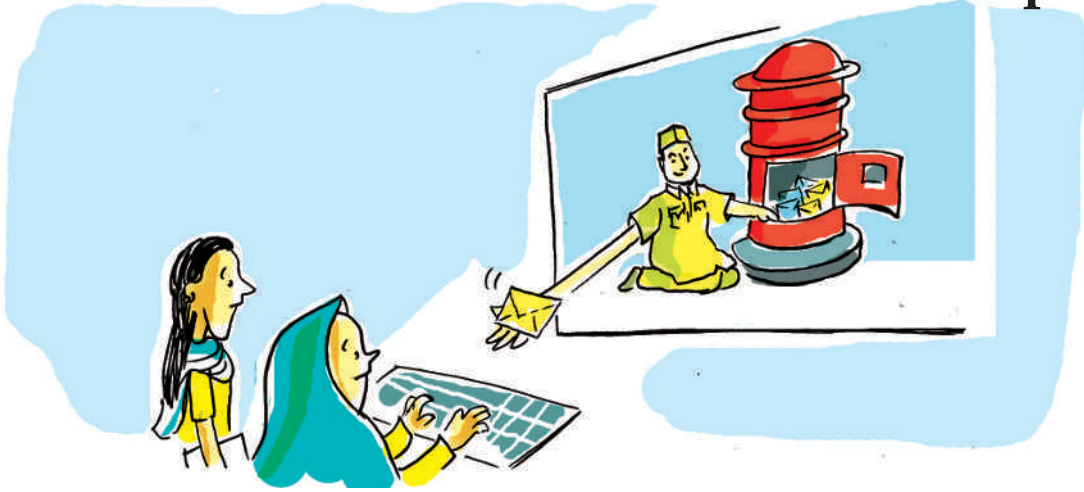
Follow-up activities

- ◆ Prepare a show card in the word processor including the equations of motion mentioned in your Physics textbook. Increase the font size, provide attractive colours and save it.
- ◆ Prepare autobiographical sketches of scientists like Plato, Democritus, Aristotle, etc. mentioned in your Chemistry textbook in the word processor. Download the necessary information and pictures from the internet.
- ◆ Create a table in the word processor that includes the atomic number, number of electrons, and electronic configuration of elements with atomic number 1 to 18.
- ◆ Prepare a digital magazine in the word processor including the works of your classmates. Make the magazine attractive by inserting pictures, providing background colours, page borders, etc. Insert the name of the magazine as header and page number as footer. Save it as *PDF*.



Chapter 3

The Infinite World Within Our Grasp



Amina and her friends of the science club of the school are preparing for a programme 'A Day to Remember our Heart' to be held in the school in connection with the World Heart Day. They have to mail the details of the programme to an eminent cardiologist who has agreed to deliver the keynote address. Being the Secretary of the club, Amina is given the responsibility of sending the mail. But she does not have an email address.

How can we help Amina?

How can we send e-mails?

First we shall create an e-mail address.



We know that today almost all the activities of the service sectors are Internet oriented. Today e-mail or electronic mail address has become a necessity for all online services. The following activity will help us to get to know in detail how e-mail address is created and how e-mails are sent.

E-mail

E-mail is the short form of Electronic mail. It is the method of sending and receiving messages through internet using the electronic media. In addition to messages, we can also send and receive pictures, audio files, films, etc. through this. There are service providers who provide e-mail facility free of cost. For e.g. Gmail, Yahoo mail, Rediff mail. Messages sent through e-mail from anywhere in the world is stored in the e-mail address of the receiver. You can open the mail using a password and read the letters and other attached files from anywhere with the help of an Internet connection.

What all preparations are to be made for sending an e-mail?

- ◆ The Internet facility should be available.
- ◆ Both the sender and receiver should have an e-mail address.

Activity 3.1 - Let's create an e-mail address

Let's see how an e-mail account is created in Gmail.

- ◆ Open the website www.gmail.com using a *web browser*.
- ◆ Click on *Create an Account* on the page that appears.
- ◆ Provide the necessary information in the online application that appears on the screen (Pic 3.1).
- ◆ Agree to the terms of service and privacy policy of the service provider given at the bottom of the page.
- ◆ Click on the *Next step* button.



Now, you have obtained an e-mail address.

Open your e-mail account with the e-mail address and password that you have created.

Name

First Last

Choose your username

@gmail.com

Create a password

Confirm your password

Birthday

Day Month Year

Gender

I am...

Mobile phone

+91

Your current email address

Prove that you're not a robot

Skip this verification (phone verification may be required)

762

Type the text:

Location

India (भारत)

I agree to the Google [Terms of Service](#) and [Privacy Policy](#)

Next step

Pic. 3.1 Online application form

- ◆ When you open your account, the inbox of Gmail appears first. In this, you will find the mails sent by Gmail welcoming you. You can click on it to open and read the message.

When you create an e-mail account...

If the e-mail address that you wish to create is already being used by someone, you will not get that address. Then, you will have to make changes and give a new address.

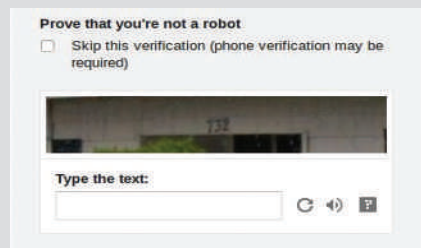
An e-mail address has two parts – name given by the user (user name) and the name of the service provider. The two names are separated by the symbol @.

For example: If a person named Joy Cheeran registers in Gmail with the id 'joycheeran', his e-mail address will be *joycheeran@gmail.com* and if he registers in yahoo.in, his address will be *joycheeran@yahoo.in*.

A person with the e-mail address of a particular service provider can send to and receive mails from the mail address of any other service provider.

CAPTCHA

You might have noticed certain letters and numbers that you were asked to type in a space, as shown in Pic. 3.2, while providing your personal details to register for an e-mail address. This is called Completely Automated Public Turing Test to tell Computers and Humans Apart (CAPTCHA). It is a test to ensure that the user is a Human Being. Websites generally use CAPTCHA to protect the site from automated programs that are used to hack the websites.



Pic. 3.2 CAPTCHA



When you enter the e-mail address...

Type the e-mail address of the person/persons to whom you wish to send the mail in the column labelled *To*. If you have to enter more than one e-mail address, use a comma to separate the addresses. If you want to send a copy of the e-mail to another person, enter their e-mail address in the *Cc* column (Carbon Copy). If you want to send a copy of the mail to another person without the knowledge of the e-mail recipients in the *To* and *Cc* column, enter the person's e-mail address in the *Bcc* column (Blind carbon copy).

You have obtained the e-mail address. Now, let's see how an e-mail can be sent.

Activity 3.2 - Let's send an e-mail

- ◆ Click on *Compose* button in the e-mail window.
- ◆ Type the receiver's e-mail address, subject and the detailed content in their respective columns in the window that opens.
- ◆ Click on *Send* button. You will receive a message that your mail has been sent.

There may be differences in the arrangement of the facilities and buttons in the e-mail box of various service providers. You may examine and find out.

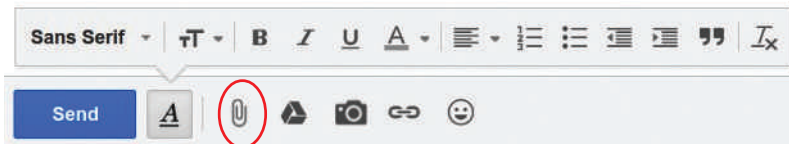
Activity 3.3 Let's send a copy of the invitation

If you have to send a copy of the notice to the chief guest, with details of the programme you intend to organise in the school in connection with the World Heart Day, what will you do? We can attach the notice to the e-mail and send it.

To do this you need a digital or scanned copy of the notice in your computer.

- ◆ Click on the *attachment* tool in the *Compose* window (Pic 3.3). Follow the instructions that appear to select the files to be sent and attach them.
- ◆ Click on the *Send* button after you have attached the files.

In the same manner, we can attach pictures, videos, audio files, etc. along with the e-mail and send them.



Pic. 3.3 Mail attachment tool

Use of e-mail: Certain precautions...

- ◆ Password is the key to enter an e-mail box. Hence, it is safer to create a password that contains capital letters, small letters, numerals and symbols.
- ◆ It is good to change your password at intervals to keep your e-mail safe.
- ◆ *Sign out/log out* of your mail account after you finish using it.
- ◆ If you receive mails, attachments, etc. from unknown or unfamiliar addresses, you should open or respond to it only after ensuring its credibility.
- ◆ Sending mails which include news, pictures or videos that are false, obscene, cause defamation to people, or is a threat to national security, is a punishable offence.

Activity 3.4 Various modes of communication

You have learnt the importance and advantages of e-mail. Now let's compare the merits and limitations of various modes of communication (Table 3.1).

Not only service providers but also organizations and government departments provide free e-mail facility for official purposes.

For example the e-mail address of *IT@School Project* is *contact@itschool.gov.in*

Mode of communication	Merits	Limitations
Letter	Information can be exchanged in the form of text and picture.	Causes delay
Telephone	Information can be exchanged in the form of sound.	Transmission of message happens very quickly.
Mobile phone		
E-mail		

Table 3.1 Various modes of communication



Ray Tomlinson (1941-2016)



Ray Tomlinson was an American Computer Programmer who developed the program to send messages from one computer to another for ARPANET, which was a precursor of Internet. He was the one who selected the symbol @ to separate the *username* from the name of the service provider in the e-mail address. Even now *user@host* is considered as the standard for e-mail address.

You have learnt how information can be collected from the Internet and how e-mails can be sent. Almost any information that we need like those related to literary works, audios, videos, maps, etc. are available on the Internet. Among the available versions of the online encyclopedia, the more trustworthy and comprehensive information is provided in Wikipedia.

You have already learnt the history and mode of the functioning of Wikipedia in your previous class. Wikipedia has many sister projects like Wikisource (<http://ml.wikisource.org>), Wiktionary (<http://ml.wiktionary.org>), Wikiquote for quotations (<http://ml.wikiquote.org>), Wikicommons (<https://commons.wikimedia.org>), etc. Like Wikipedia, OpenStreetMap is also a digital map that can be edited freely by anyone.

School Wiki

School Wiki (<http://schoolwiki.in>) is an encyclopedia developed using Wiki software that includes all details like history, location, etc. of schools in Kerala. Giving information is as important as receiving information. All these information about schools have been contributed to this site by groups comprising students, teachers and old students (alumni). Wiki

services have been developed in such a way that any person can access the site, modify and add information to it.

Wiki Projects/Services are a treasure trove of regional knowledge. The information included in the site is contributed by its volunteers. Depending on the number of volunteers, the quantity of information available in the collection may vary. Any person can contribute to Wiki by either providing information or editing the contents. People from all over the world and all walks of life are volunteers in Wiki projects like Wikipedia.

The fact that anyone, without much technical knowledge can contribute or modify information, makes Wiki projects more acceptable to all. You can include details about your school, other interesting features of your locality and also articles prepared by children in School Wiki.

The following information can be included in the page *Ente Naadu* in the info box of the school page in School Wiki (<http://schoolwiki.in>).

- ◆ Geographical features of the locality.
- ◆ Natural beauty of the region
- ◆ Major job sectors
- ◆ Statistical data, tables and diagrams
- ◆ Historical facts
- ◆ Institutions and organizations
- ◆ Eminent people and their contributions
- ◆ Developmental hallmarks and possibilities
- ◆ Heritage and tradition
- ◆ Art forms
- ◆ Language/dialect variations

Let us try to include this information in your School Wiki page?



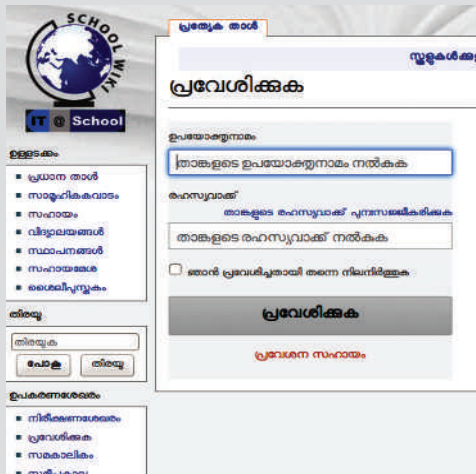
Let's build the pillars of knowledge



Wikipedia exhorts people to 'imagine a world in which every single person on the planet is given free access to the sum of all human knowledge'. Content/information is included in the wiki projects through a collaborative effort. Wikipedia operates on the basis of certain policies and guidelines. This lends clarity and helps to bring consensus when there are differences of opinion.

- Wikipedia should have a neutral point of view.
- Anyone can edit and modify the content in Wikipedia.
- Even though Wikipedia has certain codes of conduct, they are not compulsory laws.

To be a member of School Wiki...



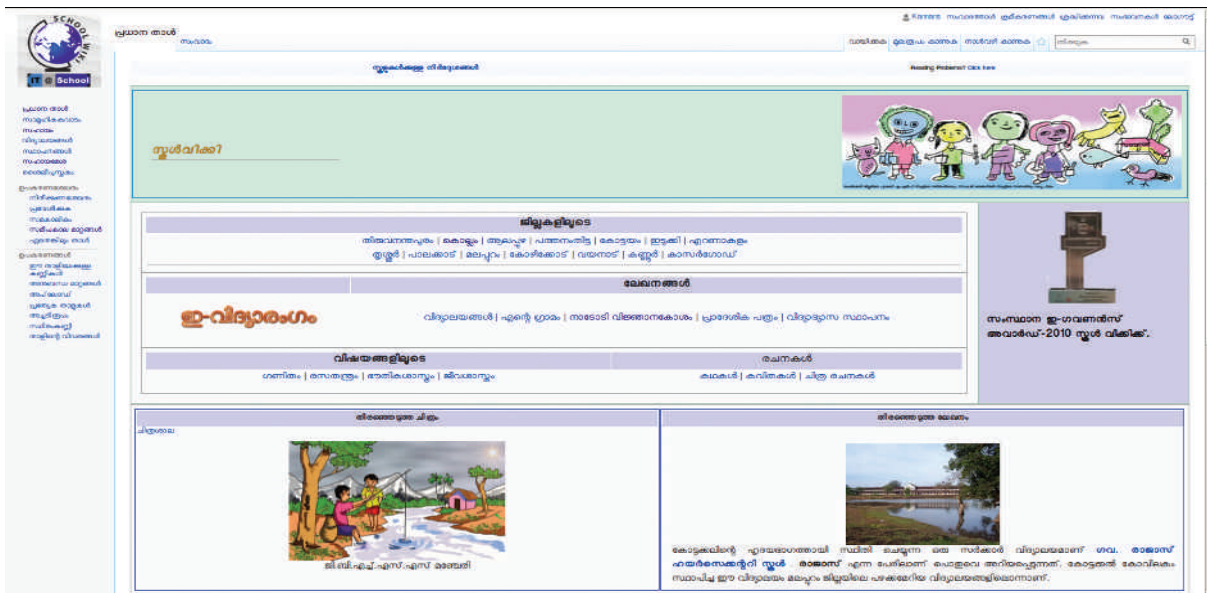
Create membership in School Wiki

Click on the red link to include your personal/group details.

Anyone is permitted to edit the contents in school wiki, but only those with membership have the permission to edit the secure pages and add new articles. Moreover, your contributions are saved either in your name or in your username. Your services to Wiki are evaluated on the basis of the contributions made and the pages edited using your username. To get a membership, click on the link *Create an account* on the main page. Type your *username*, *password* and *captcha* and click on the *Enter* button. Now, you will get the membership. As soon as you have the membership, you can see your username written in red at the top of the wiki page.

Activity 3.5 Souvenir of Ente Naadu in School Wiki

- ◆ Login to School Wiki (<http://schoolwiki.in>) and click on in the order, *District, Education District* and *School* to reach your school page.
- ◆ Open the link *Ente Naadu* from the info box of your school page (Pic. 3.5).



Pic 3.5 Interface of a School Wiki page

- ◆ Click on *Edit* seen at the top of the page. Provide the information you have collected and click on *Save*.
- ◆ The information required to organize your article can be seen on the *Help page* of Wiki.
- ◆ Wiki pages are written in a simple way. Hence, anyone can become part of this.

Wikiquotes

You have learnt the poem *Viswam Deepamayam* written by Ulloor S. Parameswara Iyer given in your Malayalam textbook. Don't you remember the last lines of the poem?

മനസ്സിൽ നൈരാശ്യമെഴുന്നവന്നു
മധ്യാഹ്നവും പ്രത്യഹമർധരാത്രം;

ശുഭം പ്രതീക്ഷിപ്പവനേതു രാവു
സൂര്യാംശുദീപ്തം പകൽപോലെതന്നെ
- കൽപ്പശാഖി

(നവയുഗോദയം)

വിളക്കു കൈവശമുള്ളവനെങ്ങും വിശ്വം ദീപമയം
വെണ്മ മനസ്സിൽ വിളങ്ങിന ഭദ്രനു മേന്മേലമൃതമയം
(പ്രേമസംഗീതം)

The wiki projects which contain a collection of such famous quotations, inspirational lines of poetry, proverbs, riddles, idioms, etc. are the Wikiquotes.

Collect such materials from your textbook or from the library and include it in Wikiquotes.



Pic. 3.5 The part of your school info box

Activity 3.6 - Let's add contents in Wikiquotes



Creative Commons



Creative works like photographs, music and literature can be exchanged or republished subject to the Copyright Laws. Often, complicated copyright laws have caused prolonged legal battles. Creative Commons is an organization that works to increase the availability of creative works that can be legally shared. The organization has released several copyright licenses. As these licenses are more democratic and popular than many other copyright licenses, the Creative Commons License is the most acceptable one for all Wiki projects.

- ◆ Type the **URL** <http://ml.wikiquote.org> in the web browser and press Enter.
- ◆ Login and type in the *search* box, the name of the person/poet whose lines/poem you wish to add in Wikiquotes.
- ◆ If these writers are already included in 'Wikiquotes', the page consisting their quotations will open on the screen.
- ◆ If the quotations or lines of a poem of a particular writer is added for the first time, then a blank page with the person's name will open on the screen.
- ◆ Click on the **Edit** button that appears on the top of the page. Now, add the portions that we wish to include and save it. There is a facility to see a preview before you save.

Do you know that you are free to use the content of the Wiki projects without any payment. When you reuse certain pictures or other materials from wiki, you must remember to give due credit to the photographer/writer as mentioned in the copyright license.

Creative use of the social media

Social media has many useful applications. Through Twitter, Facebook, WhatsApp, etc. and other online media, we get to know the latest news and day to day events around the world. Using the Facebook page of your school, you can share information about your school with more people. It enables you to share your own views and have social interactions with others. You can follow the pages of famous people like writers, artists, scientists and organisations like NASA, ISRO, etc. through these social media. There will be a lot of informative details in their blogs or posts too.

Cyber crimes

We have studied about cyber crimes in Standard VIII. Illegal activities or offences that are committed with the help of modern telecommunication networks such as computers, mobile phones, Internet, etc. are termed as cyber crimes. Exchanging or spreading messages, pictures or fake messages with an aim of disturbing the privacy of a person, trying to defame a person or to threaten the national security, through internet or any other social media, are grievous cybercrimes.

Cracking: A malicious act of breaking into a computer or a computer network with wrong intentions and tampering with the information in it is called Cracking. Hacking, which examines the operating system or the software deeply and makes drastic changes in them is often wrongly referred as Cracking.

Phishing: It is an attempt to acquire sensitive personal information like password details, credit card details, etc. from a person through fake means.

Cybersquatting: It is an act of registering and using deceptive websites and address by pretending to be the official websites.

Pornography: It is an act of exchanging, exhibiting and trading obscene contents with pictures and videos.

Cyber Terrorism: The act of using cyber technology to threaten the security, unity and supremacy of a nation.

Cyber Laws

The cyber law that came into effect in India on October 17, 2000 is the IT Act 2000. This law was later amended in October 27, 2009.

This law gives an exhaustive account of the penalties and punishment to be imposed for cyber crimes. The law is available in the link <http://deity.gov.in/content/cyber-laws>.



Emoji

Small pictures or icons (smiley) used to express emotions commonly used in the social media and other online communication facilities are known as Emoji. Be it happiness or sorrow, tiny smiley like faces are used today in online to express these emotions. Emojis convey our message more easily than a text. There are all types of pictures in emojis.





Significant learning outcomes

The learner:

- ◆ creates e-mail address.
- ◆ sends and receives mails through e-mail.
- ◆ sends videos and pictures through e-mail.
- ◆ adds content in wiki projects.
- ◆ prepares a note on the points to be taken care of while using internet.
- ◆ gains awareness about cyber laws.



Let's evaluate

1. In the e-mail address alappuzha@yahoo.co.in, what is the name of the service provider?
2. The encyclopedia which was developed using wiki software that includes details like history, location, etc. of schools in Kerala is:
 - a. Wikipedia b. Wikisource c. School Wiki d. Wikimedia Commons
3. The act of breaking into a computer or a computer network and destroying the information in it is called -
 - a. Phishing b. Cracking c. Cybersquatting d. Cyber terrorism.



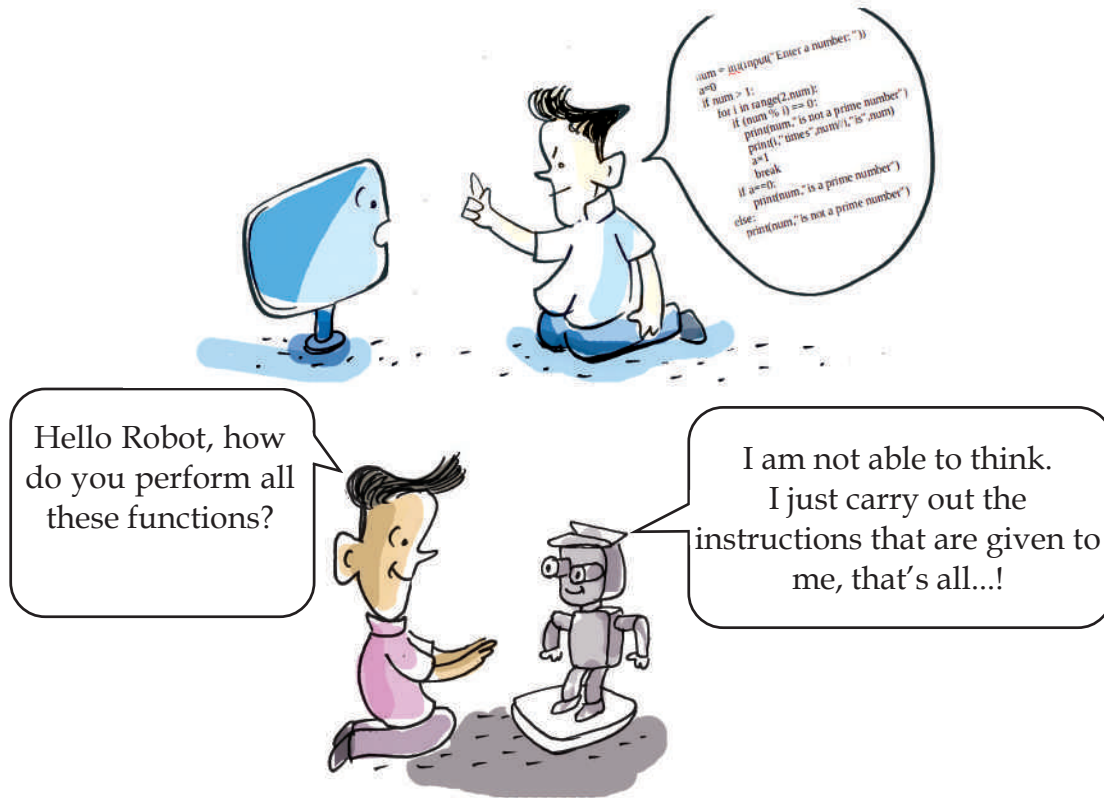
Follow-up activities

- ◆ Collect information about various e-mail service providers and write a note about the additional services provided by them.
- ◆ Collect information about various Wiki projects and conduct a seminar on behalf of the school IT club.
- ◆ In the *Vidyarangam Kalasahityavedi* page of School wiki, include your creative writing by categorising them as stories, poetry, articles, etc. Add pictures and make it more attractive.
- ◆ Collect quotations, inspirational lines from poems, proverbs, riddles, idioms, etc. from your textbook or from your school library and include them in Wikiquotes.



Chapter 4

Programming



Like the robots, all software that you are familiar with run on the basis of prior instructions given to them.

Don't you remember how you prepared computer games using scratch software in Standard VIII? In the scratch software, various blocks were used to control sprites. Did you realise that you were working on a program that contained special instructions to move the sprite while using each block?

So, we can conclude that a set of instructions (programs) helps in the functioning of each software.

Let's learn how such programs are prepared.

Programs

The set of instructions that are given to the computer is called a program. The software such as Gimp, Open Office Writer, Calc, Impress that you are familiar with, have been prepared in various programming languages.



Algorithm

While giving instructions to a computer regarding a particular function, these instructions should be arranged as minor sets of activities. This is called Algorithm which is a step by step mode of instruction given for solving a problem.

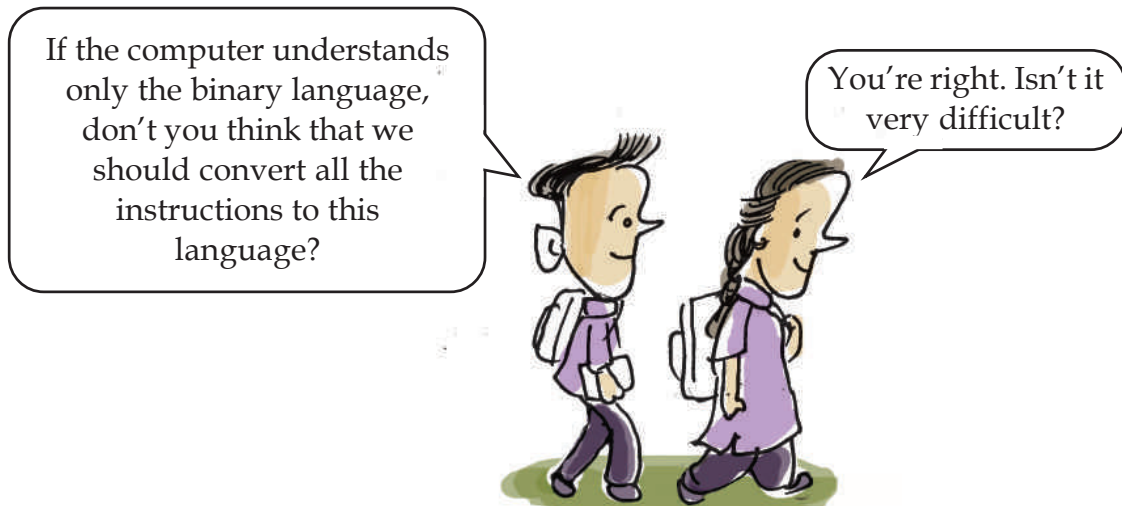
Programming languages

Can a computer understand all the instructions that you give it directly?

The language that a computer understands is the binary language.

Binary is a language that uses the two symbols 0 & 1 only, for giving instructions.

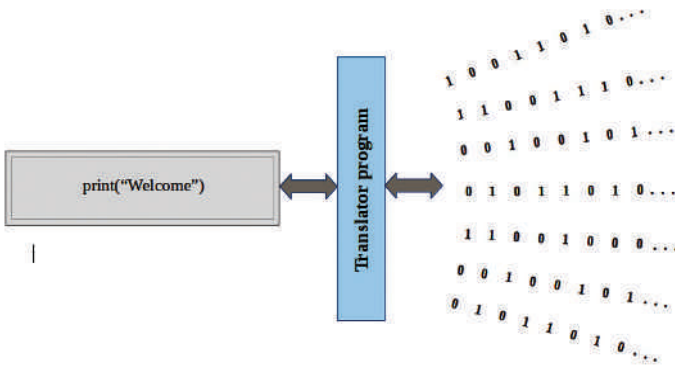
Basically, a computer is an electronic machine. A machine can understand only the presence and absence of electricity. The presence of electricity is indicated with 1 and its absence is indicated with 0. The presence and absence of electric pulses can be marked in the machine using binary language. Therefore, binary language is also called a machine language.



But it is not easy to prepare instructions in the binary language. Assume that a program spread over a number of pages consists of only 0 and 1. Also imagine a situation where this program needs to be corrected. Obviously it will be a headache, right? That is how many popular and easily comprehensible programming languages were formulated. Python is such a programming language. C, C++, Java, etc. are some other programming languages.

But, how does the computer understand these instructions?

The computer understands the instructions in these programming languages with the help of a translator program. See the picture given below (Pic. 4.1).



Pic. 4.1 Illustration of translator program

In each programming language there will be a translator program that suits its instructions. This program will take care of converting the instructions to the machine language. But this translator program should be given only those instructions that can be converted to machine language. These instructions and the respective translator program will be different for each programming language.

Now, let's get to know how a program is prepared in Python language.

Activity 4.1 - Print statement

Let's try to prepare a program statement to display your name in Python language.

```
print("Amina")
```

In this program, "print" is the instruction in Python for displaying the name, and the word in quotes is the word to be displayed.

Try to perform the process given overleaf to run this program.

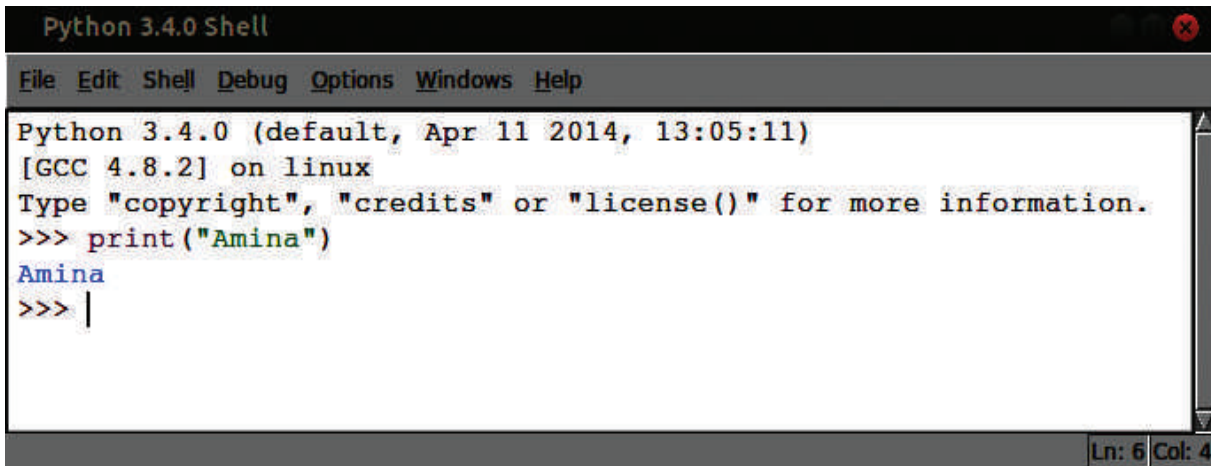
Python

Python is a very simple programming language. It has a simple syntax that can be easily understood. It uses very few symbols, compared to programs such as Java, C, etc. Python was designed under the leadership of Guido van Rossum. This software has Open Source License. Many software such as Blender and Openshot Video Editor, etc. have been prepared in Python language.

Translator programs

Translator programs are used to convert the programming language to binary language and to convert the instructions in binary language to the programming language.

- ◆ Open *IDLE3* from the *Programming* menu. The *Python Shell* window will be opened.
- ◆ Type `print("Amina")` in Shell Prompter and press the Enter key.
- ◆ Don't you get the output in the Python Shell window itself? (Pic. 4.2)



```

Python 3.4.0 Shell
File Edit Shell Debug Options Windows Help
Python 3.4.0 (default, Apr 11 2014, 13:05:11)
[GCC 4.8.2] on linux
Type "copyright", "credits" or "license()" for more information.
>>> print("Amina")
Amina
>>> |
Ln: 6 Col: 4

```

Pic. 4.2 Python Shell window

Here, "Amina" is an English word, isn't it? This is not included in the word-list of the program. Such words are called strings. You must have understood that to display the strings, they should be given in quotes along with the print statement.

Integrated Development Environment (IDE)

Text Editors can be used to write Python program codes. A program that is thus written and saved, can be run using a *Terminal*. For example, suppose a file that contains a Python program has been saved as *pgm1.py* in your folder. In order to run this program we need to open a *Terminal* from your folder and type `python3 pgm1.py` and then press *Enter*.

But there are several integrated software that help you to write and run programs. They are called **Integrated Development Environment (IDE)**. *IDLE* is a simple IDE software. In Python 2 and Python 3 versions of Python, there are slight variations in the word arrangement structure. In this unit, Python 3 is referred. We can use *IDLE3* version for this.

Activity 4.2 - Practise program functioning in Python Shell

Type each statement given below in *Python Shell* and complete the table after observing the output.

Program statement	Output
<code>print("Welcome")</code>	Welcome
<code>print("123")</code>	
<code>print(123)</code>	
<code>print(8+9)</code>	
<code>print("8"+"9")</code>	

Let's learn more programs

Activity 4.3 - Let's find the area

Imagine that you need to find the total area of the playground in your school. You have found the length and breadth of the playground. What should be done to find its area?

Shall we give instructions for this to the computer?

Suppose the length is 80 *m* and breadth is 60 *m*.

Don't you want to find the area?

If the variable *l* (length) is considered as length and the variable *b* (breadth) is considered as breadth, we can consider $l = 80$ and $b = 60$.

If we indicate the area with the variable *A*, then $A = l*b$.

Now, let's display *A*.

How can we write this as a Python program?

```
l=80          # length = 80
b=60          # breadth = 60
```

Strings

A group of words, letters, digits or symbols can be called strings. Anything that is given in quotes (even if they are digits), will be considered as strings.

Variables

Variables can be used to collect data. Variables can be indicated using either letters or words. Numbers and strings can be taken as values for variables.

Comment

The comment for each statement in Python program can be added after # symbol. The comments that are added in the same row after # symbol will not be considered while running the programme.

Don't forget to include such comments in the programs you prepare.

```
A=l*b           # area = length x breadth
```

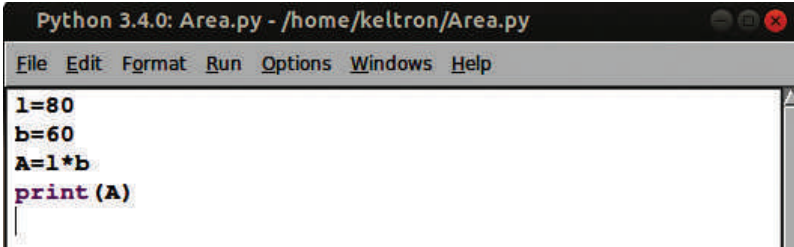
```
print(A)       # display value of A
```

Run each statement of this program in *Python Shell*.

Don't you think that it is difficult to run everything at one stretch?

Shall we create a new file and run this program?

Open a new file from *Python Shell* window (*File* → *New File*). Type the program in the window that opens (Pic. 4.3) and save it in your folder. While saving give a suitable name to the file.



```
Python 3.4.0: Area.py - /home/keltron/Area.py
File Edit Format Run Options Windows Help
l=80
b=60
A=l*b
print(A)
```

Pic. 4.3 Window for typing Python program

Don't you wish to run the Python codes that you have prepared?

We can run this program by selecting *Run Module* from the *Run* menu. The output of this function can be obtained from the *Python Shell* window. Run this program once again. What answer do you get? You will get the same answer even if you run this program many times. What is the reason for this?

File extension

The extension of Python files is *.py*. When Python files are stored in *IDLE* software they get saved with a *.py* extension.



If you wish to find the area giving different measurements, with the help of this program, what are the changes to be effected?

- ◆ The value for length (*l*) and breadth (*b*) should be given.

The Python instruction that is given for this is `eval(input())`.

- ◆ Try to run this program.

```
l=eval(input())
```

```
b=eval(input())
```

```
A=l*b
```

```
print(A)
```

Give different values to *l* and *b* while you run the program and press Enter. Don't you get different values for the area, with change in the measurements for length and breadth?

But here, the person who works on this program does not have any clues as to what measurements should be given as input or what result should be obtained as output.

We can give the hint for this along with the input statement and the print statement while writing the program. Take a look at how the program has been written after effecting the changes detailed above.

```
l=eval(input("Enter length of the rectangle:"))
```

```
b=eval(input("Enter breadth of the rectangle:"))
```

```
A=l*b
```

```
print("Area of the rectangle=",A)
```

What changes can you observe while working with this program compared to what was written earlier?



Interpreter and Compiler

There are mainly two types of translator programs called Interpreter and Compiler which are used to convert the instructions in the programming language into machine language. Interpreter converts each statement in the program into machine language. But in Compiler the whole program is changed into machine language.

Combining strings

While displaying more than one string using print statement and while displaying the strings and the value of the variables together, the strings and the variables should be separated using comma.

Activity 4.4 - Let's combine strings

Let's try to create a program which tells that you are a student of your school if you give the name of the school. If string is the value that should be given while the program is running, give input() in the place of eval(input()).

```
s=input("Enter your School's name:")
print("You are a student of",s)
```

Activity 4.5 - Use of mathematical exercise

Prepare a program that gives the sum total of the angles of a polygon if the sides of a polygon are given.

Suppose assigning the name of the polygon is in variable "a" and the number of the sides is in variable "n", then,

The sum total of the angles is $s = (n-2) * 180$. This has to be found out and the value should be displayed.

```
a=input("Enter the name of polygon:")
n=eval(input("Enter number of sides:"))
s=(n-2)*180
print("Sum of angles of ",a," is ",s)
```

You have practised the use of strings and finding solutions to mathematical problems using Python program. There may be several situations in which you have to take different decisions by examining a value. Let's perform an activity in which we can handle such situations.

Activity 4.6 - Examining the score

Prepare a program that helps you know whether you got selected for the district level competition, when you enter your score for the school level quiz competition. (Imagine that only those who scored above 80 are eligible for the district level competition).



What all instructions should be given for this?

- ◆ The score that is given while running the program should be considered as *a* variable. (Imagine *a* as the variable). For this the statement `eval(input())` can be used for this.
- ◆ Examine whether you have scored above 80. To check whether *a* statement is correct, *a* conditional statement can be used in programs. Here, using the conditional statement if you can examine whether `a>80`.
- ◆ When this statement is correct, *“Congratulations, You are Selected”* will be displayed.

How will the program be?

```
a=eval(input("Enter your score:"))
if a>80:
    print("Congratulations, You are Selected")
```

What happens if the score given is 80 or below when the program is running?

Nothing is displayed as output, right?

That is, if the statement that you examine is incorrect, you will not get an output. Therefore, this can be expanded to an *if...else* statement.

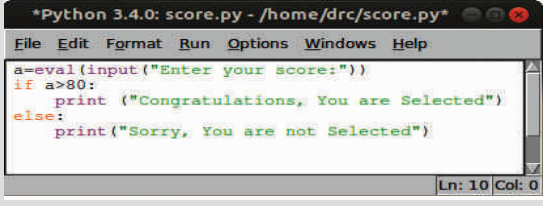
When the statement is correct, *“Congratulations, You are Selected”* should be displayed and when the statement is incorrect, *“Sorry, You are not Selected”* should be displayed.

```
a=eval(input("Enter your score:"))
if a>80:
    print ("Congratulations, You are Selected")
else:
    print("Sorry, You are not Selected")
```

You have learnt how different values are given to different variables. Now, let's familiarise ourselves with the Python statement to indicate a group of values.

Conditional Statement *if...else*

The conditional statement *if...else* can be used to check whether a statement is right or not and instruct what should be done if the statement is correct and what should be done if the statement is not correct. Take a look at the indent for the statements used after *if, else*.



```
*Python 3.4.0: score.py - /home/drc/score.py*
File Edit Format Run Options Windows Help
a=eval(input("Enter your score:"))
if a>80:
    print ("Congratulations, You are Selected")
else:
    print("Sorry, You are not Selected")
Ln: 10 Col: 0
```

Pic. 4.4 Program using *if..else* statement



range

In Python language (`range()`) is used to indicate a group of values.

`range(10)` indicates 10 numbers lesser than 10. Here, the starting number is 0 and 1 is considered as the increase. Therefore, the numbers will be 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

`range(1, 10)` indicates 10 numbers lesser than 10, starting from 1. Here, the increase is 1. Therefore, it will be 1, 2, 3, 4, 5, 6, 7, 8, 9.

`range(1,20,2)` indicates odd numbers that are lesser than 20, starting from 1. Here, the increase will be 2. Therefore, it will be 1, 3, 5, 7, 9, 11, 13, 15, 17, 19.

Activity 4.7 - Find the numbers using the range instructions

Attempt writing down the numbers denoted while using the following range instructions.

Instructions	Denoted numbers
<code>range(3, 100, 5)</code>	3, 8, 13, 18, 23, 28.....83, 88, 93, 98
<code>range(0, 50, 10)</code>	
<code>range(50, 0, -10)</code>	
<code>range(2, 20)</code>	
<code>range(15)</code>	

These instructions can be typed in *Python Shell* and you can find the numbers that are denoted if you run the programme.

While running *Python Shell* instead of `range()`, indicate `list(range())`.

Don't you want to check whether your answer is right or not?

You are now familiar with the `range()` statement that indicates a group of numbers. Let's learn how `range()` is used in situations where one or more actions are repeated.

Activity 4.8 - Let's repeat the activities

You know how to display your name through the statement `print("Amina")` (Activity 4.1). What instructions will you give, to display the name 20 times?

As the statement `print("Amina")` has to be repeated 20 times, it can be included in a loop. So, we can write the program like this:

```
for i in range(20):
    print("Amina")
```

Here `range(20)` indicates 20 values such as (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19). When the variable `i` is given to each value, the statement `print("Amina")` starts functioning. Therefore, when '`i`' gets the value 0, the name Amina is printed. When the next value is given, (`i=1`), again the name Amina is printed. We can conclude that, the name Amina will be printed when '`i`' is given any value within the range. Thus the word is printed 20 times.

Activity 4.9 - Displaying numbers

Suppose you need to create a program to display the even numbers from 2 to 100. For indicating the numbers, you may use the range (2, 101, 2). You can give different values to variable `k` and then display.

```
for k in range(2,101,2):
    print(k)
```

for loops for repeated instructions

When a statement or a group of statements need to be repeated in a program, it can be included in a *loop*. A *loop* statement that is used in Python is called *for loop*.

Observe the program given below.

```
for i in range(1,11):
    print(i)
```

This is a program to display whole numbers from 1 to 10.

In *for loop* the `print(i)` statement runs when the variable `i` is given values 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

That means, the different values of `i` is displayed 10 times.

Did you notice the indent when you used the repeated statements in *for loop*?

While Loop

A *loop* statement used in Python is called *while loop*. When we use *while loop* instead of *for loop*, the statements that indicate the starting value of the variable and the increase of the value have to be indicated separately. Look at how a program in *for loop* has been converted to *while loop* (Table 4.1). What differences can you see?

<i>for loop</i>	<i>while loop</i>
<pre>for k in range (2, 101, 2): print (k)</pre>	<pre>k = 2 while k<101: print (k) k = k + 2</pre>
<p>Every time when the value of k is increased by 2, then $k = k+2$ is used.</p>	

Table 4.1 Program in which *while loop* is used instead of *for loop*



Significant learning outcomes

The learner:

- ◆ prepares simple programs in Python language.
- ◆ prepares programs in the IDE software called IDLE.
- ◆ uses print(), eval(input()), input() statements in Python program.
- ◆ prepares Python programs using conditional statement (*if...else*).
- ◆ uses range() statement in Python program.
- ◆ prepares Python programs using loop statements (*for, while*).



Let's evaluate

1. What will be the output (value of a) of the following program?

```
a=2
a=a+3
print(a)
```

- a. 5 b. 6 c. 2 d. 3

2. Which among the following is used in Python to indicate numbers from 1 to 20?

- a. range(20) b. range(1,20) c. range(1,21) d. range(1,21,2)

3. for i in range(1,5):

```
    print("Welcome")
```

How many times will *Welcome* be displayed in the output of this program?

- a. 5 b. 4 c. 2 d. 1

4. a="3"

```
b= "2"
```

```
print(a+b)
```

What will be the output of this program?

- a. 5 b. 6 c. 23 d. 32

5. Anu wishes to prepare a program to display the value of numbers from 1 to 25. The program that Anu prepared is given below. There are some errors in it. Can you edit the errors?

```
s=0
```

```
for i in range(25):
```

```
    s=s+i
```

```
print(s)
```



Follow-up activities

- ◆ Prepare a Python program to display the multiples of 7 below 200.
- ◆ Prepare a Python program to find the sum of the even numbers from 2 to 50.
- ◆ Prepare a Python program to display the multiplication table upto 20 by giving a number as input.



Chapter 5

The Practical Lab in Computers



We live in the wonderful age of information technology. There has been a great leap in the world of technology which is an offshoot of the incredible rate at which the whole world in programming. We can make use of the various facilities offered by information technology to make learning and activities related to it, more effective. Nowadays many educational software are available in our computer as a scaffold for learning activities. You are already familiar with learning activities using different software. In this chapter, you will be acquainted with some simulation software that helps you to comprehend and assimilate complex ideas in an easy manner.

Floating Continents...



'...Long before the lizards, before the dinosaurs, two spores set out on an incredible journey. They came to a valley bathed in the placid glow of sunset.

My elder sister, said the little spore to the bigger spore, let us see what lies beyond'.

The Legends of Khasak
(O.V. Vijayan)

How was this green earth formed even before the lizards and dinosaurs reigned over it? Continents and oceans were formed when lithospheric plates floated on top of asthenosphere that was partially in liquid form. You have discussed this phenomenon named Continental Drift in the chapter titled 'The Signature of Time' in your Social Science textbook. Such natural phenomena can be carefully studied in detail by using simulation software. We can observe this with the help of GPlates software that is included in GNU/Linux by IT@school. GPlates, which is a Free software has the facility to observe the formation of tectonic plates over the years, the reconstruction of tectonic plates and their shifting through different periods, with the help of simulation.

Let me watch the animation of how continents are formed.

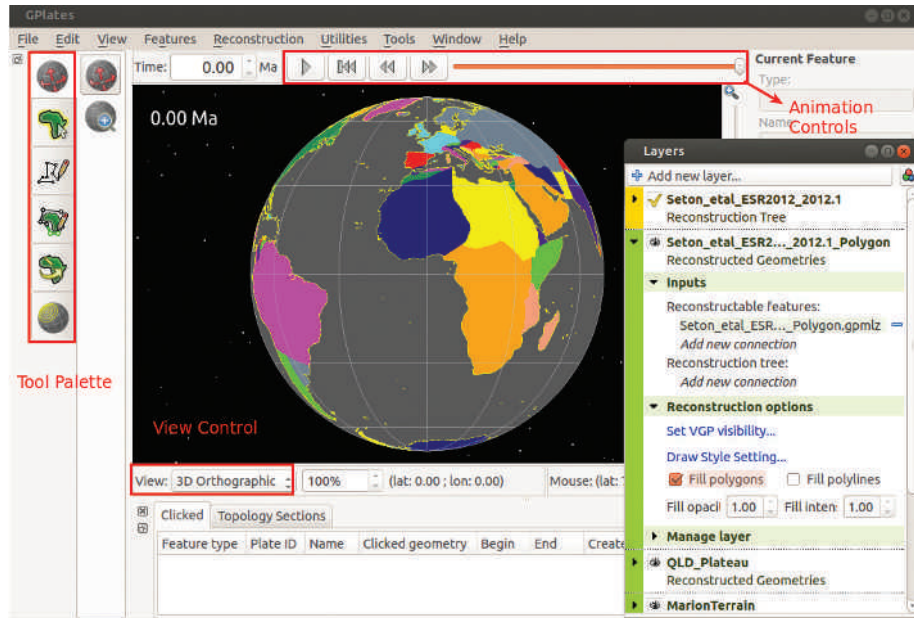


Activity 5.1 - Formation of continents

Let's see how continents acquired their present form through continental drift with the help of GPlates software.

- ◆ Open GPlates software.
- ◆ Open the folder *Shapefile* in the *Gplates Project* folder in Home, through *Open Feature Collection* in File Menu. Click *Open* after selecting all the files (also by Ctrl+A) in the folder.

You may note that the *Layer* window also opens along with the main window (Pic. 5.1).



Pic. 5.1 GPlates Main window



- ◆ Click on *Toggle Visibility* (sign of an eye) in the *Layer window*, you can either show or hide each layer.
- ◆ If the *Layer window* is not visible, click on *Show Layers* in the *Window* menu of *Main Window*.
- ◆ You can select the *Drag Globe tool* and freely move the globe, using the mouse or the Arrow keys.
- ◆ While using other tools in the *Tool Palette*, you can press the *Ctrl key* in the keyboard and move the globe.

GPlates

GPlates software was developed by the scientists in the School of Geosciences in the University of Sydney as part of their EarthByte Project. Using this software, we can observe the transfer of the position of tectonic plates in each period, due to continental drift. The visualisation and analysis of Raster Images in GIS is possible in GPlates. All the data files in GPlates software are called Features. Such data files that can be opened through the software are called Feature Collections. When we open the software we can see a globe that can be turned in any direction any number of times. GPlates does most of its activities and analysis by including the feature collections of geological features which were either downloaded or created with the help of this software.

- ◆ To see the geographic plates in different colours, click on the *Triangle* on the left side of the layer named 'Seton_et al_ESR2012_Coastlines_2012.1_Polygon' in the *Layer Palette* and give a tick to the check box named *Fill Polygons*.
- ◆ Click on *Configure Text Overlay* in *View* Menu. Then the *Enable Text Overlay* window will open. Give a tick to this window and see the duration of continent formation. This is measured in Ma (1 Mega Annum=1 million years) unit.
- ◆ Select Full Screen in *Window* Menu and run the *Play the animation* button.

You have seen the wonderful visual of how various continents reached their present position after so many evolutionary stages of coming together and drifting apart, over the years. Watch the animation once again, keeping the continents in the globe against you. Seven mega lithospheric plates which have an area of several thousand square kilometers and some minor ones like Philippine, Cocos, Nazca, etc. have been clearly identified. You know that the drifting of these plates to different directions is the basis of all major geographical processes. Haven't you understood that continents moved apart due to tectonic pressure and that the modern concepts of nations and international border were but human constructs?

Let's save this activity.

- ◆ Click on *Save Project* from the *File* Menu.
- ◆ Now, name the file and save it in your folder.

The unique file format of GPLates project is gproj. The projects once saved can be opened through *Open Project* in *File* Menu.

Projection in many ways

Animation can be viewed in different projection forms such as 3D Orthographic, Rectangular, Mercator, Mollweide, Robinson, etc. which are there in *View Control* seen at the bottom of the main window. You can restore the window, by a click on the *Leave Full Screen Mode* on top of the window.

Animation backwards

The continental drift animation can be viewed in two ways, i.e. from the ancient period to the modern era and vice versa. Click on the Reverse the Animation option from the Configure Animation in the Reconstruction menu.

Activity 5.2 - Let's find volcanoes

You know that the boundaries of tectonic plates are active with volcanoes. We can view volcanic areas with the help of GPlates.

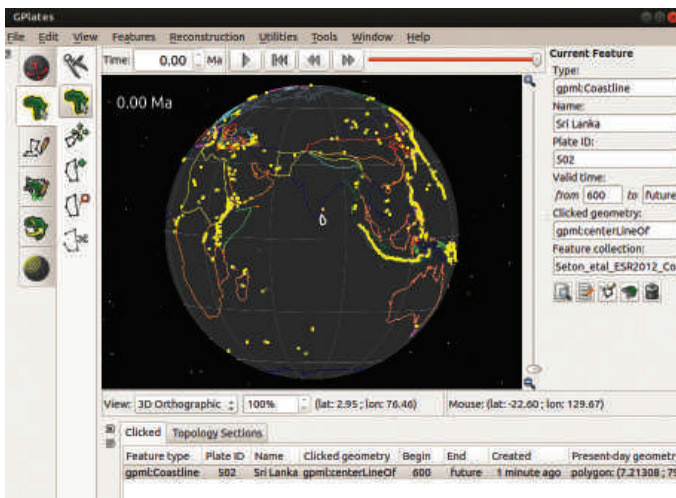
- ◆ Use *Open Feature Collection* to open 'volcanoes.gpml' file from the 'Creating Features' which is saved in the Gplatesproject folder in Home. The small yellow squares that are seen in the globe indicate volcanoes.
- ◆ To show the boundary of plates in the globe, include the feature collection 'Seton_et al_ESR2012_Coastlines_2012.1_Polygon.gpmlz' from Shapefile folder in the Gplatesproject folder.
- ◆ Now, save this in your folder.

Where are volcanoes mostly found?



Did you understand that volcanoes are found in the boundaries of tectonic plates? To understand more about volcanoes and boundaries of plates,

- ◆ Click on the *Feature Inspection* tool in the *Tool Palette*.
- ◆ Click on the coastline, volcanoes, etc. on the globe.
- ◆ Now, you can see their details on Current Feature which can be seen on the right side of the window (Pic. 5.2).



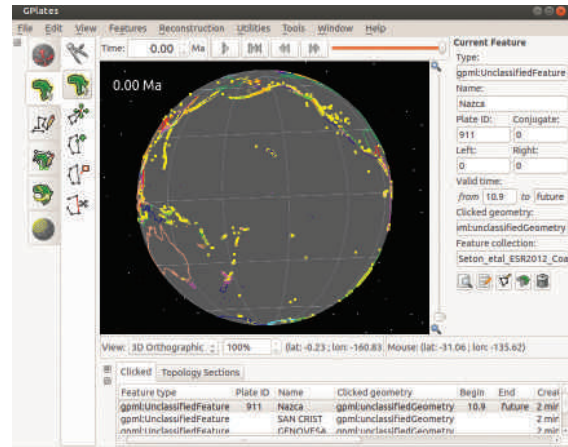
- ◆ Make use of this and prepare an observation note.

Activity 5.3 - Let's export GPlates projects

You may use the export technique to convert the simulations in GPlates software to graphic mode. Let's see how the 'Ring of Fire' area in the Pacific plate can be exported in *svg* format (Pic. 5.3).

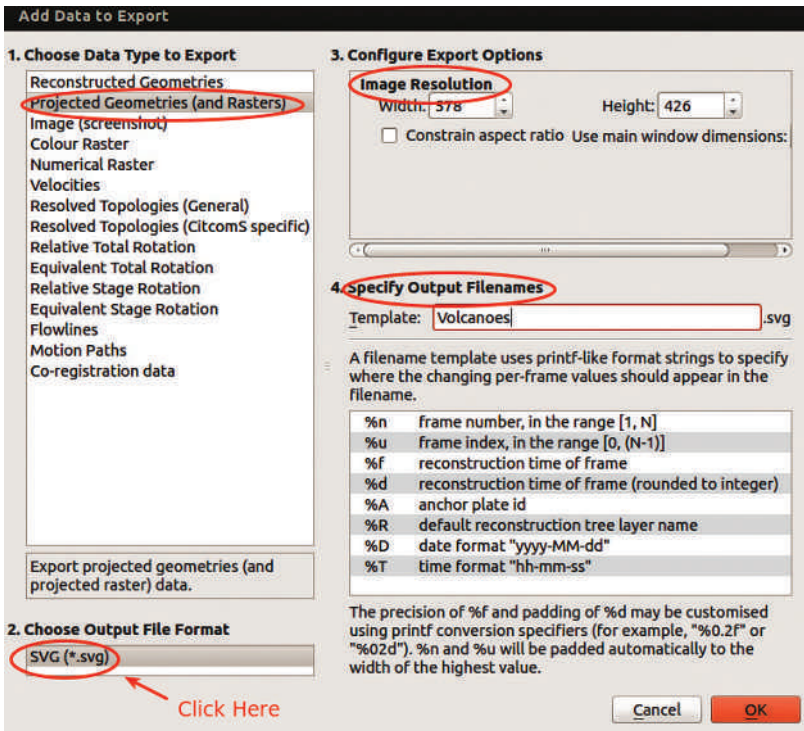
Pic. 5.2 Visualisation of volcano in GPlates

- ◆ Open the file that was saved in Activity 5.2.
- ◆ Arrange the Pacific plate in the globe (Pic. 5.3) in such a way that it faces you.
- ◆ ‘Ring of Fire’ is an area in Pacific Ocean which appears like a belt active with volcanoes.
- ◆ Click on *Export* in *Reconstruction* menu and then select *Export Single Snapshot Instant* from the window that appears.



Pic. 5.3 GPlates image of ring of fire

- ◆ Select *Add Export*. Click *Projected Geometries (and Rasters)* from *Choose Data Type*. Then, click on SVG in *Choose Output File Format*. Give suitable resolution and name the give the file name in *Specify Output Filenames*. Click *OK*.
- ◆ Select the folder in which you intend to save the image from *Target Directory* and press *Export Snapshot*. Now, the image will be saved.



Pic. 5.4 Add data to Export window

Export in two ways

The visuals that are viewed in GPlates can be exported through *Export Time Sequence of Snapshots* and *Export Single Snapshot Instant* methods. Export the animation in Activity 5.1 using *Export Time Sequence of Snapshots* and save it in your folder. You will use the images that you get for slide presentation, when you learn about the presentation software.



Significant learning outcomes

The learner :

- ◆ interprets Continental Drift by means of simulation in GPlates software.
- ◆ prepares a report after locating volcanic areas on the earth with the help of GPlates software.
- ◆ finds the 'Ring of Fire' area in Pacific Ocean with the help of the software and exports their image to svg format.



Let's evaluate

- ◆ What is the unique file format to save a project in GPlates software?
1) gproj 2) gpml 3) svg 4) png
- ◆ Include Shapefile feature collection in the software and sequence the Continental Drift period as 200 Ma. Locate the position of South America and Africa and save it in svg format.



Follow-up activities

- ◆ Include the Feature Collection Working with Mid Ocean Ridge from GPlates Project Folder and devise the formation of submarine mountain ranges through simulation.

* * * * *

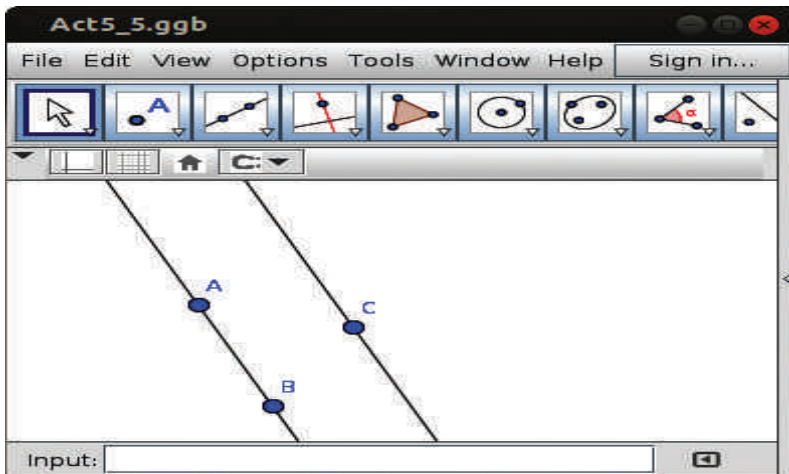
An aid for learning geometry

You have learnt many facts about parallel lines in your Mathematics textbook. If you wish to confirm these facts through experiments how many lines will you have to draw to find out the measurements and their characteristics? We have studied the GeoGebra software in the eighth standard which helps to effectively construct geometric figures and effect some changes in them. Shall we use this software to prove certain facts?

Activity 5.4 - Let's draw parallel lines

- ◆ Open GeoGebra software and draw the line AB using *Line Tool*.

- ◆ Mark point C using *Point Tool*, near to this line (Pic. 5.5).



Pic. 5.5 Parallel lines

How can we draw a line through point C, parallel to the line AB?

- ◆ Select the *Parallel Line* tool.
- ◆ Click on the point C and on line AB.

Give a suitable name to this construction and save it in your folder.

What will you do if you want to draw another line at the same distance? How many times would the distance of this line be from AB? We can draw a line like this at a particular distance using *Dilate from Point* tool in GeoGebra.

Activity 5.5 - Draw a parallel line at a particular distance

It will be two times the distance from A to the line that passes through C. Let's do this activity.

- ◆ Select the *Dilate from Point* tool. Then, click on the line through C and on the point A using the tool.
- ◆ Give 2 as *Dilation Factor* in the window that appears.

Haven't you got a new line that you wanted? (Pic. 5.6)

Various kinds of Windows

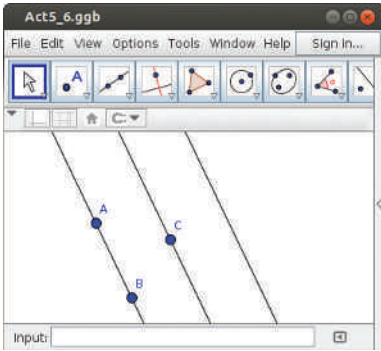
By marking a tick mark in the *View* menu of GeoGebra window, you can include perspectives such as:

- Algebra View
- Graphics View
- 3D Graphics View
- Spreadsheet View
- CAS View

according to your wish. When you click on each View, the respective tools will be displayed.

Dilation

Dilation Tool can be used to increase the size of an object and its distance from a point in a fixed rate. If you click on the object to be dilated and the point that is considered as the base after selecting the tool, you will get a window. If you give the *Dilation Factor* which is the number that indicates the number of times, the distance should be increased and give *OK* you will get the new object in the prescribed size and distance.



Pic. 5.6 Parallel lines at a same distance

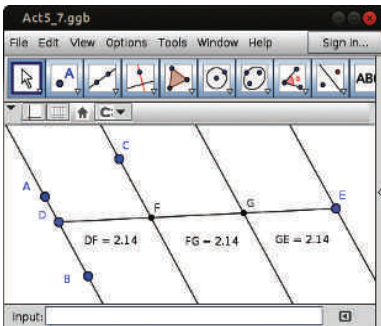
Now, dilate the line that passes through C three times and draw another parallel line. What is special about the four lines that are seen there?

Save the activity in your folder.

Activity 5.6 – Find speciality of parallel lines

Let’s draw a line segment that intersects the four lines you have constructed. For this,

- ◆ Mark one point each on the first and the last line using the *Point* Tool.
- ◆ Join them using the *Segment* Tool as you see in Pic. 5.7.



Pic. 5.7 A small line that intersects the parallel lines

Don’t the parallel lines intersect this line segment? You can use the *Intersect* tool in GeoGebra to find the points of intersection.

- ◆ Select the *Intersect* Tool and click on one of the parallel lines and the line segment. Didn’t you get the points of intersection? Mark other points of intersection like this.
- ◆ Mark the length of each part using the *Distance or Length* tool. Are the lengths equal?

Change the position of the end points of the line segment using *Move* tool. What specialties do you notice? Note them down.

.....

.....

.....

We have learnt how to draw circles of a given size in the eighth standard. What should be done to adjust the

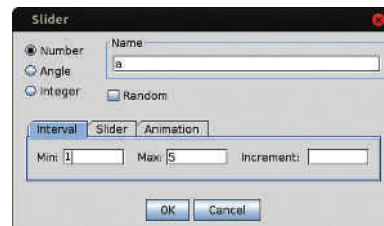
Let’s mark the point of intersection

You can mark the points of intersection of two geometric figures by a click using the *Intersect* Tool.

size and shape of a geometrical figure? We can use the *Slider* tool in GeoGebra for this.

Let's make Slider

Slider is a tool in GeoGebra that is used to control the value of a variable that indicates a number or a measurement of an angle. Select the *Slider* Tool and click on the GeoGebra window. A window like the one you see in Pic. 5.8 will appear. The values of the Slider can be arranged as real numbers, measurement of angles or integers, according to your wish. For this, you need to press on the radio buttons Number, Angle or Integer respectively and select any of them. The Slider will appear when you give the name of the Slider, its minimum value, maximum value and the rate of increase and click on the *Apply* button. You can adjust the value of the Slider by dragging or using the arrow keys after selecting.



Pic. 5.8 Window for creating a Slider

Activity 5.7 - Let's draw a circle that can be adjusted using Slider

Suppose you wish to construct a circle of which the radius can be adjusted from 1 to 5. First of all, you have to construct a slider for this.

- ◆ Select the *Slider* tool and click on the window. A window will appear as you can see in Pic. 5.8. It is the radius of the circle that has to be adjusted. For this, the *Number Slider* has to be selected. Don't you notice the name of this Slider?
- ◆ Provide values *Min*: as 1 and *Max*: as 5 and click on *Apply*. The slider will appear.
- ◆ Click on the window after selecting *Circle with Center and Radius* tool. In the window where you have to provide the value of the radius, provide the name of the slider you have already constructed.
- ◆ Move the slider using *Move* tool. You can observe that the radius of the circle changes according to the value of the slider.

Try to give animation to the Slider. What should be done to see the circles for each value of the slider at the



More software for learning Mathematics

There are many software which come under the group of software like Interactive Geometry Software (IGS) and Dynamic Geometry Environment (DGE). Geometric Supposer, which was formed in the 1980s was the first of this kind. Drawing Geometry (Dr. Geo), K Interactive Geometry (Kig), CaRMetal, etc. are free software whereas Cabri Geometry, Cinderella, etc. are proprietary software.

Let's give animation

To give animation to the objects in GeoGebra window, right click on them and put a tick mark to Animation On in the check box. You cannot give animation to all objects. Animation can be given to objects that move in a fixed path. (e.g. A point on a circle or a line). If a slider is given animation, the objects that are controlled by it also get animation.

same time? You need to right click on the circle and put a tick to *Trace on*.



Significant learning outcomes

The learner :

- ◆ familiarises the tools in GeoGebra software, establishes geometric theories using them and documents them.
- ◆ finds the facts related to geometric figures like triangle, circle, lines, etc. through the activities in GeoGebra and documents them.
- ◆ draws figures using GeoGebra that are helpful for the learning of Mathematics.



Let's evaluate

1. Imagine that using the Slider you have drawn a figure in GeoGebra. Which tools are to be used simultaneously to see the figures having different values in the Slider all at once?
 - (a) Zoom In
 - (b) Trace on
 - (c) Animation on
 - (d) Intersect
2. Do the following activities using GeoGebra and save them in your folder after giving suitable names.

- ◆ Draw two parallel lines. Find the distance between them and mark them.

Hint: You can use Perpendicular Line, Intersect, Distance or Length tools.

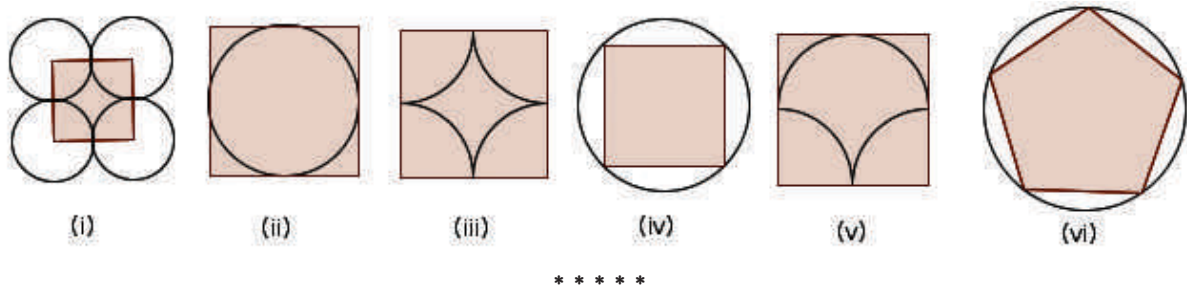
- ◆ Construct triangle ABC in the given measurement. $AB = 5$ units, $AC = 4$ units, $BC = 3$ units.

Hint: You may use tools viz. Segment with given Length, Circle with Center and Radius, Intersect, etc.



Follow-up activities

- ◆ Draw each figure given below using GeoGebra. Select the part that includes the figure and export them in image format (File-Export).

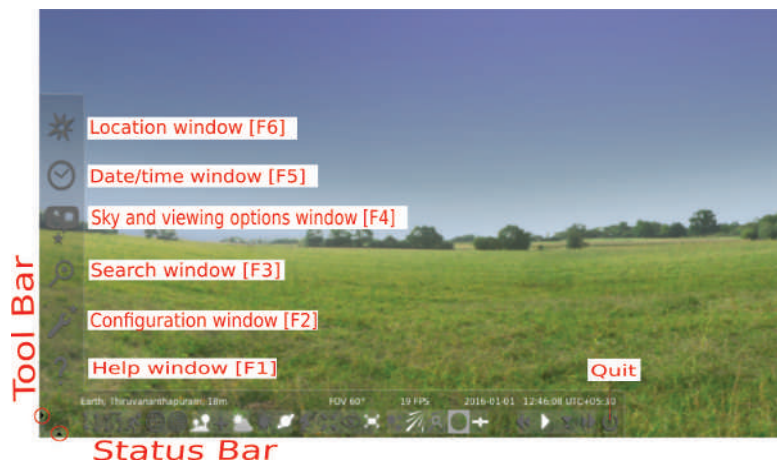


Through the Stellar Sights

There is a reference to stars in the unit titled “Our Universe” in your Physics textbook. We have limitations to observe the stellar objects that appear in the sky, including stars. We have a simulation software called Stellarium that produces a virtual reality of the sky. By adjusting the location and time in this software, you can observe the sky from any location at any time. You can reproduce interesting and wonderful stellar aspects in a clear and simple manner through Stellarium software.

Activity 5.8 - Let's use the Stellarium software

- ◆ Open the Stellarium software.
- ◆ When you bring the mouse pointer to the left side of the main window, you get the **Tool bar** and when you bring it to the bottom, the **Status bar** will appear (Pic. 5.9).
- ◆ By a click on the triangles that are seen at the place where the status bar and tool bar joins, you can fix them on their respective places.



Pic. 5.9 Stellarium - Main window

Activity 5.9 - Let's adjust the location

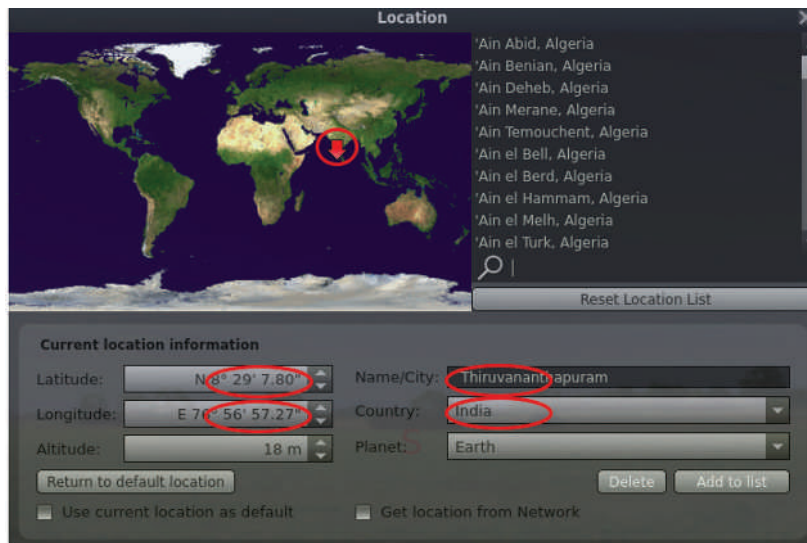
The area of sky that is visible to us will be different when we observe space from various locations. If the area of the sky from a particular location should be made visible, the location has to be specified in the software. For this, follow the activities given below.

You can click on the *Location window (F6)* tool seen on the top part of the tool bar.

You can click on the location in the map that appears in the window that opens and adjust the view of the sky from there (Pic. 5.10). You can also select from the list of locations given in the software. If necessary, click on the *Reset Location List*.

Add a new location

We can include places in the *Location window* that are not in the list of places in Stellarium. Enter the details of the location such as latitude, longitude, the name of the location and country in the relevant boxes seen below the *Current location information* (Pic. 5.10). Then, click *Add to list* button and close the window. (no need to make changes in the *Altitude* box).



Pic. 5.10 To adjust the location of observation

Adjust day and time

Click on the *Date/Time window (F5)* (Pic. 5.9) in the *Toolbar* to observe the sky at a particular time on a particular day. Click on the Triangular buttons in the *Date and Time* window (Pic. 5.11) and change the day and time.



Pic. 5.11 Adjust day and time in the software

Activity 5.10 - Let's observe constellations

You have seen a lot of stars in the sky. Stars appear in the sky as particular groups or constellations. These constellations are considered by us as imaginary figures. Let's see how we can observe such constellations using Stellarium software.



- ◆ Open Stellarium software.
- ◆ Click on *Constellation lines (C)*, *Constellation labels (V)* and *Constellation art (R)* (Pic. 5.12) tools that appear in the Status bar.




Pic. 5.12 Stellarium status bar

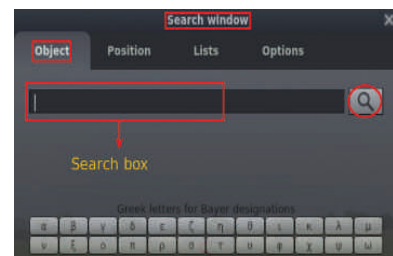
To watch the sky which is boundless, click on *Ground* tool in the status bar (Pic. 5.12).

- ◆ Enter the name of the constellation that you wish to view and their imaginary shape in your notebook.

Activate *Atmosphere* tool (Pic. 5.12) in the status bar to view the space clearly during the daytime.

Suppose you want to see the constellation Leo (Chingam) through this software. For this,

- ◆ Click on the *Search window* (Pic. 5.9) in the tool bar.
- ◆ Type Leo in the *Search box* (Pic. 5.13) in the *Object* tab that appears and then click on .
- ◆ Zoom using Page Up, Page Down keys or using the Scroll button of the mouse.



Pic. 5.13 Stellarium Search Window



Pic. 5.14 Leo (Chingam), the constellation

- ◆ Observe carefully the Leo constellation (Pic. 5.14) by dragging the mouse or using the arrow keys in the keyboard.
- ◆ Find the name of the star that appears when you click on each star in constellation Leo and complete Table 5.1.

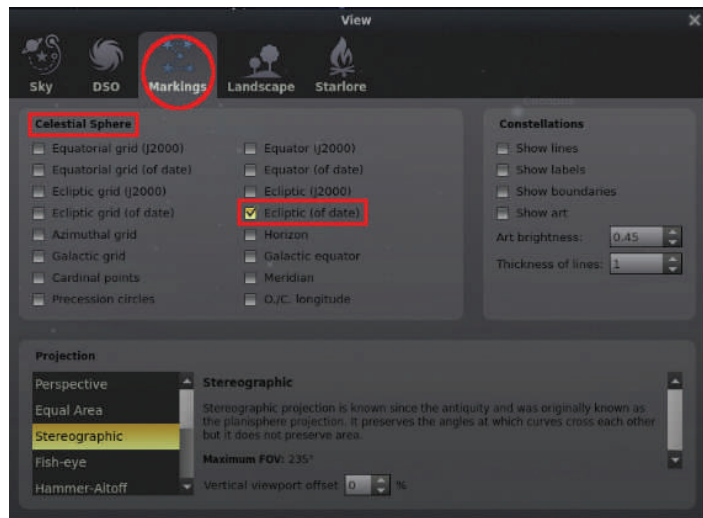
You know that the sun is the closest star to the earth. You have learnt that the earth revolves round the sun, while it rotates by itself. Because of the revolution of the earth, a person who observes the sun from the earth may feel that the sun is moving in a particular path. This path is called an Ecliptic Line. Shall we observe the Ecliptic Line through Stellarium Software?

Sl. No.	Name of the Star
1	Regulus
2	Denebola
3	
4	

Table 5.1 - Stars in Leo constellation

Activity 5.11 - Let's find the ecliptic line

- ◆ Click on *Sky and viewing options window* tool (F4) (Pic. 5.9) in the tool bar in Stellarium software and reach the View window.



Pic. 5.15 View window

- ◆ Click on *Ecliptic (of date)* (Pic. 5.15) in the *Celestial Sphere* list of *Markings tab* and close the window.
- ◆ Zoom using Page Up and Page Down keys or the Scroll Button of the mouse.
- ◆ You can bring the Ecliptic Line in the range of visibility

Names of Stellar objects in Malayalam

When you select Malayalam from *Sky Culture Language* in the Main tab of *Configuration Window (F2)* in the tool bar of Stellarium Software and close the window, the names of constellations will appear in Malayalam.

either by dragging the mouse or by using the arrow keys in the keyboard.

- ◆ Identify and list the constellations in the Ecliptic Line using *Constellation Lines (C)*, *Constellation labels (V)* and *Constellation art (R)* given in the status bar.



Pic. 5.16 - Ecliptic line



Significant learning outcomes

The learner :

- ◆ adds location for observation in Stellarium software.
- ◆ identifies constellations with the help of software and notes down their characteristics.



Let's evaluate

- ◆ On which tool should you click to display the imaginary form of Orion constellation in the Stellarium software?
 - a. Constellation labels
 - b. Constellation art
 - c. Constellation lines
 - d. Azimuthal grid
- ◆ Which function helps to fix the Tool bar and the Status bar in the window of Stellarium software in their respective positions?
 - a. Click on Ground button.
 - b. Click on Configuration window.
 - c. Click on the triangles that you see where Status bar and Tool bar joins.
 - d. Click on Ocular view button.



Follow-up activities

- ◆ Make changes to the time of observation in the software and find the constellation in which the sun appears in the Ecliptic Line on January 1.
- ◆ Observe Polaris with the help of the software and find in which constellation it is found.

* * * * *

From charcoal to gem brightness

You have learnt in your Chemistry textbook the phenomenon called allotropy which explains how an element appears in various physical states. Carbon atoms combine with each other to become molecules in cyclic forms or chain forms. In nature, we can see carbon in different forms from charcoal to diamond. This is because of the difference in the configuration of atoms in molecules. Is it possible for us to find how atoms are configured in molecules? You have practised various activities in gchemical software on the ways to prepare models of simple molecules and to observe their three-dimensional structure in the computer in your eighth standard. Which are the compounds, the models of which were constructed by you using gchemical software in your eighth standard?

- ◆ Water (H₂O)
- ◆ Carbon dioxide (CO₂)
- ◆

We have done the construction and observation of molecules with a simple structure. We can observe molecules with a complex structure using RasMol software included by IT@school in GNU/Linux.

Diamond, Graphite and Fullerene are the allotropes of Carbon in crystal form. A lot of carbon atoms are combined in it. The *pdb* files of such complex molecules are available on the internet. Download the *pdb* files of Diamond, Graphite and Fullerene with the help of your teacher and save them in your folder. Files of this kind can be used for your learning purposes.

Activity 5.12 - Observe the molecular structure of Fullerene

- ◆ Open *RasMol (GTK version)* software.

RasMol

RasMol is a software developed by Roger Sayle to observe the three dimensional structure of molecules (<http://www.rasmol.org>). The three-dimensional form of molecules will be shown in different colours in the graphic screen of RasMol software when we give the basic facts as file input. Usually extension files named protein data bank or .pdb are given as input.

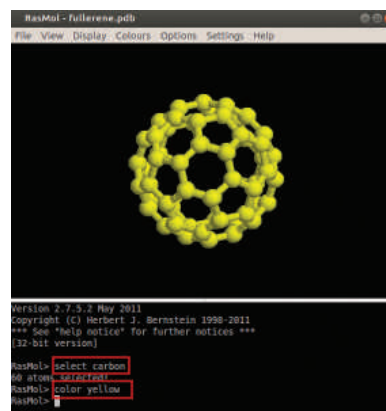
- ◆ Open the pdb file of Fullerene molecule using *File* → *Open*. The *Wireframe* model of Fullerene molecule structure will be visible.
- ◆ To convert this to Ball & Stick model, select and click on the *Ball & stick* in the *Display* menu.
- ◆ Using the mouse, turn the molecule and observe how carbon atoms are combined in it.

Suppose you want to find the number of carbon atoms in a Fullerene molecule. What is the way out? Follow the process given below.

- ◆ When the *Command prompt (F7)* in the *View* menu is activated, the *Terminal* window appears below the Graphic Screen window.
- ◆ When you type 'select carbon' in the *Terminal* window and press the Enter key, the number of carbon atoms will be shown (Pic. 5.17). Then type 'color yellow'. Don't you see that the carbon atoms turn yellow? What will you do to give some other colours?

Activity 5.13 - Observe the molecular structure of diamond and graphite

Find out the pdb files of Diamond and Graphite molecules which are allotropes of Carbon, using RasMol software and complete Table 5.2.

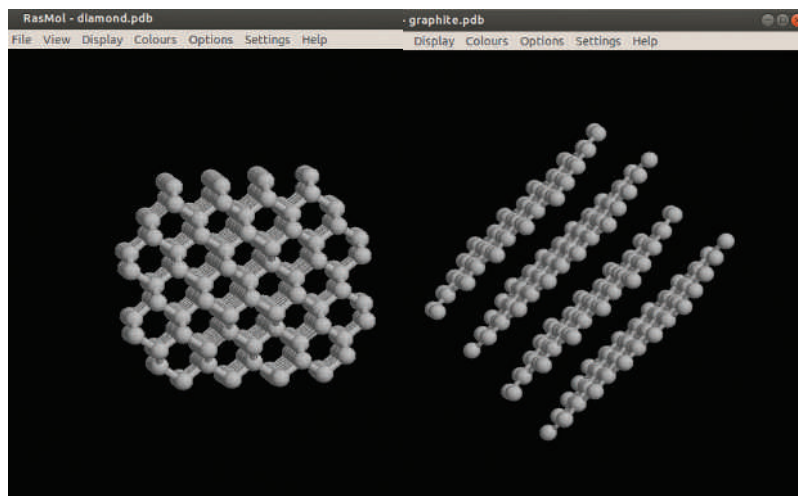


Pic. 5.17 Molecular structure of Fullerene

Characteristics	Diamond	Graphite
Shape of the molecule	Three-dimensional network	Hexagonal Layer
Combination of carbon atoms	One atom of carbon combines with other four carbon atoms	

Table 5.2 Difference in the molecular structure of diamond and graphite

Though only carbon atoms are contained in Diamond and Graphite, the configuration of atoms in their molecules are different. This is why their physical properties appear to be different.



Pic. 5.18 Molecular Structure of diamond and graphite



Significant learning outcomes

The learner:

- ◆ observes the molecular structure of substances as three-dimensional images.
- ◆ observes the molecular structure of Fullerene molecule with the help of the software and finds the number of carbon atoms in it and their molecular shape.
- ◆ observes the three-dimensional image of allotropes of carbon such as Diamond and Graphite with the help of software and finds out the reason behind the difference in their physical properties.



Let's evaluate

- ◆ Which of the following files can be used to observe the molecular structure of a substance through RasMol software?
 - a). pdf
 - b). pdb
 - c). png
 - d). ppt



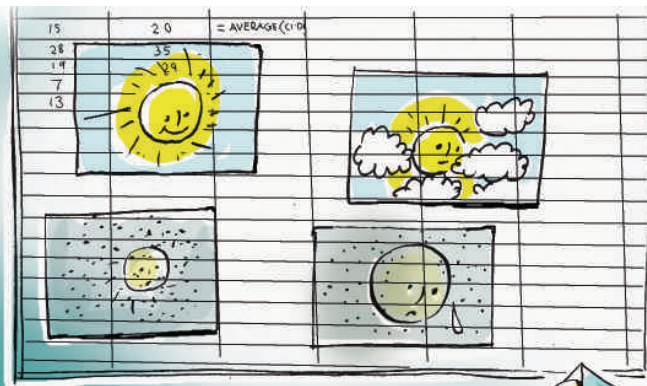
Follow-up activities

- ◆ Collect pdb files of various molecules from the internet and observe them using RasMol software.



Chapter 6

Analysing Data in the Computer



These statements indicate the changes in atmospheric temperature of recent times. You might have understood how the change in atmospheric temperature influences the climatic conditions.

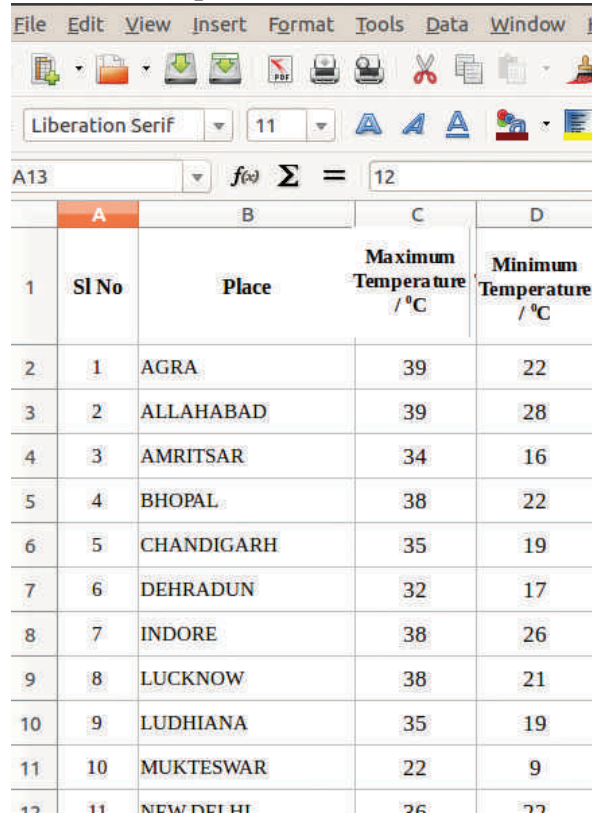
In the lesson 'Sun: The Ultimate Source' in your Social Science textbook, different types of analyses of temperature in various parts of India is referred to. Anu and Amina are getting ready to gather information on the temperature in different parts of India as referred to in the lesson and analyse them. Anu is of the opinion that the activity is a bit difficult because a lot of data has to be handled. It was their teacher who hinted that Spreadsheet software can be used for analysing data and for arriving at conclusions.

Weather information on the Internet

Information on the daily weather conditions of all the important cities in India are available on the Internet. We get daily information from the official website (<http://imd.gov.in>) of the Indian Meteorological Department under the Ministry of Earth Sciences. The department is entrusted with the responsibility of studying the climatic changes and giving prior warnings on natural disasters.

With the help of LibreOffice Calc familiarised in the eighth standard, let's help Anu and Amina to do this activity according to the teacher's instruction.

For this, they collected the data of the maximum and minimum temperature in different parts of India from the Internet. Then, it was tabulated in LibreOffice Calc as seen in Pic. 6.1. The table was saved with the name 'temperature' in the prescribed folder in Home.



	A	B	C	D
1	Sl No	Place	Maximum Temperature / °C	Minimum Temperature / °C
2	1	AGRA	39	22
3	2	ALLAHABAD	39	28
4	3	AMRITSAR	34	16
5	4	BHOPAL	38	22
6	5	CHANDIGARH	35	19
7	6	DEHRADUN	32	17
8	7	INDORE	38	26
9	8	LUCKNOW	38	21
10	9	LUDHIANA	35	19
11	10	MUKTESWAR	22	9
12	11	NEW DELHI	26	22

Pic. 6.1 Temperature at different places

The table of temperatures is ready. Now, we have to find out the daily mean temperature in each place.

How do we do that?



Activity 6.1 - Let's see the average temperature

Add the title “Daily Mean Temperature” to the first cell of the column next to Minimum Temperature in the table that you have saved. You know that you need to divide the sum of maximum temperature and minimum temperature by 2, to find the average of any town. You may remember the way to find the sum. Here, you need to find the sum of the cells from C2 to D2. Follow the process given below.

- ◆ Select the cell in which you intend to get the average (E2).
- ◆ Type =SUM(C2:D2)/2 and press Enter key. (Pic. 6.2)

Now, save the file.

You can also find the average using the function AVERAGE which is available in LibreOffice Calc.

Moreover, you may use the functions for making more complex calculations and analyses.

Daily Mean Temperature

Daily Mean Temperature is the average of the maximum and the minimum temperatures in a locality.

	A	B	C	D	E
1	Sl No	Place	Maximum Temperature / °C	Minimum Temperature / °C	Daily Mean Temperature / °C
2	1	AGRA	39	22	=SUM(C2:D2)/2
3	2	ALLAHABAD	39	28	
4	3	AMRITSAR	34	16	
5	4	BHOPAL	38	22	

Pic. 6.2 To find the mean

Functions - A scaffolding

Don't you remember the function SUM you have used to find the sum of numbers? There are more than 350 functions in LibreOffice Calc to analyse and interpret data. Based on their usage, these functions are divided into different categories viz. Mathematical, Statistical, Logical, Financial, etc. You can open the Function Wizard using the function tool ($f(x)$) or by selecting Function from the Insert menu. (Keyboard shortcut Ctrl + F2). You can select the necessary function from the window and give information according to the instructions to get correct results.

AVERAGE, ROUND, IF, LOOK UP, COUNT IF, etc. are some of the useful functions.

The user can construct his or her own functions in addition to those that are available. You can learn more about this in your higher classes.

How will you find out the average temperature of other cities? Do you have to repeat the activities that you have done earlier? Is it possible to do this using Fill handle that you have learnt earlier?

Select the cell E2 in which you have found the average temperature and drag the Fill handle (+ sign seen when the mouse pointer is brought to the right bottom of a cell) downwards.

Calculations would have been easier if decimal places had been avoided.

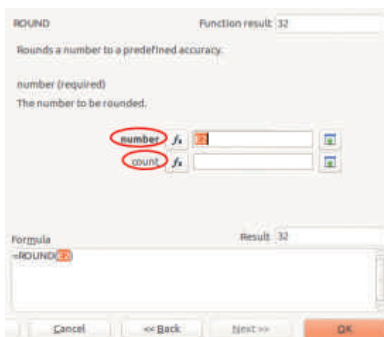


ROUND is a function that is available in Calc to determine the necessary decimal places after retaining the required digits after a decimal.

Activity 6.2 - Let's round the decimal places

We can give the title "Daily Mean Temperature Rounded" to the column (Column F) which is next to Mean Temperature. Try to do the activities by selecting the cell (F2) in which the results have to be obtained.

- ◆ Select the function tool (*f_x*) in the tool bar.
- ◆ From the window that opens, select ROUND from the Function list and click Next.
- ◆ Click on the box *number* and give the cell address (here E2) in which the decimal place has to be rounded (Pic 6.3).
- ◆ You have to give the number of digits that should be there after the decimal point in the box called *count*. As we don't need any number after the decimal point here, we need not give anything (you can also type 0).



Pic. 6.3 ROUND function window

Now click on **OK** and drag the Fill handle in F2.

Do not forget to save the file.

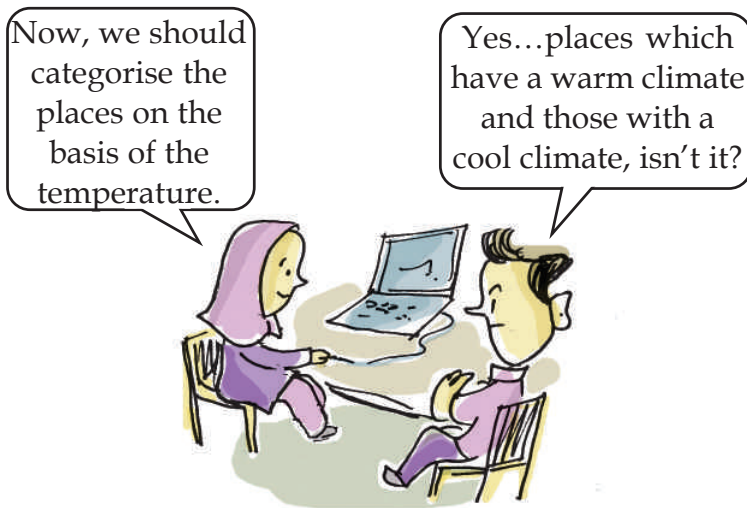
What difference should be brought about in this activity to show two digits after the decimal point using the ROUND function?

Activity 6.3 - Let's include the functions directly to the cell

Complete the following table (Table 6.1) by finding out how to include the necessary functions for the activities given below.

Activity	Function	What should be typed in the cell
Find the sum of cells from A1 to A6.	SUM	= SUM (A1:A6)
Find the average of the numbers in the cells from A1 to A6		
Round the number in A7 to two decimal points		
Find the average of numbers in the cells from A1 to A6 as a whole number.	ROUND & AVERAGE	= ROUND(AVERAGE(A1:A6), 0)

Table 6.1 Functions and Instructions



Is it not possible to categorise the places in the table as places with warm climate and those with cool climate on the basis of a fixed norm? Calc has many functions for categorising the data. Let's see how the function IF is used in this category.

When Fill handle is double clicked

You know that to copy a function or formula to the next cell, it is enough that you drag the Fill handle. Instead of this you may double click on the Fill handle. Does the formula/ function/ sequence get copied to the downwards cells? We can understand that in certain situations this is not possible. This can be possible only if the data is there in the columns that precede or succeed the column in which Fill handle is used.

Let's include more sheets

At the bottom left of the Spreadsheet window, a label Sheet 1 is indicated. It means, the table that includes temperatures is the first sheet in this file. You can include more sheets according to your need by a click on the + sign that is seen here. The Spreadsheet file that includes more than one sheet is also called a Workbook.

In Spreadsheet, facility to give suitable names to the sheets is also available.

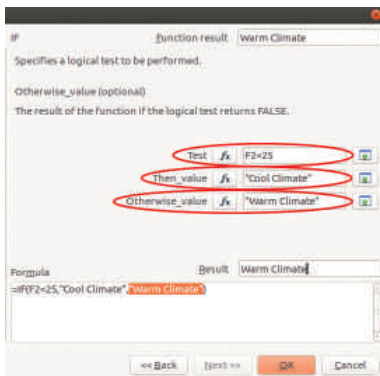


Fig. 6.4 IF function window

Activity 6.4 - 'IF' to categorise data

There should be a criterion for categorising the data. Imagine that you need to categorise places: those with the average temperature below 25°C as Cool Climate and those above 25°C as Warm Climate places. Add the title Climate in the 'G' column which is next to Daily Mean Temperature Rounded column in the table and try to do the following activities.

- ◆ Click on *Function* tool, after selecting the cell where you should get the result (G2).
 - ◆ Select *IF* from the Function list in the *Function Wizard* window that opens and click on *Next*.
 - ◆ In the *Test* box, fix the average temperature as below 25°C, which is the criterion for categorisation. Using the cell address you may add as $F2 < 25$ (Pic. 6.4).
 - ◆ In the *Then_value* box, you should add what is to be displayed if the norm is correct. (here 'Cool Climate').
 - ◆ In the *Otherwise_value* box, you should add what is to be displayed if the norm is incorrect (here 'Warm Climate').
 - ◆ After that click *OK* and drag the Fill handle in G2.
- Now, you may save the file.

Now, Anu had a doubt. If we want to compare the climate of more than two categories, can we use IF in such cases.

When you have to categorise the data into three or more groups, LOOKUP function is more suitable than IF function.

Activity 6.5 - LOOKUP for categorising data

Let's fix the criteria for categorising the data just as we used IF. For example, imagine that you are using the following method:

- Temperature below 20°C - Cool Climate
- Temperature between 20°C and 30°C - Moderate Climate
- Temperature above 30°C - Hot Climate

Save the table with the name 'temperature_climate' using *Save As*. Delete the data of the last column which was categorised using IF and try to do the activities as given below.

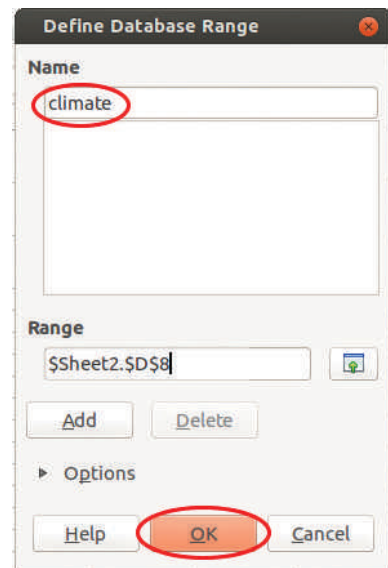
- ◆ Type the criteria either in the sheet of the table or in any other sheet (Pic. 6.5). This is the LOOKUP chart. Here LOOKUP chart is typed in Sheet2. (You should remember that you can include any number of sheets.)
- ◆ Select the LOOKUP chart wholly and click on *Define Range* in the *Data* menu.
- ◆ Give a name in the *Name* box in the window that opens and click *OK*. (Here the name given is 'climate') (Pic. 6.6).
- ◆ Now, select the cell in which you want to get the result in Sheet 1 and click on the function tool in the tool bar.
- ◆ Select LOOKUP from the Function Wizard window that opens and click Next.
- ◆ Give the cell address of the average temperature in the *Search criterion* (here F2) box and the name of the LOOKUP chart (climate) in the box named *Search vector* (Pic. 6.7).
- ◆ There is no need to enter anything in the *result_vector* box.
- ◆ Now, click on *OK* and drag the Fill handle. Are they categorised in the desired way? (Pic. 6.8).

	A	B	C
1	0	Cool Climate	
2	20	Moderate Climate	
3	30	Hot Climate	
4			
5			
6			

Pic. 6.5 LOOKUP Chart

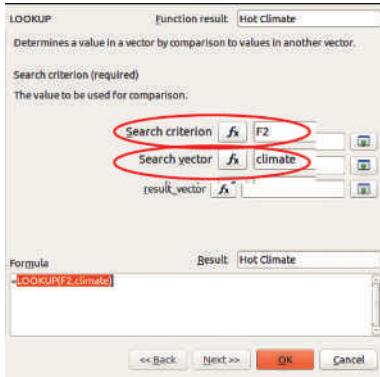
Be careful while using IF...!

While using IF, do not forget to type in quotes (" ") when you enter the sentences to be displayed in the value boxes. ("Cool Climate", "Warm Climate", etc.) But if the numbers have to be entered instead of sentences, it is not mandatory. Don't you remember Strings and Numbers that you have studied in the previous lessons?



Pic. 6.6 Define Range window

There is a facility available in Calc to classify a particular type of data and make a new table from the table you have prepared. We use the facility named Auto Filter for this purpose.



Pic. 6.7 LOOKUP function window

How can I classify places which have the same temperature in this table?



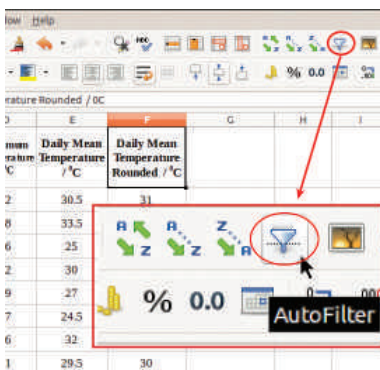
	A	B	C	D	E	F	G
	Sl No	Place	Maximum Temperature /°C	Minimum Temperature /°C	Daily Mean Temperature /°C	Daily Mean Temperature Rounded /°C	Climate
2	1	AGRA	39	22	30.5	31	Hot Climate
3	2	ALLAHABAD	39	28	33.5	34	Hot Climate
4	3	AMRITSAR	34	16	25	25	Moderate Climate
5	4	BHOPAL	38	22	30	30	Hot Climate
6	5	CHANDIGARH	35	19	27	27	Moderate Climate
7	6	DEHRADUN	32	17	24.5	25	Moderate Climate
8	7	INDORE	38	26	32	32	Hot Climate
9	8	LUCKNOW	38	21	29.5	30	Hot Climate
10	9	LUDHIANA	35	19	27	27	Moderate Climate
11	10	MUKTESWAR	22	9	15.5	16	Cool Climate
12	11	NEW DELHI	36	23	29	29	Moderate Climate

Pic 6.8 Analyses of temperatures

Activity 6.6 - Let's classify data

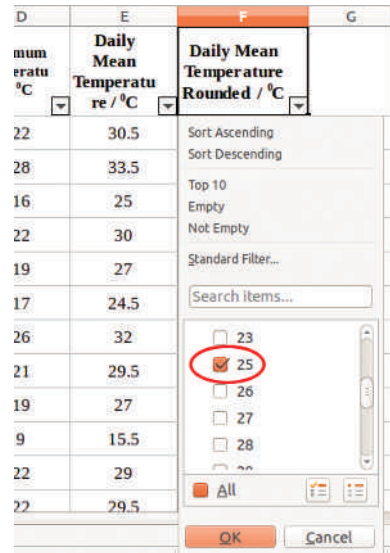
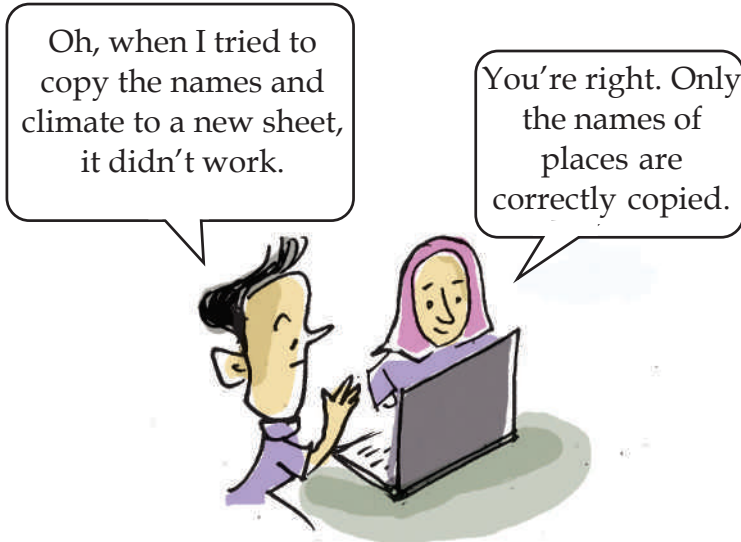
Suppose you want to find places having a daily average temperature of 25°C. Let's see how this activity can be done using *Auto Filter*.

- ◆ Select any one of the cells from the title cells.
- ◆ Click *Auto Filter* tool in the Tool bar (Pic. 6.9) (Or else select *Filter* → *Auto Filter* from the *Data* menu).
- ◆ From the buttons (☐) you see in the cells that have the titles, click on the button which is close to the data that has to be classified (here F1).
- ◆ Retain the tick marks of the necessary data in the window that opens (here the tick mark of 25 alone has to be retained) (Pic 6.10).
- ◆ When you click *OK*, you will get the table of those cities that have a daily average temperature of 25°C.
- ◆ Include a new sheet in the Spreadsheet window and Copy→ Paste the table that has been filtered. Then, save the file.



Pic. 6.9 Auto Filter tool

You can filter the data by selecting *Standard Filter* in the *Auto Filter* window by fixing the criteria for filter. Now, filter the table and using this method, find out the data in which the average temperature is below 20 °C.



Pic. 6.10 Auto Filter window

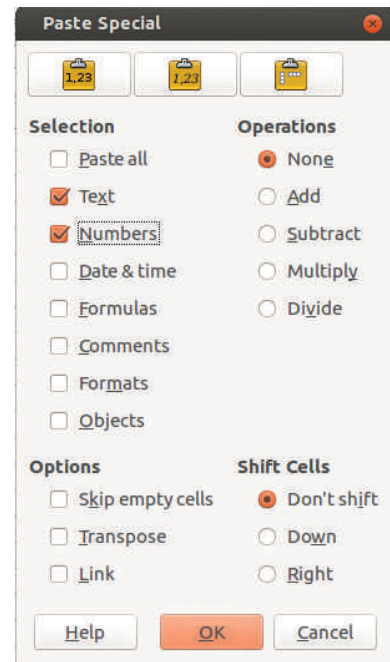
You must also have faced such a problem while copying the data which was prepared by a function or formula from the Spreadsheet to another cell/sheet.

We can solve this problem using the facility Paste Special in LibreOffice Calc.

Activity 6.7 - Paste special

Add a new sheet to the Spreadsheet file. Copy the names of places including title from the table and paste them in the first column (Column A) in the new sheet. Now, follow the process given below in order.

- ◆ Open the sheet that contains the table and copy the column in which the climate including the title is recorded.
- ◆ Then, select the second column in the new sheet. Select *Paste Special* from the *Edit* menu.
- ◆ Tick *Text* and *Numbers* only in the window that opens and click *OK* (Pic. 6.11).



Pic. 6.11 Paste Special window

Let's interchange rows and columns

If you click Paste Special while you copy and paste the data in a row and tick on Transpose under Options in the window, (Pic. 6.11) then, the data will be arranged in a column. If you copy more than one row using this facility, the rows will be arranged in the order as columns.

You may not be able to open the Spreadsheet file that we saved in the computer that has a different operating system or office application, or on any other device. This problem can be solved by converting this file to pdf format.

Activity 6.8 - Let's export as PDF

We have learnt in earlier units that files in pdf format are supported by most of the operating systems. Now, try to export the Spreadsheet file that you prepared to pdf format.

Even if we save our Spreadsheet file, it is likely that others may bring in changes to it. Such corrections may create difficulty. Let's see what facility is there in Calc to solve this without hampering the freedom to open and see the file.

Activity 6.9 - Let's protect our file

You can protect your files from unnecessary editing using the facility *Protect Document*. Follow the process given below.

- ◆ Open the sheet that you want to protect.
- ◆ Open the *Protect Sheet* window from the *Tools* menu in the order *Protect Document* → *Sheet*.
- ◆ Give a password in the box which demands a password. Type the password again in the Confirm box and then click *OK*.
- ◆ Save the file.

Now, try to edit the file. Does it work? What if you need to edit the file again? Try to do it in the same way as referred to above.



Online Spreadsheets

We have been discussing about Spreadsheets that can be worked by installing it in the operating system. But there are Spreadsheet applications that can be used online without installing, in a computer that has internet facility. The major advantage of online Spreadsheets is that they support most of the Spreadsheet formats. But, online Spreadsheets can be used only if you agree to the conditions specified by the organisation that provide them.



Significant learning outcomes

The learner:

- prepares Spreadsheet tables using AVERAGE, ROUND and FILTER facilities.
- adds new sheets to the Spreadsheet table.
- prepares analyses in Spreadsheet table using IF and LOOKUP functions.
- pastes data using Paste Special facility.
- exports the table in Spreadsheet to PDF format.
- protects the sheets in Spreadsheet table from editing.



Let's evaluate

1. Which of the following facilities is available if you protect a table in a sheet of Calc using Protect Document?
 - ◆ The data in the sheet cannot be copied by anyone else.
 - ◆ The data in the sheet cannot be edited by anyone else.
 - ◆ The data in the sheet cannot be seen by anyone else.
 - ◆ The data in the sheet cannot be printed by anyone else.
2. If you categorise the data using the following LOOKUP chart, in which category will 41 appear?

LOOKUP chart	
0	A
10	B
20	C
30	D

- ◆ A
- ◆ B
- ◆ C
- ◆ D

3. As part of the activities of the School Health Club, find out the weight (in kg) and height (in m) of all the children in your class. Calculate the BMI (Body Mass Index) of each child by tabulating the data in LibreOffice Calc.

Hint : BMI = (weight in kg/height in m²)

4. Based on the table of BMI in the previous activity, use LOOKUP function and categorise the health condition of the children as Under Weight, Normal Weight, Over Weight and Obesity.

Hint : LOOKUP chart

BMI less than 20 - Under Weight

BMI between 20 and 25 - Normal Weight

BMI between 25 and 30 - Over Weight

BMI 30 and above - Obesity



Follow-up activities

1. Tabulate the national income of the last three years of some countries using LibreOffice Calc. Calculate the average national income of each country using AVERAGE function.
2. Collect data on the population of all states in India and tabulate them in Calc. Using the Filter facility, categorise only those states which have a population of more than 8 crore. Add a new sheet and include this table in it. Give the name 'Highly Populated States' to this sheet.
3. Collect data on the consumption of electricity for a period of ten days in the houses of all your classmates and tabulate them in Calc. Calculate the daily average consumption of electricity. Filter those houses where the average consumption is more than 5 units and show them in a separate sheet. Visit these houses and create awareness on the need to reduce the consumption of electricity.
4. Prepare a Spreadsheet table of School Kalolsavam which shows the grades according to the given criteria, when the scores given by the judges for various items are entered.
5. There are many Spreadsheet applications supported by different operating systems. Collect information regarding them and list them in the following table.

Spreadsheet Application	Developed by	Operating systems that support



Chapter 7

Making an Impressive Presentation



“കത്തുന്ന സൂര്യന്റെ കണ്ണുകളിൽ നിന്നഗ്നി
വർഷിച്ചു രോഷമുണരുന്നു
ആടമുകിൽമാല കുടിനീരു തിരയുന്നു
ആതിരകൾ കുളിരു തിരയുന്നു.”

- *Bhoomikoru Charamageetham*
(O N V Kurup)

All the pulsations of life on our planet earth are controlled by the Sun. The very existence of the biosphere is dependent on solar energy. You might have learnt about the human deeds which cause the changes in the atmospheric temperature and also about the need for protecting the Earth for the coming generation, in the lesson ‘Sun: The Ultimate Source’ in your Social Science textbook.

Varsha and Vipin are preparing a presentation in the computer on the topic ‘Global Warming’ to be presented at the seminar to be conducted in the school on the World Environment Day. Can you help them? You are already familiar with the presentations using LibreOffice. What are the prerequisites for this?

- ◆ Fix the content.

We can
prepare the
presentation
using Impress.





Slide Template

Slide templates are used for getting uniformity on the slides used for preparing presentations. Various built-in templates are available in LibreOffice Impress. Free downloadable templates are available on the Internet too. If needed, you can download such templates and include them in your presentations. The slides which are prepared using a template will have the following features:

- ◆ one design
- ◆ one background colour
- ◆ uniqueness in fonts

◆ Prepare the storyboard.

◆

.....

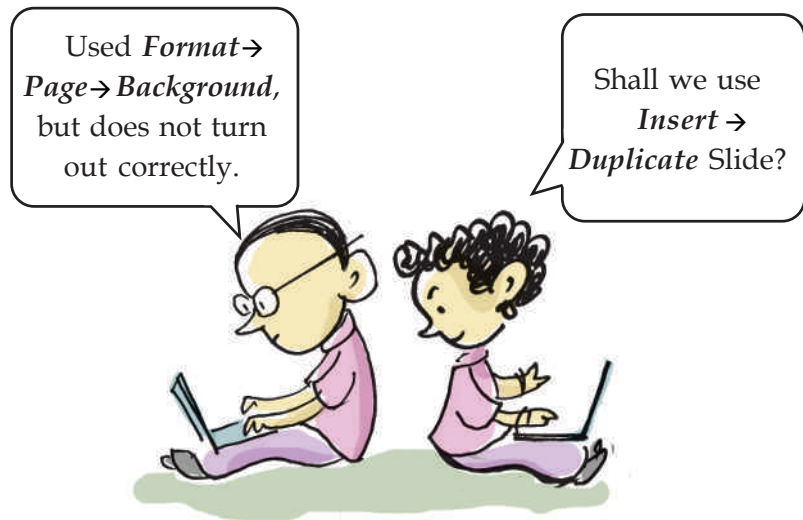
◆

.....

You know how to prepare a good storyboard, don't you? Now, you have to collect information, pictures and videos required for a presentation. From where can you collect these?

You can gather information from various content CDs, Internet, other digital collections, etc. You can gather information and store them in a separate folder.

You can start preparing slides, if you have completed the arrangements. For this, open LibreOffice and type the content in it. You were taught in the previous class to give the appropriate background colour to the slides. So you can give background colour to the slides. What should be done to give the same background colour to all the slides?

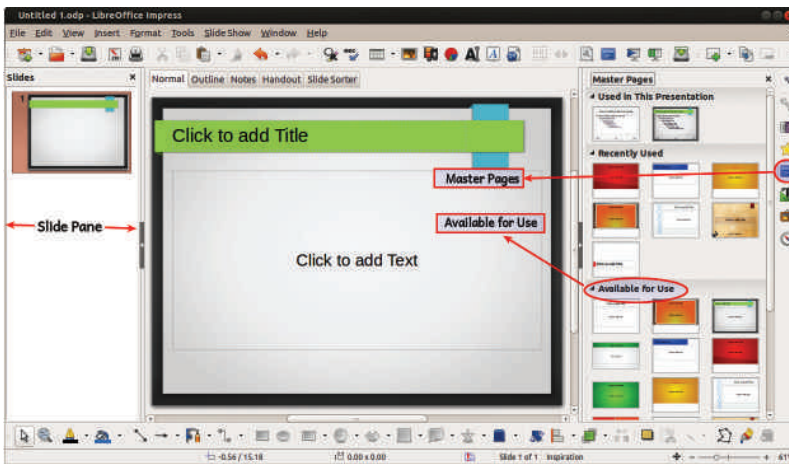


When you select a suitable background colour from *Page* in the *Format* menu, a question (Background settings for all pages) appears. Click on Yes. All the slides get the same background colour. Is there any other way to get the same background?

Activity 7.1 - Select a template

Impress contains provisions for providing the same background to all the slides. Let's examine how the templates can be included.

- ◆ Click on the *Master Pages* tool which is seen on the side of the presentation window (Pic. 7.1).
- ◆ Select the template from the slot below the option *Available for use* in *Master Pages* window.



Pic. 7.1 Impress window

You have already set the selected template as the background of the slide. Now, insert a new slide. What do you see? The background of all the slides are the same, aren't they? You may now save the prepared presentation in the folder after giving it a file name.

Now, you may include information and pictures needed for the presentation. You have practised how to include pictures and information in a presentation in the previous class, haven't you?



Scrolling texts in presentations

You can make scrolling texts in presentations also. You have studied in Standard VIII about giving animations to texts. Follow the steps given below to make scrolling texts.

- ◆ Type the required text using the text box.
- ◆ First, select the text. Then, select *Text Animation* seen in the box when you click open the *Text* from the *Format* menu.
- ◆ Click on *Scroll Through* option seen in the box below *Effect* and select suitable direction from *Direction* and then click *OK*.

When we include a picture, the words we typed have disappeared!



What shall we do to see the words again?

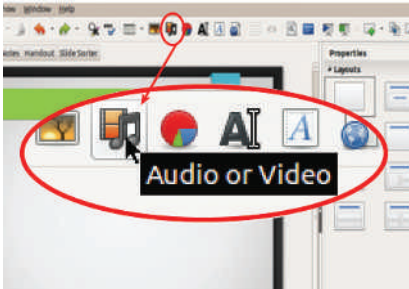
Activity 7.2 - Let's include a picture and arrange it

This happened because the picture came on top of the text. If you can place the picture behind the text, you can solve this problem. How can this be done? Follow the instructions given below.

- ◆ Click on the picture and select it.
- ◆ Click on *Arrange* from the *Format* menu and select *Send to Back*.
(You can right click on the picture and perform this process.)

Observe the changes that happen when you click on the other options available on the *Arrange* menu.

You can also use the *Arrange* tool in the tool bar to perform this process.



Pic. 7.2 Window that includes audio-video tool

Add audio files

You can insert audio files in the same manner as you inserted the video files. Here, you have to select the audio files and insert them instead of the video files.

Into the slides...

You can link into a slide using Interaction. Select Go to page or object from Action at mouse click. Select Target (Slide No) and click OK.

Activity 7.3 - Include a video

You have already included pictures and information. Shall we include a video in our presentation? How can this be made possible?

- ◆ Select the slide in which the video is to be inserted.
- ◆ Click on *Audio or Video* from *Media* seen in the *Insert* menu and include the video you want to insert.

You can also click on *Audio and Video* tool to insert a video (Pic. 7.2).

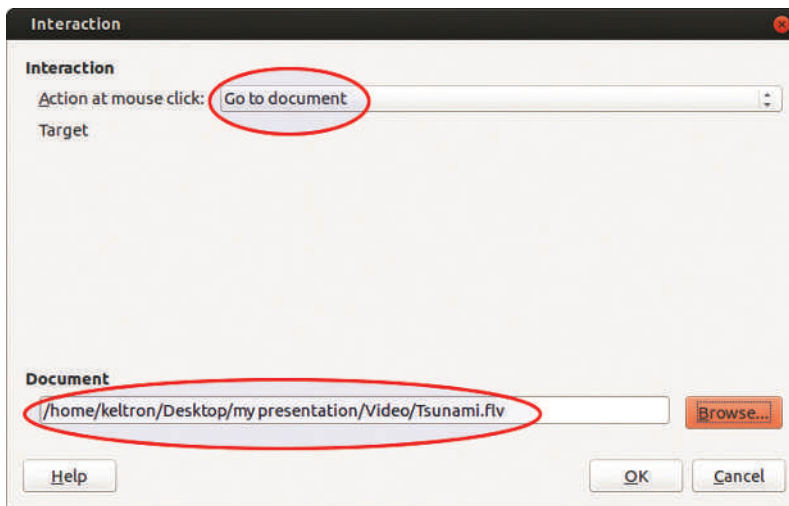
Click and select the video that appears on the slide and adjust the size of the video window, if necessary. Now, view the presentation. Videos of all formats may not play in the presentation if inserted like this. For such videos you can use the Interaction option.

Activity 7.4 - Provide interaction

It is common that while using websites you visit new pages when you click on the links provided in it. Like this, you can link to the video file from the presentation using *Interaction* tool. (You can link video files on any format in this manner.)

Making an Impressive Presentation

- ◆ Select **Object** (text, picture, etc.) on the slide you intend to include in the Interaction.
- ◆ Select Interaction in **Slide Show** menu. You can click on **Interaction** tool and open the window (Pic. 7.3).
- ◆ When the Interaction window opens, select **Go to document** from the box near the **Action at mouse click** (Pic. 7.4).
- ◆ Click on **Browse** and select video file and click **OK** (Pic. 7.4).

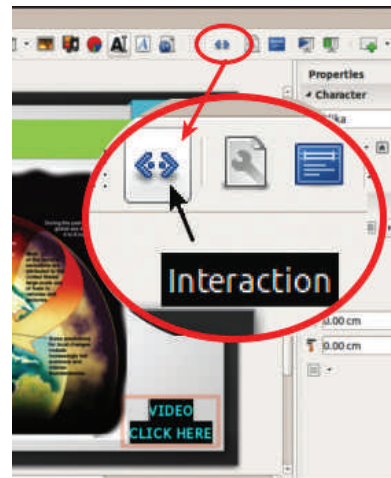


Pic. 7.4 Interaction window



Interactive buttons

The buttons needed for giving Interaction can be drawn using the tools in the Drawing toolbar. After selecting the button, click on the **Properties** tool in the Sidebar. What changes can be made in the button?



Pic. 7.3 The window that includes Interaction tool

What all activities in this way can be done using Interaction? Identify other options and their uses in the **Action at mouse click** box and list them in the given table (Table 7.1).

Think of including additional information related to the seminar. What are the sources from which you can collect the additional information?

Action	Target
No action	
Go to previous slide	to move back to the previous slide
Go to next slide	
Go to first slide	
Go to last slide	
Go to page or object	
Go to document	
Exit presentation	to exit the presentation

Table 7.1
Action and their targets



Mark-up texts

You might have identified some words having blue colour underline while you visit sites like Wikipedia. You might have noticed the changes when you bring the mouse on the top of it. These are called Mark-up Texts. When you click on it, you reach the file to which the text is related. This process is called Hyperlink.

While linking files

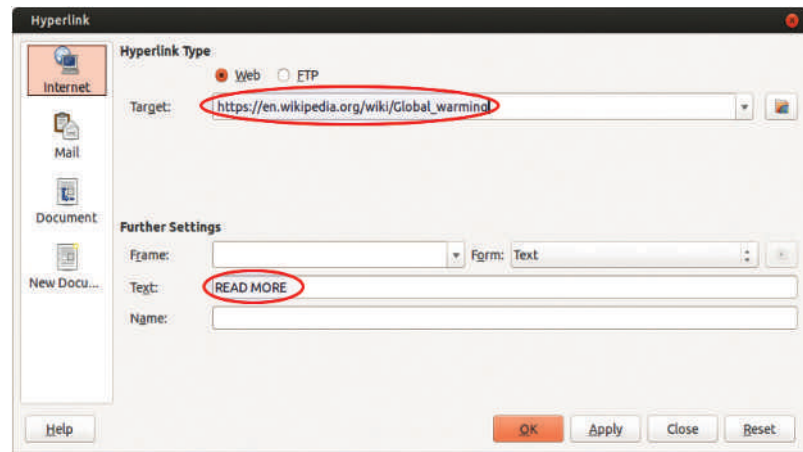
If you change the position of the files you included in a presentation through Interaction, Hyperlink, etc., it may not work properly in the presentation. Therefore, it is better to copy such files to a folder in which you intend to save the presentation and then link them to the presentation.

Is it practicable to include all the additional information you have collected in the presentation? You can make use of the provision of hyperlink like Interaction.

Activity 7.5 - Let's hyperlink

You have seen a lot of information in internet related to global warming. Now, think of how to link the presentation you have prepared to Wikipedia.

- ◆ Select the word in the slide which you intend to hyperlink.
- ◆ You can enter the window by a click on the *Hyperlink* tool or select *Hyperlink* in the Insert menu.
- ◆ Select *Internet* from the box on the left side of the window (Pic. 7.5).
- ◆ Type the web page address (URL) of the file to be linked in the *Target* box (Pic. 7.5). The text you selected to give hyperlink will appear in the *Text box*. This will be the Mark-up Text.



Pic. 7.5 Hyperlink window

Now, view the presentation. What changes occur when the mouse pointer reaches the top of the mark-up text? And what happens if you click on it? You reach the web page which you hyperlinked earlier, don't you?

Activity 7.6 - Let's insert a table

If you include the information you have gathered for the seminar in the form of a table, the presentation would become more effective. Consider the following steps to include a table in the presentation.

- ◆ Select the slide in which you want to insert the table. Then, click on *Table* in the *Insert* menu.
- ◆ In the box that opens, type the number of rows and columns and then click *OK*. (You can also click on the *Table tool* and select the number of rows and columns required in the table.) Now, include the information in the table.
- ◆ You can make the table attractive using the tools that appear in the *Properties* window while selecting the table.

You might have understood how to add rows and columns in a table. Select the table and right click on the mouse to see the options available in it and their uses. If you insert a chart in the slide with the details of the table, don't you get a clear idea?

Activity 7.7 - Insert a chart

You have studied how to insert a chart in Spreadsheet in Standard VIII. Now, you may follow the steps given below to insert a chart in the presentation slide.

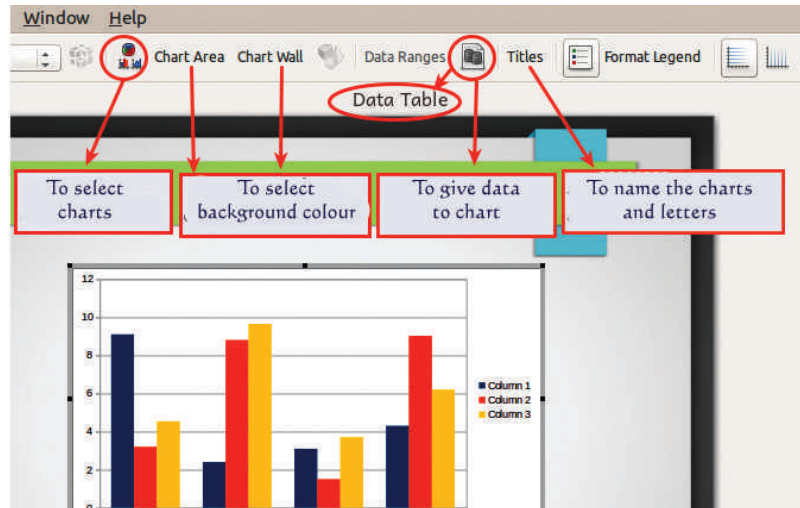
- ◆ Select the slide in which the chart is to be inserted.
- ◆ Click on *Insert* menu and then on *Chart*, the window to insert the chart will be opened. (This can be done by clicking on the *Chart tool*.)
- ◆ Format the chart using the tools marked in the picture (Pic. 7.6).
- ◆ After formatting, click on the outer part of the chart and include it in the slide.

How can I include a table in a slide?



Include data in charts

- ◆ To add data to the chart, click on *Data Table* and provide the data in the window that opens. You can also add or delete rows and columns in the chart by giving details here (Pic. 7.6).
- ◆ Click on *Chart Area* or *Chart Wall* and provide suitable background colour to the slide.
- ◆ Click on *Title* and give names to the X and Y axis of the chart.



Pic. 7.6 Window for inserting chart

Activity 7.8 - How to add presentation files

Can you add the presentations prepared by other groups on the seminar topic, to your presentation. How is it possible?

What should be done to add a presentation wholly or partly to a presentation file? Let's see how it is possible.

- ◆ Select the slide in which you have to add the presentation file.
- ◆ Select the presentation file you intend to add. Select **File** from the **Insert** Menu. Now, click on **Open** and insert the presentation file.
- ◆ Then, click **OK** in the **Insert Slides/Objects** that appears.

Did you notice that all the presentation files that you have selected have been included?

If you want to add only a part of the presentation or only certain slides to the presentation file, select and copy those slides and paste in the **Slide Pane** wherever it is to be added (Pic. 7.1).

Did you notice the change in the background colour of the slides you added now? To solve this problem, click on the **Master** page and select a suitable template from it.

Slide Pane...

What are the facilities available in Slide Pane?

- ◆ You can see the *Thumbnail view* of the slides.
- ◆ You can easily select a slide.
- ◆ Copy - Paste a slide.
- ◆ Add new slides to the presentation.
- ◆ Delete a particular slide.
- ◆ Rename a slide.
- ◆ Arrange the slides.
- ◆ Hide a particular slide.

Now, let's slide show the presentation.

After the slide show of the presentation, Vipin identified that certain texts and pictures are repeated and some are not in the expected position. His teacher told him that it was due to some problems in giving animation to the presentation. If we animate an object more than once, this problem may happen. How can we overcome this problem?

Activity 7.9 - Slide sorting

You have seen how to change the arrangement of animation. Now, how can you change the arrangement of slides?

- ◆ Click on the *Slide Sorter* tab seen above the *Workspace*. Now, you can see all the presentation slides in one window.
- ◆ Drag the slide which you want to change the position and drop it in the correct position.
- ◆ Click on *Normal* tab to go to the previous window.

Haven't you saved the works you did till now in a folder? Now, you may present the slides before your friends.



Let's make master slides

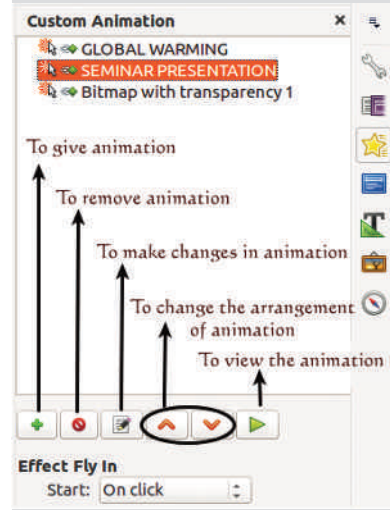
Did you notice the templates that you used while selecting the slide design? You can make similar templates of your own.

- ◆ Click on *Master* in the *View* menu and select *Slide Master*.
- ◆ A window as shown in the picture appears. (Note that here you can see only the master slide.)
- ◆ The colours, pictures, etc. you add as background will be seen in all the slides.
- ◆ Select suitable one from *Date Area*, *Footer Area*, *Slide Number Area* and add data in it. This will be visible in all the slides.

To arrange animation

- ◆ Select a slide.
- ◆ Click on the Custom Animation tool in the Sidebar.
- ◆ Select Animation and click on the UP/DOWN button.

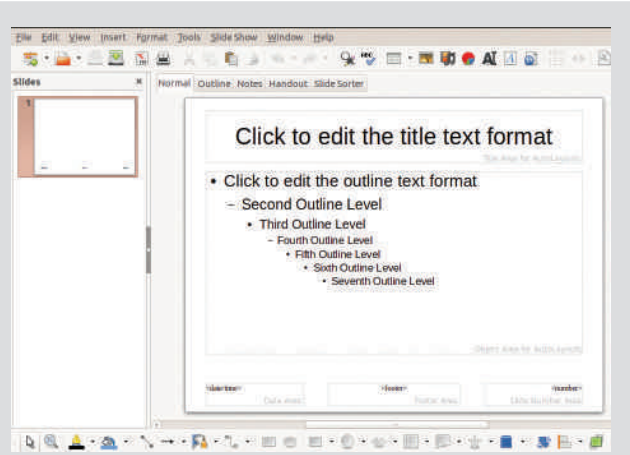
Facilities to make changes in animation, remove animation and preview animation is available in this window. Try and find out these facilities.



Pic. 7.7

Custom Animation window

- ◆ If you prepare master slides and prepare slides, such designs cannot be edited in *Normal View Mode*.
- ◆ Whatever change/editing done in the master slide will be visible in all the slides.
- ◆ To go back to the *Normal View Mode*, click on *Normal View* in *View* menu.



Significant learning outcomes

The learner:

- ◆ prepares presentations using Impress software templates.
- ◆ brings the typed text to front or back of a picture in the slide using Arrange tool.
- ◆ inserts a video in the presentation slide.
- ◆ links Interaction from one slide to another slide or to another file.
- ◆ links a presentation to another file using the technique of Hyperlink.
- ◆ inserts a table in the presentation; includes details in the table; formats the table.
- ◆ inserts a chart in the slide; adds necessary data to the chart; gives names to the chart and slide.
- ◆ adds a prepared presentation completely or partially to another presentation.
- ◆ arranges the slides in the proper order using Slide Sorter facility.



Let's evaluate

1. Which of the following tools from Arrange will you select to bring a typed text or picture to the front of the slide?

a) Send to back	b) Send Backward
c) Bring to Front	d) Bring Forward

Making an Impressive Presentation

2. Which of the following from the Interaction window will you select to link the first slide to the fifth slide in a presentation?
 - a) Go to document
 - b) Go to page or object
 - c) Go to first slide
 - d) Go to next slide
3. How will you remove a slide temporarily from a presentation?
 - a) delete the slide
 - b) hide the slide
 - c) sort the slides using Slide Sorter
 - d) click on the master page
4. Which of the following icon in the Hyperlink window will you select to link a presentation in a previously prepared file through Hyperlink?
 - a) Internet
 - b) Mail
 - c) Document
 - d) New Document
5. What will you do to add two slides from another presentation to the presentation you have prepared?
 - a) Insert slide
 - b) Insert Duplicate slide
 - c) Insert media
 - d) Insert file



Follow-up activities

- ◆ We have studied in the earlier classes on how to convert a word processor file to PDF. Convert the presentation file you have prepared to PDF format.
- ◆ Prepare a presentation as part of the IT Quiz competition in the School IT fair by setting a master page using Slide Master.
- ◆ Prepare a presentation based on the topic 'Ozone depletion and its Remedies' a lesson from your Chemistry Textbook.
- ◆ Prepare notes on the three important parts seen when Impress opens and its major features.
- ◆ Provide beautiful borders to the pictures in the presentation you have prepared using the Frame tool in the Drawing toolbar.



Chapter 8

Making a Web Page



Shall we make a website to publish the programmes of our school?



How will you make a website?



Anu and Amina are watching the programmes of State School Kalolsavam from the Kalolsavam site. Apart from the results of the competitions, all the stage presentations are available as video in the Kalolsavam site. “All the competitions staged in the Kalolsavam and all the important events are shown in the social media”, says Vipin.

Let's prepare a page for the Kalolsavam

You have studied in the earlier classes that a website contains more than one web page. We can also construct a website including the details of the major events of our school. We can add information about various programmes organised in our school related to Sports, Youth Festival, etc. and also programmes of excellence in different pages of the school's website.

Let's see how the website with different pages can be constructed. Shall we prepare a web page demonstrating the programmes of the School Kalolsavam this year?

What are the details and information to be included in the web page that we intend to prepare?

Activity 8.1 - Deciding the content

Visit the various websites of the Internet. Examine each page of these websites and find out what kind of contents are included and how they are arranged.

Likewise, don't we want to make our web page attractive? For this, list the contents that we can include in the Kalolsavam page.

- ◆ Heading
- ◆ Pictures
- ◆
- ◆

Now, let's start preparing the web page. You know that web pages are opened on web browsers. But web browsers cannot prepare web pages. How the texts, images, sounds, videos, etc. shall be displayed on the web page will be given as instructions in the Text editor. Browsers visualise the contents of this web page according to the instructions in it. The language used for preparing such web pages is called Hypertext Markup Language.

Activity 8.2 - Let's build a web page

Tags or HTML elements are instructions used in HTML language to define the contents of a web page and its arrangement. Tags are used by typing them in < > symbols .

HTML



Web pages are interconnected hypertext documents. The markup language used for preparing these web pages is called HTML. In ancient days, symbols were used to give instructions to the typesetter to set the type for printing. The size of letters, colours to be used, slant of letters, etc. for the text to be printed were represented using symbols or codes called markups. Since HTML language is marking up the content, it is called markup language. The fifth authorised edition of HTML is HTML 5.

HTML tags

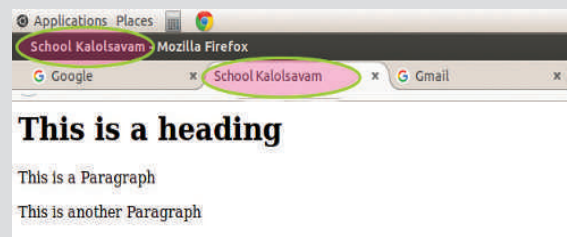
When a web page is prepared <html> (opening) tag is given at first to denote the beginning and </html> (closing) is used at the end to denote the ending of the page. The contents are given in between. The instructions that contain an opening and a closing tag is called container tags. Those that do not need a closing

```

<html>
<head>
  <title>School Kalolsavam</title>
</head>
<body>
  <h1>This is a heading</h1>
  This is a Paragraph
  This is another Paragraph
</body>
</html>

```

Pic. 8.1 HTML page layout



Pic. 8.2 Title bar

tag is called an empty tag.

The common structure of HTML tags in a web page is given in Pic. 8.1. The main tags that comes in between `<html>` `</html>` are `<head>` tag and `<body>` tag. Details related to the page, but not the content should be included in `<head>` `</head>` tag. For example, `<title>` `</title>` tag. This is the instruction to show a text on the title bar when a web page is opened (Pic. 8.2). The content to be shown in the web page should be included in `<body>` `</body>` tag.

- ◆ To prepare a Kalolsavam page of your school, open a Text editor and type the instructions as given in the picture (Pic. 8.3).

```

*Untitled Document 1 - gedit
File Edit View Search Tools Documents Help
Open Save Undo
*Untitled Document 1 x
<html>
  <head>
    <title>School Kalolsavam </title>
  </head>
  <body>
    Content Area
  </body>
</html>
Plain Text Tab Width: 8 Ln 1, Col 7 INS

```

Pic. 8.3 Basic HTML tags

- ◆ Save this file in the sub folder Web page in your folder with a name 'kalolsavam.html' and close it. (This text file becomes a web page when you give the file extension **.html**)

- ◆ Open the file you have saved (Double click).
- ◆ Examine how the web browser displays the details you have entered in the web page.
 - ◇ Where is the text School Kalolsavam shown?
 - ◇ What other contents can you see in the page?

Now, you can add information to the web page. You have decided the contents to be included in the web page, haven't you? What should appear on the top of the page?

Look at the headings and sub headings in your textbook. Like this, there are various tags which can be used to show the headings and sub headings in a web page. Use the tags given below to give a suitable heading to your Kalolsavam page.

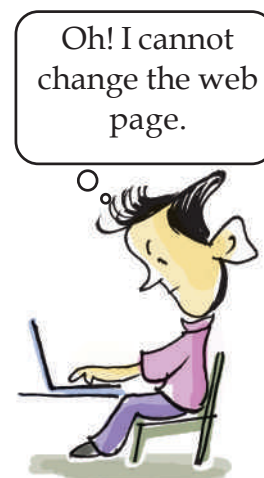
Heading	Tags
FIRST HEADING	<code><h1> FIRST HEADING </h1></code>
SECOND HEADING	<code><h2> SECOND HEADING </h2></code>
THIRD HEADING	<code><h3> THIRD HEADING </h3></code>

Table 8.1 Headings

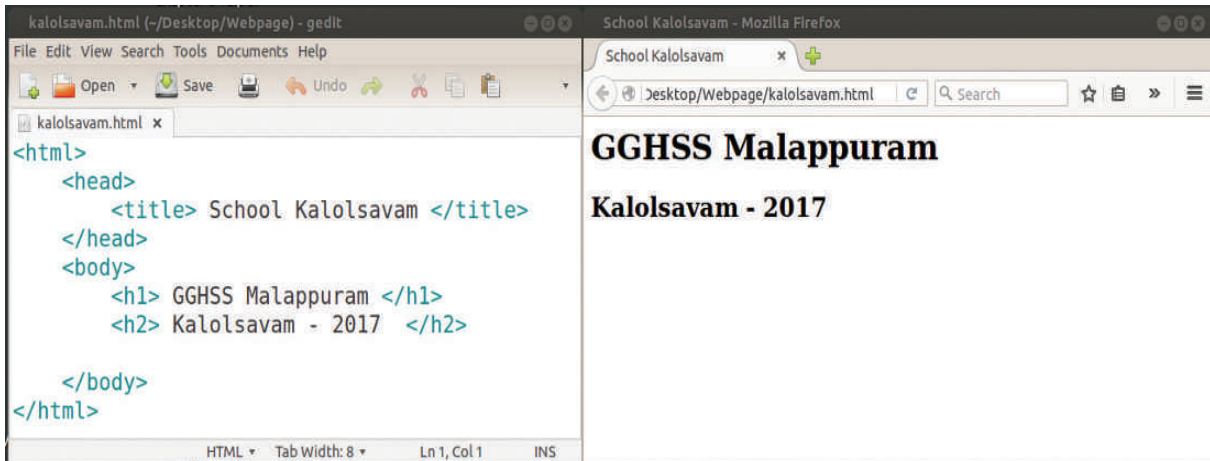
Activity 8.3 - Adding a page heading

Enter the name of your school as the heading in the web page where *Content Area* is typed and enter 'Kalolsavam - 2017' as sub heading (Pic. 8.3).

To make the changes in the web page, make changes in the page source. Open the web page you have prepared in Text editor using the command *Open with* → *gedit*. You can edit the html instruction and make changes in the web page.



Read the HTML instructions given by Anu to include the headings and instructions that the browser displayed (Pic. 8.4).



Pic. 8.4 Instructions given to include a heading and the web page window display

Compare this instruction with the one you have already prepared. Observe the changes happening to the heading when you use h3, h4 tags instead of h1, h2 tags. Find out the heading tags other than h1, h2, h3 and h4.

You might have heard the quote “*A picture is worth a thousand words*”. Don’t you see the images in the websites you have visited? The web page becomes more attractive if suitable images are added to the web page.

Prepare a banner in Image editing software for your Kalolsavam page. Let’s familiarise ourselves with inserting the banner in the web page.

Activity 8.4 - Let’s include a banner

You know how to insert a picture in the word processor, don’t you? In a web page, image file can be inserted with the help of the HTML tag ``. Along with this instruction, the details of the kind of image to be included, from where the image is to be included, the size of the picture, etc. can be given using the attributes `src`, `height`, `width`, etc.

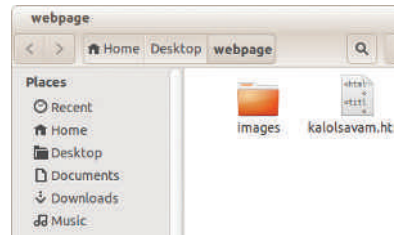
For example: ``

Attributes

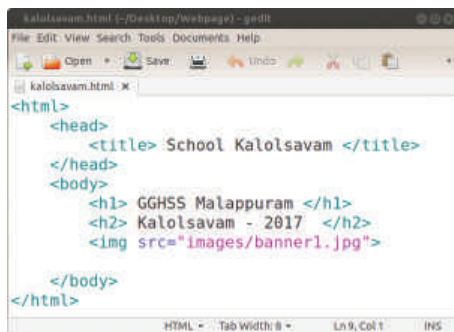
Attributes are instructions given in a tag for additions to be made in it. Attributes may be given in the opening tags only.

As you have to give instruction for inserting a picture and its position, the picture you intend to include can be saved in the folder in which the web page is saved. The pictures can be saved in a new folder (e.g. Images) inside the folder 'Webpage'.

To insert this picture in the web page, open the web page in Text editor. Type the instruction `` as in Pic. 8.6. Don't give a closing tag for this instruction. Save this web page and observe how this page appears in the browser.



Pic. 8.5 Folder in which the web page is saved



Pic. 8.6 Picture tag

The background colour of a page is one of the major factors that make a web page attractive. Background colour should suit the content and the topic of the web page.

Activity 8.5 - Change background colour

With the help of the hints given below, give suitable colour to the web page you have prepared.

- ◆ To change the background colour of the web page, an additional instruction 'bgcolor' should be given in the opening tag `<body>` (`<body bgcolor="lightgreen">`).
- ◆ You can give any background colour viz. green, yellow, blue, black, etc.
- ◆ You can indicate a colour using hexadecimal colour code instead of names of colours like green, blue, etc.

Relative path and Absolute path

The position of an image file is represented in two ways. Relative path - This is the way in which the image is inserted here. But the path to the image will be clearly defined in the Absolute path. The absolute path of the above image may be as follows: `/home/user/Desktop/webpage/images/banner1.jpg`

Hexadecimal colour code

You can mix colours like red, green, blue, etc. in various quantities to form new colours. A colour containing red, green and blue beams with the intensity from '0' to 'f', 16 codes (hexadecimal) can be represented using 6 digits. (e.g. `#5fd0ff`)

Activity 8.6 - Adding a Text

Given below is the web page prepared by Anu in which the Kalolsavam items are included (Pic. 8.7). Compare it with the Kalolsavam page prepared by you. What differences do you find?



Pic. 8.7 Web page that includes Kalolsavam items

Line by line

Even though we type the Kalolsavam items line by line in the web page source, they appear in the browser as continuous words according to the availability of space. To denote the end of a line, the tag `
` can be given to arrange the words in different lines.

Insert paragraphs

When details are entered in a web page, you may have to enter it in more than one paragraph. The text can be split into paragraphs by giving the tag `<p> ... </p>`. This is how paragraphs are inserted in a web page.

- ◆ Anu has included the Kalolsavam items in it.
- ◆ The word 'Items' is given in bold letters.
- ◆ Given colour to words.
- ◆
- ◆

You may also add the Kalolsavam items below the picture in your web page as in the given model and make changes in the page source.

Some HTML tags are given overleaf which will help you to make the words attractive (Table 8.2). You may try the tags and make the words attractive.

Objective	Tags	How to use
to make a text bold		 Kerala Nadanam
to italicise a text	<i>	<i> Nadanpattu </i>
to 'underline'	<u>	<u> Ganamela </u>
to give colour to the text		Bandmelam
to change the font		Bandmelam
to increase the size of the font		Kathaprasangam
to change the colour and size		 kathaprasangam
to align at the centre	<center></center>	<center>item</center>

Table 8.2 Formatting tools

Don't you remember the table used in the presentation software? Likewise, you can include a table in a web page and display the contents in different columns and rows.

Look at the Kalolsavam items prepared in the web page (Pic. 8.7). Now, discuss the advantages of arranging these items in two columns as shown in the picture (Pic. 8.8).

Items	
Kerala Nadanam	Desabhakthiganam
Nadanpattu	Kathaprasangam
Nadakam	Vanchipattu
Sangha Nrutham	Nadodi Nrutham
Ganamela	Vattappattu

Pic. 8.8 List of Kalolsavam items



Activity 8.7 - Let's include a table

Given below (Pic. 8.9) are the instructions to include the Kalolsavam items in a table of two columns. Like this, prepare a table in your web page. Open the browser and examine how it appears.



```

kalolsavam.html (~/Desktop/Webpage) - gedit
File Edit View Search Tools Documents Help
Open Save Undo Redo Find
kalolsavam.html x
<h4><font color="blue">Items<br></font></h4>
<table border="1"><tr><td>
<font size=4 color="red">
Kerala Nadanam <br>
Nadanpattu<br>
Nadakam <br>
Sangha Nrutham <br>
Ganamela <br></font>
</td>
<td>
<font size=4 color="red">
Desabhakthiganam <br>
Kathaprasangam <br>
Vanchipattu <br>
Nadodi Nrutham <br>
Vattappattu</font>
</td>
</tr></table>
HTML Tab Width: 8 Ln 1, Col 1 INS

```

Pic. 8.9 Table tags

The instructions to include a table and its process are given below. Complete the missing parts.

Instructions	Use
	to include a table.
<tr>	
	to include rows and columns (cell) in all lines.
<table border=1>	to make the lines of the table appear

Table 8.3 Instructions to include a table and its process

You might have seen web pages with videos in it. Now, let's see how to insert a video in the web page.

Activity 8.8 - Let's insert a video

Video files can be inserted in the same manner as image files. The videos that are to be used in the web page can be kept in a folder near the web page (e.g. "video"). Use the instruction `<video></video>` to insert the video in the web page.

Insert a video of the programmes in your web page with the help of the instructions given below and see how it appears in the web page.

```
<video width="400" height="250" controls>
```

```
<source src="video/oppna.mp4" type="video/mp4">
```

```
</video>
```

In the `<video>` tag, out of the three attributes, width and height are provided to adjust the size of the video as it appears. To show the play and stop buttons of the video, you have to include the 'Controls' attribute. Two attributes 'src' and 'type' are given in the source tag. The attribute 'src' tells you which video is to be added, and the attribute 'type' tells you which type of video is used.

e.g. `type="video/mp4"` or `"video/ogg"` or `"video/webm"`

Let's design a table

Won't it be better to add the video to the table? Discuss with your friends and find out how you can do this.

Design the page using table

You can design a web page according to your wish by preparing table/tables and include words, pictures, videos, etc. in it.



Fig. 8.10 Tables for page layout

You might have seen flash news in TV, haven't you? You can see words and pictures scrolling in various websites. You can also scroll words in your web page.

Activity 8.9 - Scrolling texts

Scroll the text 'Registration Started' below the banner of your web page.

You can scroll texts and pictures using the tag `<marquee>` `</marquee>`. Most probably words scroll from right to left in a web page. But you can give special instructions to the attributes to scroll the text rightwards, downwards or upwards.

For example: `<marquee direction=right> Registration Started</marquee>`

You might have noticed the change that happens to the mouse pointer when it reaches the top of certain words or pictures in websites. See what happens when you click on it. Another page opens. These are hyperlinked texts named Hypertext. You can give hyperlink from your web page to other pages or to the school website or School Wiki.



Activity 8.10 - Hyperlink to School Wiki

You have given the name of your school as the heading of your web page. Now, hyperlink the school name and when you click on it, School Wiki will open.

Hyperlink

`<a>` --- `<a>` is the tag which is used to give hyperlink or to make a word in a hyper text. You have to indicate the attribute "href" to denote the place to link the text.

For example, if you want to give hyperlinks in the name GGHSS Malappuram to the School Wiki, give the instruction as: ` GGHSS Malappuram `.

When you prepare your school website, the pages in it can be linked to the main page by giving hyperlink to the file name of the main page including its path.



Significant learning outcomes

The learner:

- ◆ prepares web pages using the HTML code.
- ◆ gives heading and sub heading to School Kalolsavam web page.
- ◆ inserts picture in a web page.
- ◆ changes the background colour of the web page.
- ◆ includes words/text in a web page.
- ◆ changes the size of the font, make it italics, bold, gives colour to the words in the web page.
- ◆ includes a table.
- ◆ includes a video in the web page.
- ◆ scrolls the text.
- ◆ gives hyperlink to the words in the web page.



Let's evaluate

1. Which one of the following HTML tags can be used to give the heading of a page?
 1. <title>
 2.

 3. <p>
 4. <h1>
2. Given below to the right are the HTML instructions prepared by Saleena to make a web page. Prepare a web page using these instructions. Are these instructions adequate to prepare this web page? Make necessary changes in these HTML instructions.



```
<html>
  <head>
    <title> School Kalolsavam </title>
  </head>
  <body bgcolor="lightgreen">
    <h4> GHSS Kottakkal</h4>
    <h3>Sportsday - 2017</h3>
    <h2><font color="red">Events<br></font></h2>
    <table border=1><tr>
      <td> <font size=5 color="blue">
        100 Mts Race <br>
        4x400 Mts Relay<br>
        400 Mts Race <br>
        1000 Mts Race <br>
        5000 Mts Walk <br>
      </td>
      <td> 
      </td>
    </tr></table>
  </body>
</html>
```

3. Match the list of items with the HTML instructions suitably.

1	Image	<code><body bgcolor>... </body></code>
2	Underline	<code><a>.... </code>
3	Hyperlink	<code><u>.... </u></code>
4	Background colour	<code><p>...</p></code>
5	Paragraph	<code></code>



Follow-up activities

- ◆ Prepare a web page which shows the sports activities in the school.
- ◆ Prepare a page displaying the excellence of your school. Give hyperlink to the pages.
- ◆ Include a table of Kalolsavam winners in your web page. Give different colours to the words and background of the table.
- ◆ Visit the page source of the website www.itschool.gov.in. Evaluate the usage of certain familiar instructions (*Right click → View Page Source*).
- ◆ Prepare a web page keeping in mind any of the web pages you have visited on the Internet. (Design the layout of the web page using `<table>`)



Chapter 9

Video Editing



Vipin and Varsha are preparing a video documentary of Kalolsavam programmes to be included in the Kalolsavam web page prepared by the IT Club. The details to be included in the documentary were prepared by Saleena and based on that a visual presentation was also prepared by Anu.

If you prepare video documentations of the important programmes in your school, it will be helpful for you to re-examine and publish them at a later time. Which programmes can be documented in this manner?

- ◆ Pravesanolsavam
- ◆ Sports Meet
- ◆ Independence Day Celebrations
- ◆ Tour programme
- ◆
- ◆
- ◆

Which documentary would you like to prepare? Discuss with your friends and select a programme conducted in your school for preparing a documentary.

Video editing

Video Editing is the process of arrangement of videos in a suitable manner and editing and removing unnecessary parts from a video. It also includes the process of adding dialogues, background music, special effects, title, etc. to the video and organising it for a presentation. In earlier days, tape-to-tape linear video editing using video tapes were common. Later, with the introduction of computers and video editing software, non-linear video editing using digital facilities became popular. Thus, editing a part of the video file with perfection and speed was easily possible.

Now, there are various software which help in the process of video editing. OpenShot Video Editor, Kdenlive, Kino, Pitivi Video Editor, etc. are some of the video editing software available in GNU/Linux.

Then, shoot the programme with details that you intend to include in the documentary and save them in your computer.

What else should be done to the video clips that you have saved in the computer, to combine them to make a video documentary? List the process.

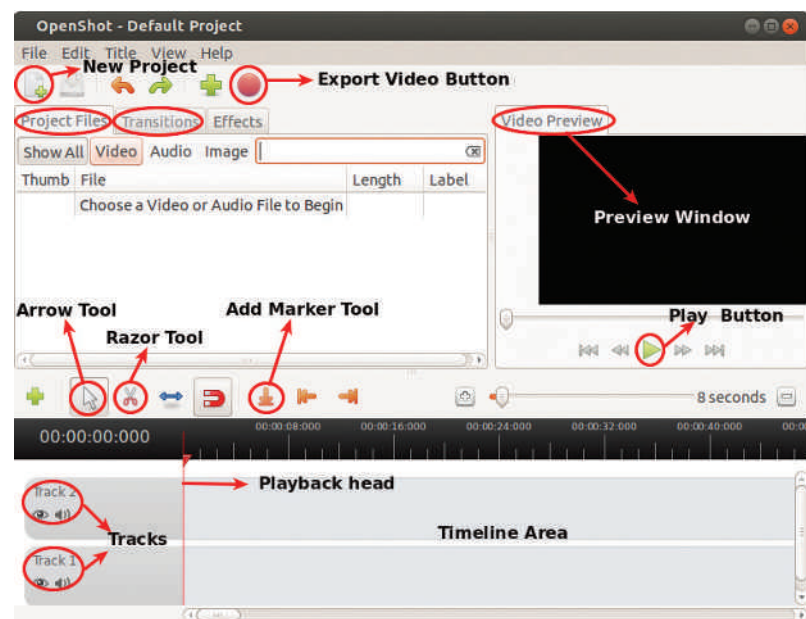
- ◆ arrange the videos
- ◆ edit and remove unwanted parts
- ◆
- ◆

You have studied the process of editing a text or image or sound in your previous class. Recall the process of editing.

Like this, let's see how you can prepare a video documentary using OpenShot Video Editor which is included in the IT@School GNU/Linux.

Activity 9.1 - Let's familiarise openshot

Open OpenShot Video Editor in your computer and examine the facilities provided in it. (Pic. 9.1)



Pic. 9.1 OpenShot Video Editor window

Activity 9.2 - Let's start a video project

You are now familiar with OpenShot Video Editor, aren't you? Now, let's start editing videos. For this, we have to start a new project.

Before we start video editing in OpenShot Video Editing, you have to decide to which file format the video file that you prepare is to be exported. Along with this you have to prepare a project profile which is suitable for the prescribed format.

You may select a profile suitable for your project by making use of the process given below.

- ◆ Select *New Project* from the *File* menu and click open the window *Create a Project*.
- ◆ In the window that opens, you may provide a name for the project, a place to save the file and a profile in the slots of Project Name, Project Folder and Project Profile respectively. Then, click on *Save Project* and save the entries made.

OpenShot video editor

OpenShot Video Editor is a simple video editing software. The project was started in 2008 by Jonathan Thomas, an American, with the aim of producing a simple and stable video editor for GNU/Linux. Within two years he produced a stable version. The OpenShot Video Editor developed using Python programming language supports many other video file formats.

While selecting Project Profile

There is a possibility of a difference in the quality of the video that is exported, if you do not set the Project Profile in a suitable way. If you propose to export the video files to a more qualitative format, then, you can set the Project Profile in DV/DVD PAL. You can also include a new profile in OpenShot by clicking on in the order *Edit* → *Preferences* → *Profiles* → *Manage Profiles*. The new versions of OpenShot supports HD, HDV (High Definition) video formats also.

Now, you may open the software and save your file, selecting a project profile suitable for your video documentation.

Activity 9.3 - Include files

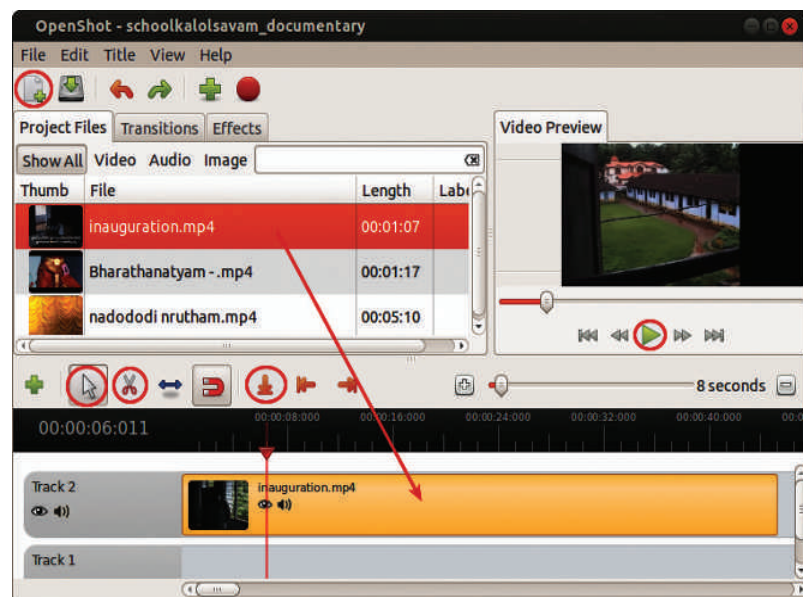
You have saved the collected video clips in your folder, haven't you? You have to include these video clips in the timeline in OpenShot and then perform the editing process.

Timeline

In the video editing software, film, picture, sound, title, etc. can be edited at the timeline based on their timing. In a timeline, normally there are video and audio tracks. The process of editing is done by inserting the video files in the video track and the audio files in the audio track. But in the existing version of OpenShot there is no separate track for sound clips. Instead the video clips or video tracks are disabled and they are changed to audio clips/tracks.

Insert the clips in the time line based on their time with the help of the instructions given below:

- ◆ You can include a video or an audio file which you want to edit in OpenShot project using the **File → Import Files**.
- ◆ The files you have included can be seen in the **Project Files** section.
- ◆ Video transition, video/audio effects are set in **Transitions, Effects** tabs respectively.
- ◆ Drag the video clips you want to edit from Project Files in their chronology of time to the timeline tracks (Pic. 9.2).



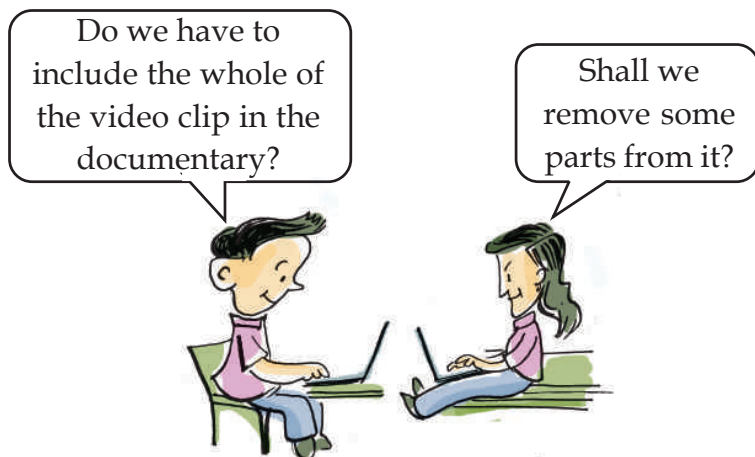
Pic. 9.2 When videos were included in the track

- ◆ You can run the clips or stop running them by pressing the Space key in the keyboard or click on the **Play/Pause** button in the video preview window.




You may include the parts of the video from the Project Files to the **Timeline track**. You can add or cut files in these tracks.

Activity 9.4 - Let's compile video files

When the video clips that were to be edited had been dragged and played, Vipin and Varsha had some doubts regarding them.



How can you remove the unwanted parts from a video?

- ◆ Identify the part to be removed by moving the *Playback head*.
- ◆ Mark the part to be removed using *Add Marker Tool* . To avoid the marking, right click on it and click on *Remove Marker*.)
- ◆ You can cut the marked parts using the *Razor Tool*  (Pic. 9.3).
- ◆ If you want to delete an unwanted part of the video from the track, Right Click on the video using the *Arrow Tool*  and click on *Remove Clip*.

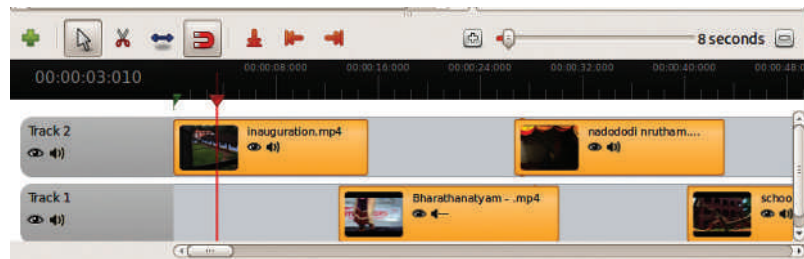
You have removed the unwanted parts from the video clips. Now, include the existing video parts in the track and edit them and arrange them (Pic. 9.4).

Playback head

The video clips in the track appear in the video preview according to its position on the Playback Head tool. When you activate the Play button on the timeline, the Playback Head starts moving through the clips on the track. During its movement, the Playback Head displays/produces sounds of all the files on the track on its path. While displaying, the priority will be given to the video clips on the top of the track. If there are no videos on the top track, the Playback Head displays the video file placed in the track just below. But for audio clips this file is not considered.



Pic. 9.3 When a video clip is cut using Razor tool



Pic. 9.4 When the edited video parts are arranged on the track



Slide transition

You know how to prepare a slide presentation using the presentation software. You have also studied how to make the presentation attractive by giving slide transition effect to the slides.

You usually use the technique of slide transition when you have more than one slide to present. What are the advantages of providing slide transition effect to slides?

- ◆ Ideas in each slide will be carefully viewed by the audience.
- ◆

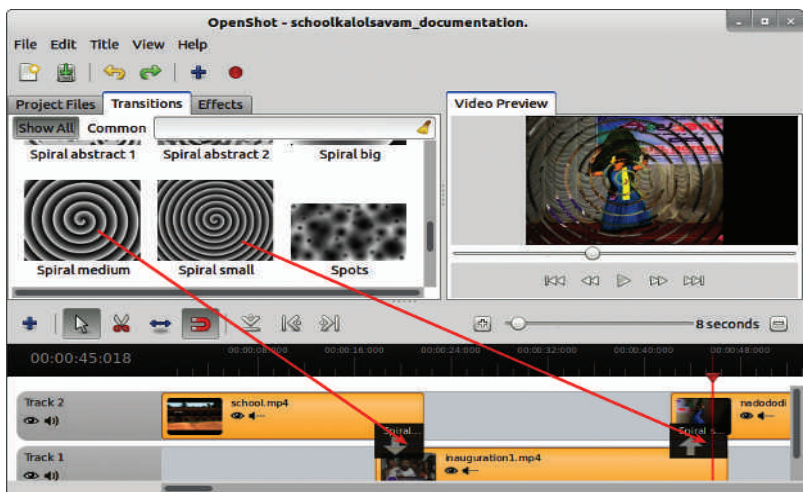
Activity 9.5 - Let's effect transition

In films and telefilms, transition effects are provided in between scenes to realise the change of the scene. The video documentary that is prepared by you can also be made attractive by providing transition effects. For this, follow the process given below.

- ◆ Click on *Transition* tab.
- ◆ Include suitable transition effects in between the video clips that are arranged in the track (Pic. 9.5).

Special Notice

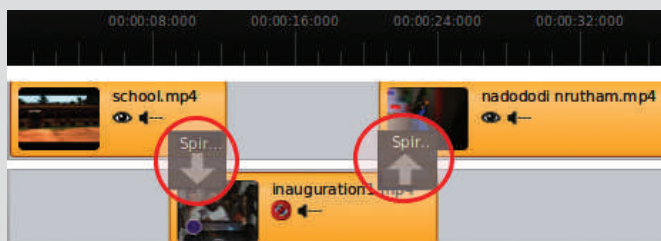
Do not forget to save each activity that you perform while editing. Then only it will be saved in the file. So, click in the order *File* → *Save Project* and save the project intermittently. The OpenShot project file format is osp.



Pic. 9.5 When the videos were provided transition

While providing transition

Arrange the video clips on the top track and just below it to provide transition between the two video clips. Select a suitable transition from the *Transition* tab and drag it to the place where the video clips join together. Right click on the transition and click on *Switch Direction*, if you wish to change the direction of the transition. Observe Pic. 9.6.



Pic. 9.6 Adjusting the direction of transition

The transition time included in between the video files can be adjusted using the *Resize* tool. For this, click on the *Resize* tool and then click on the first or last part of the transition and drag according to the length you wish.

Activity 9.6 - Add effects

You might have understood how transition effect can be added to the place where two video clips join together. Apart from this, provision for adding effects to all video clips is possible in OpenShot Video Editor. Follow the process given below and add suitable video effects to the clips.

- ◆ Right click on the video clip which you have included on the track.

- ◆ Provide effects like *Fade*, *Animate*, etc. one by one to the video clips and play them through *Video Preview* window and see how they work.
- ◆ Identify effects and include them to the video clips suitably.

Collecting audio files


Do you wish to include a description along with the documentation? For this, first you have to prepare the text to be included as description. To include the description into a video file, it has to be converted into a digital format.

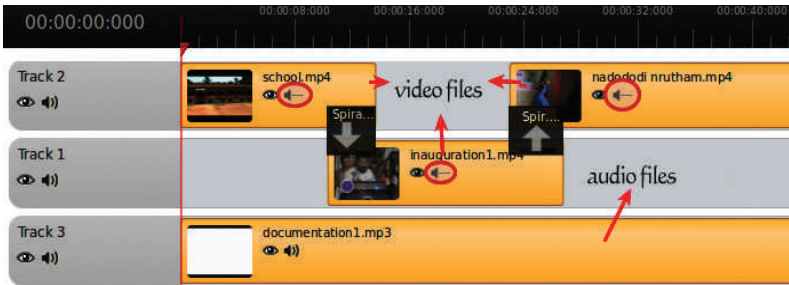


Record the text for description using Sound recording software and convert it to an audio file format (wav, mp3, ogg). Save it in your folder. You can either use Sound Recorder or Audacity software which you have familiarised in Standard VIII. If you intend to add music, collect such files in your folder well in advance.

In the timeline of OpenShot Video Editor, there are normally two tracks. If we include videos in the two tracks, how can we include an audio file in it? We need a new track for this purpose. See, how can a new track be added and how the sound file can be inserted?

Activity 9.7 - Include sound files

- ◆ To add a new track, click on *Add Track*  icon or right click on the existing track and then click on *Add Track above/Add Track below*.
- ◆ Include the sound files in the track as you have included the video clips in the track (Pic. 9.7).
- ◆ To give sound or description to a video, place the sound clip in the track below the concerned video clip.
- ◆ If the sound that exists in the video clip is not needed, remove that sound and include the new sound. Click



Activity 9.7 Sound file included in the track

on the audio icon (*Speaker* symbol) and you can disable the audio.

Titles

You have seen in the beginning and end of documentaries and films, the names of persons who worked behind such films (titles). Like this, you can also include titles/courtesies in your documentary. Note down the titles you intend to include in your documentary.

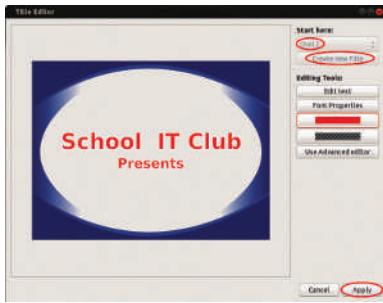


- ◆ School IT Club presents
- ◆
- ◆
- ◆

Now, perform the following activities.

Activity 9.8 - Let's include titles

- ◆ Open the Project and select *New Title* from the Title menu. Now, open the *Title Editor* window (Pic. 9.8).
- ◆ Select a title style from the box on the right side. Then, click on *Create New Title* to give a file name for the title. (Each title should be saved as a separate file.)



Pic. 9.8 Title Editor window


To move the video clips which are added on the track to a slight distance forward

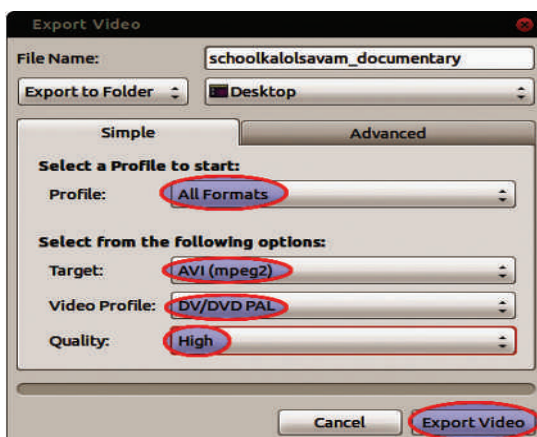
If you want to move the video clips which you added on the track to a slight distance forward, right click on the video clip and click on Shift clips in the window that appears. Then, type the time (in seconds) and move the video clips to the desired distance forward.

- ◆ Include the title in the window that appears and click on *Apply*. The title returns to the *Title Editor* window (Pic. 9.8).
- ◆ When you give Apply on the *Title Editor* window, they appear on the part of Project Files.
- ◆ You can include the titles from here by dragging them to the track and arranging them in the place where you want them to be as you have included the video files earlier.

Activity 9.9 - Export the project

The video and audio files are now placed in different tracks in OpenShot. If you want to make this file work as a video, it has to be converted into a video file. Then, you can play it using a media player. You can export your project file to video format by following the process given below.

- ◆ Save the project.
- ◆ Open *Export Video* window either by clicking on *Export Video*  button or by selecting *Export Video* from the *File* menu.
- ◆ Type the file name and select the folder to be saved, profile, additional options of the profile, etc. (Pic. 9.9)



Pic. 9.9 Export Video window

- ◆ Close the project window when the process is completed.

Video file formats

Digital videos are stored in data computers in various video file formats. Some of the important video file formats are ogv, mpg, mp4, avi, flv, mov, wmv, 3gp.

Convert image files to video files

You might have stored many photographs of festivals/programmes held in your school. Don't you like to make a video file compiling all the photographs you have stored? This facility is available in OpenShot Video Editor. Follow the process given below.

- ◆ Open OpenShot software. Include all the image files into the Project files section of OpenShot.
- ◆ Select the images that are to be included in the video files (Ctrl+A).
- ◆ Right click on the selected image files and then click on *Add to Time Line*.
- ◆ On the window that opens, click on *Transition, Transition time*, etc. seen on the *Transition* tab. Then, click on the *Add* button.
- ◆ Now, the image files are given transition and are arranged on the track.
- ◆ You may export this to a Project Video file.

Activity 9.10 - Let's play the videos

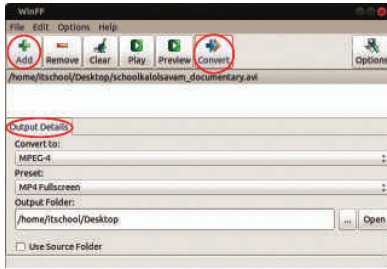
Did you play in the computer the video files you have exported? You can do this in two ways: Double click on the video files or follow *Right Click → Open with* and select a suitable media player and play the video files. Can you open your video documentary in all the media players in the computer? This video may not work in websites, tablets, etc.

In such cases, these video files can be converted to other file formats with the help of software. WinFF, HandBrake, etc. are software which helps to convert these file formats in GNU/Linux system.



Activity 9.11 - Change video format

Let's convert the video documentary that we have prepared using WinFF software. For this, follow the steps explained below:

- ◆ Open WinFF from *Sound & Video* menu.



Pic. 9.10 WinFF window

- ◆ Select the details of the format you have to convert and the folder in which you have to save the project, from the columns seen below *Output Details* (Pic. 9.10).
- ◆ Click on the *Add*  button to include the file for which the format is to be changed, into the software.
- ◆ Then, click on *Convert*  button.

Close WinFF window when the process is completed. Now, check the output folder. You can see the file in it with format change.

You may include this video documentary in the web page that you have prepared earlier.



Significant learning outcomes

The learner:

- ◆ opens OpenShot Video Editor software and identifies the various tools available in it and list them.
- ◆ collects video or audio files in the computer for editing and includes them in OpenShot project.
- ◆ drags each file to the Timeline area on the track and plays them using Playback head and avoid unnecessary parts and arrange them accordingly.
- ◆ includes transitions and effects in the audio - video files to get better comprehension and conveys ideas.
- ◆ includes titles and dialogues in a video documentary.
- ◆ exports a Project file to a suitable video file format.
- ◆ combines various image files into a video file.
- ◆ plays video files in various media players.
- ◆ changes the format of audio or video files using software.



Let's evaluate

1. Which among the following is a video format?
(a) mp3 (b) wma (c) wav (d) avi
2. What is the need of exporting a Project file into Video Editing software?
3. Prepare titles for the video documentary related to a tour programme of your school in OpenShot Video Editor software.



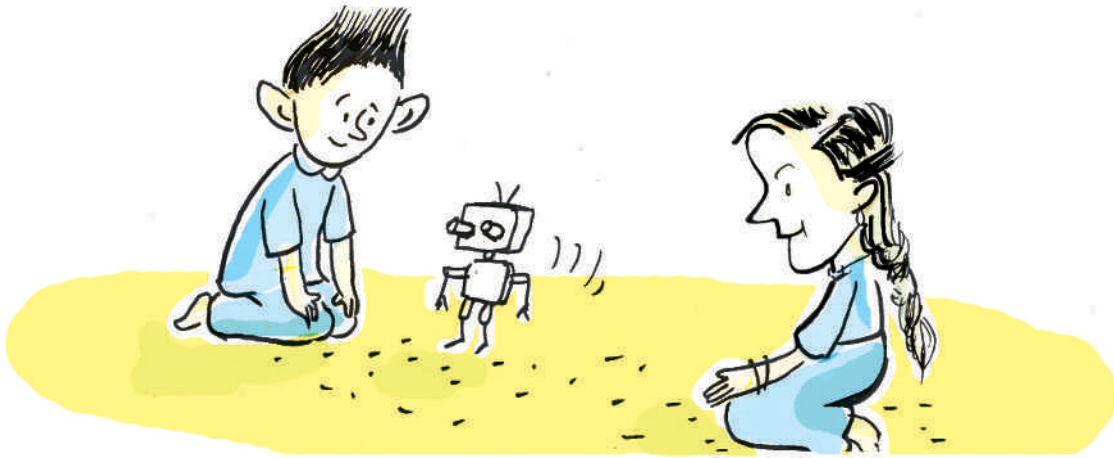
Follow-up activities

1. Prepare a video documentary on the life of the famous poet ONV Kurup collecting his poems, video clips and images from the Internet.
2. Prepare a documentary of the annual report to be presented on the School Annual Day using OpenShot Video Editor software.
3. Prepare a short film using OpenShot Video Editor software on the topic 'Drug Abuse among School Children'.
4. Convert a video file you have prepared to another video file format with the help of WinFF software.

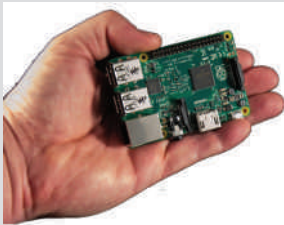


Chapter 10

Inside the Computer



Raspberry Pi



Raspberry Pi is a credit card sized computer. The facilities that are available in a normal computer are also available in it. But this consumes only very low electricity. This computer is designed mainly for educational purposes. But various computer programs can be prepared with the help of this computer. Using these kinds of programs, this computer has facilities to control external equipment also.

Atul and Divya, who won prizes in IT Quiz competition, came to school with two tiny boxes. Everybody was astonished when Atul told that the box contained a small computer named Raspberry Pi. Kunjamina expressed her doubt whether a computer can be made in such a small size. Jobin at once cleared the doubt by saying that most of the smart phones can perform all the tasks performed by a computer.

Have you ever thought of how the computers are varied in size, performance and facilities? You know that equipment like smart phones and desktop computers work with the help of a number of big and small components.

Day by day changes occur in the size and shape of computers and its allied instruments because of the high leap in the field of electronics and information communication technology. What other changes do you observe?

- ◆ reduction of size
- ◆ storage capacity increases

- ◆
- ◆

Have you ever thought what process goes on in a computer when it works?

A computer stores the data that is received through the input devices and gives back whenever required using the output equipment. We have familiarised ourselves with some of the input and output devices we use, in the previous classes. Try to remember those devices.

The picture of an old model of a major input device is given in Picture 10.1. Can you identify the device? This is the old model of a significant input device called mouse. Identify the differences between the old mouse and the mouse we use today. Like this, drastic changes are occurring in most of the equipment related to computer.



Pic. 10.1 Old model mouse

In desktop computers, all components other than input - output devices are kept inside a box called cabinet. How are components like monitor, keyboard, mouse, etc. connected to the cabinet? These are connected to the ports seen in the cabinet of the computer using different kinds of connectors. You have identified the differences occurred in the shape and function of a mouse, haven't you? Likewise, the system of connecting the input and output equipment to a computer also has changed a lot.

Activity 10.1 - How to connect?

Interfaces of certain equipment and their names are given in the table below. Examine the computers in your school computer lab and write down in the table (Table 10.1), the names of equipment that can be connected to each interface.

Examine how the keyboard and mouse that you use is connected to the computer. Instead of using various types of ports as in earlier days, USB ports are used more

Are all the input and output equipment connected to the computer in the same manner?









Connectors	Equipment	Ports
 <p>PS2</p>	<p>Mouse</p> <p>Keyboard</p>	
 <p>VGA (Video Graphic Array)</p>	<p>.....</p> <p>.....</p>	
 <p>USB (Universal Serial Bus)</p>	<p>.....</p> <p>.....</p> <p>.....</p>	
 <p>R J 45</p>	<p>.....</p> <p>.....</p> <p>.....</p>	
 <p>TRS (Tip-Ring-Sleeve) Connector</p>	<p>.....</p> <p>.....</p> <p>.....</p>	

Table 10.1 Various ports and connectors

Be Careful!

Carefully fix the connectors to the ports or else the pins in the connectors will get broken or bent. This will lead to disruption of information transfer and the equipment may get destroyed.

nowadays. What are the advantages of using USB connectors? Modern computers need no ports or connectors for different equipment. Moreover, the rate of information transfer using USB technology is too high.

You have seen devices that can be connected using USB.

Which output devices are used to present the visuals from a computer?

- ◆ monitor
- ◆ projector

The output devices used to present the visuals from a computer is the monitor (Pic. 10.2). What kinds of monitor do you know? List them.

- ◆ CRT monitor
- ◆ LCD - TFT monitor
- ◆

Did you understand that monitors are connected to computers using Video Graphic Array (VGA) adaptors? High Definition Media Interface (HDMI), Digital Visual Interface (DVI), Display port, etc. are some of the modern interfaces that are used to transfer the audio-video data between equipment. You may collect more information about these interfaces with the help of internet.

The data that we give as input in various methods are later given as output through a complicated

Universal Serial Bus (USB)

USB is an advanced technology that helps in the speedy transfer of information between equipment. Apart from ordinary USB connectors, micro USB connectors to be used in mobile phones and cameras are also available now. This helps for providing power to the machine also. You might have seen mobile phone chargers, fans, lights, etc. working using USB. Nowadays, in new generation equipment, we use USB 3.0 which can transfer information more speedily.



Pic. 10.2 Monitor

Visual display unit

Monitors are commonly known as Visual display units. They use various kinds of technology.

Cathode Ray Tube (CRT) monitors consume more electricity than other monitors.

But the Thin - Film - Transistor (TFT) and Liquid - Crystal - Display (LCD), monitors that we use nowadays consume very low electric power and is more clear and vibrant.

Light Emitting Diode (LED), Organic Light Emitting Diode (OLED) technologies are also commonly used in display units. They provide clear and vibrant screen and will also provide visual clarity.



processing. This is done with the help of microprocessors in the Central Processing Unit (CPU) of the computer. This kind of highly important microprocessors are fixed inside a computer.

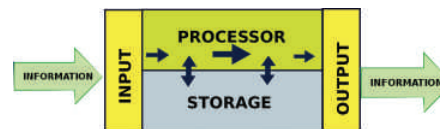


Illustration 10.1 Working of CPU

Those who leave the stage



With the advancement of modern technology, many sources and components are replaced with new technological devices. The PS2 ports used for connecting the mouse and keyboard, serial ports used for connecting printers and the parallel ports are examples for such replacements.

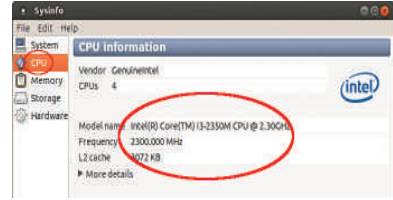
Analyse the picture given (Illustration 10.1). Microprocessors help to make basic mathematical calculations and control the activities of input and output equipment in the computer. The joint activities of the software and other peripherals in the computer help in getting the necessary information through output devices.

Do you think that the microprocessors used in different computers have the same speed and same efficiency? How can you identify the features of the processors used in your computer.

You can know the details of the computer and the peripherals in it without opening and examining them. Many applications are available for this. *Sysinfo* is such an application available in your computer.

Activity 10.2 - Different kinds of Processors

Open Sysinfo software in the computer (Pic. 10.3). Observe the features of the CPU in the systems used by you and your friends. Who is the manufacturer of the processors? You may use the information given below.



Pic. 10.3 Sysinfo window

Clock speed and cache memory

When a computer works, a number of information is transferred from the CPU and to the CPU many times within a second. The rate of information transfer in a processor is referred to as frequency or clock speed. If the clock speed of the processor is more, then the instructions it handles also increases. Clock speed is normally measured in unit Hertz (Hz).

When the CPU works, it depends mainly on the primary memory of the computer. Sometimes the CPU which works very fast may find it difficult to get the information in time. Hence, facility is available in the processor to retain the frequently used information in the CPU itself. This is cache memory of the CPU. Processors differ in their levels of cache memory.

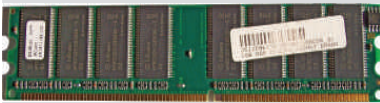
System	Model	Frequency	L2 Cash
• System 1	•	•	•
• System 2	•	•	•
• System 3	•	•	•
• System 4	•	•	•

Table 10.2 Features of the processor

Examine what additional basic information you can collect about your computer which is available in Sysinfo.

You might have understood that there are different kinds of microprocessors. The microprocessors used in a computer are the major factors which influence the working speed of that computer. The microprocessors contain a number of very small electronic components which get heated while working. To absorb the emitted

Random Access Memory (RAM)



Drastic changes happen to the structure and storage facility of RAM. We use big size RAM in desktop computers and smaller size RAM in laptops. In gadgets like smart phones, tablets, etc., the RAM is inbuilt in the mother board. Nowadays we use RAM which have many times storage facility than the RAM used earlier.

heat, heat sink and a small fan is attached to the processor. New generation processors have the technology which enables them to handle many instructions at the same time. Frequency, cache memory, the speed of information transfer to other components outside the processor, etc. are features related to the efficiency of processors.

The information and instructions handled by the microprocessors will be in the memory of the computer. Where is the memory of the computer situated?

Imagine that you are preparing an article in Word Processor software. If the power supply goes out, your file will be lost. But what if you have saved the file? The file can be used again. The file was in the temporary memory of the computer before it was saved. But after the file is saved, it is sent to the permanent memory.

Permanent memory and temporary memory

Computers store temporary information files in RAM, a component which is made up of IC chips. When the power supply goes out, the data stored in the RAM gets lost. The operating system and the hard disk which stores all the files are considered as permanent memory of the computer.

If you increase the storage capacity of the RAM, the processing speed of the computer increases. Examine the RAM available in your computer lab. You can see the name of the manufacturer and the storage capacity of the RAM. Examine and record these details.

Activity 10.3 - Know the storage capacity of RAM

You are now familiar with the Sysinfo application which helps you to know the details of the components in it. Now, find out the capacity of the RAM in your computer and write it in the space below.

◆

How much percentage of the capacity of RAM is now utilised by your computer for its working?

◆

In some tasks like video editing, more memory than the capacity of the RAM may be used for its functioning. A part of the hard disk is kept apart for these purposes. This is called Swap Memory.

How much is the Swap Memory available in your computer?

◆

Hard disks

You have seen that the permanent memory of the computer is the hard disk. Normally all files including pictures, music, videos and the operating system of the computer is stored in the hard disk. Hard disk drives of various storage capacities are now available. Try to find out the storage capacity of the hard disk in your computer. Is this facility available in Sysinfo? Examine.



Becoming smaller

The vacuum tubes used in earlier computers were very big in size. After making transistors using semiconductors, the size of computers became small. Later after the invention of integrated chips which contained millions of transistors, the size of electronic equipment became smaller in size and the efficiency went up.

Units of data storage

The basic unit of the capacity of data storage devices is bytes. A byte is eight bits. Bit is a word formed from binary digit. A bit is a value of either a 1 or 0 (one, zero). You have studied about these values in the unit 'Programming'. A kilobyte is 1,000 bytes. Then, higher units like Megabyte (MB), Gigabyte (GB) and Terabyte (TB) are formed. In the place of Kilobyte and Megabyte units like Kibibyte (KiB) and Mebibyte (MiB) are also used. For more details visit the link <http://en.wikipedia.org/wiki/Kilobyte>

Activity 10.4 - Let's find the storage capacity of the hard disk

Open *Disks* software in the operating system of your computer.

Paths of information transfer



The paths used to transfer information between computers or between the components in the computer are called bus. Nowadays Serial Advanced Technology Attachment (SATA) cables are used to connect DVD drive and hard disk drive to the mother board. This helps for speedy transfer of information.

Identify the storage capacity of the hard disk in your computer and write it down.

.....
 Connect a USB flash drive to the USB port of the computer. Examine the storage capacity of the USB drive.

Which are the data storage devices used nowadays?

- ◆ Hard Disk Drive (HDD)
- ◆ Solid State Drive (SSD)
- ◆ Secure Digital Cards (SD Cards)
- ◆
- ◆

You may collect more details regarding this with the help of internet.

Motherboard

You are now familiar with the components of a computer like CPU, RAM, hard disk drive, etc. When the computer works, all these components and other parts of the computer have to exchange the data. How is this possible?

This happens through the mother board or the main board. Mother board is a complicated circuit board which contains a number of electronic chips and electric circuits. All these components in the computer are connected to the mother board. The connectors of the input-output equipment are also connected to the mother board. Slots for connecting the expansion cards can also be seen in the mother board. Now, you might have understood how mother board got its name.



Pic. 10.4 SMPS

Switched Mode Power Supply (SMPS)

You have seen the components connected to the mother board. Electricity is a major component for the transfer of data. There are small and big components in

the computer. Do all these components need the same quantity of power? Regular and accurate quantity of power supply to components like mother board, processor, hard disk, DVD drive, etc. is carried out the equipment called Switched Mode Power Supply (SMPS) (Pic. 10.4).

What process should be started when you power on the computer? You know that the operating system is in the hard disk. This should reach the RAM which is the temporary memory. All the components including the CPU should become functional. Where will these components get the instructions from?

Examine Illustration 10.2. All these components function from the instructions they get from the chip called Basic Input Output System (BIOS) which is fixed in the mother board.

When you switch the power on, the first process that take place inside the system unit is known as Power-on Self-test (POST). This is a test to examine whether the components in the computer are functioning properly.

What happens after the 'Power-on Self-test'?

Booting is a process by which the operating system in the hard disk starts functioning.

Will the date and time go wrong even if you do not use the computer for many days? This is always accurate even if there is no power supply because of the function of a CMOS battery that is fixed on the mother board near the BIOS chip.

Activity 10.5 - Identify the major components in the Motherboard

The mother board of a desktop computer is given in Pic. 10.5. Observe a mother board available in your school computer lab. Compare the mother board with the model (Pic. 10.5) and identify the parts. Complete the table given (Table 10.3).

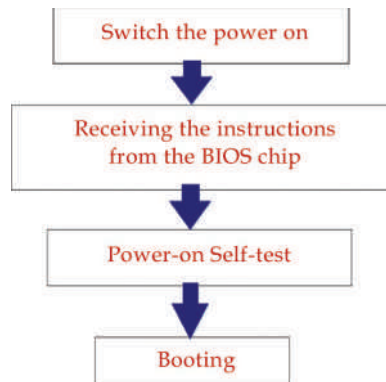
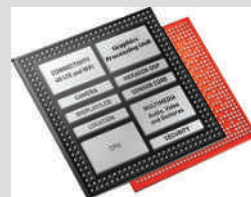


Illustration 10.2
Flowchart of Booting

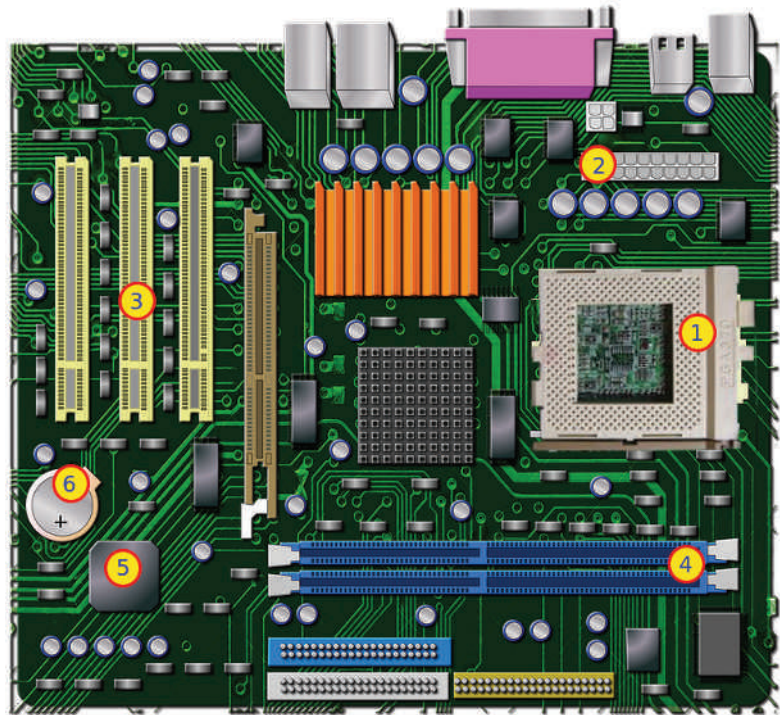
System on Chip (SOC)



These are Chips in which all the components of the computer are included in one integrated circuit. The processor, RAM, data storage systems, USB ports, etc. are all included in one Chip. In the processors of tablets and smart phones, along with the CPU, facilities for receiving audio, video and wireless will be included.

No. in the picture	Name of the component in the motherboard
1	• Processor socket
2	•
3	•
4	•
5	• BIOS chip
6	•

Table 10.3 Components in Motherboard



Pic. 10.5 Model of Mother Board

Green computing

Green computing is the environment friendly way of designing, manufacturing and using electronic devices. It also includes the disposition of defunct materials and wastes in an effective manner.

The worn out computer parts, damaged or complaint phones and other electronic wastes have become causes for pollution. Electronic wastes (E-wastes) affects living beings and environment badly.

Buying more durable equipment, using less energy consumable equipment, etc. are aspects of green computing. What else can we do in this respect?

- ◆ Properly shut down the electronic equipment and computer after you have finished working on it.
- ◆ Take less prints in papers.
- ◆
- ◆

What will happen next?

Innovative development in the field of science and technology has brought about drastic changes in the shape and working of computers. The uses and services of computers have encroached almost all sectors. This has moved beyond the mobile phones and computers to the concept of Ubiquitous computing. The facilities of the computer and its services in the future can only be dreamt of.



Ubiquitous computing

Ubiquitous computing is a situation in which the computer technology reaches you at the place where you are in the world. This can be used in any instrument, in any place and in any manner you like. Imagine a situation in which the internet, mobile phones, electronic chips, Global Positioning System (GPS), etc. come to your help even if you are on the road, or in a vehicle or in the kitchen.

For more details: https://en.wikipedia.org/wiki/Ubiquitous_computing



Significant learning outcomes

The learner:

- ◆ fixes and turns on the cabinet of the computer, the input and output devices in the proper manner.
- ◆ gets a knowledge about the various visual display units and the display port technology which is used to connect them using HDMI and DVI and tabulate them.
- ◆ uses applications like Sysinfo, Disks, etc. to identify various components in a computer, its features and storage capacity.
- ◆ identifies and tabulates the ports and slots for connecting the components to the mother board.
- ◆ collects, prepares and present notes based on the changes that happens to the information technology sector.



Let's evaluate

- Find the odd man out and explain.
 - HDMI
 - DVI
 - Display port
 - Network cable
- Where does the computer get the instruction to load the operating system when you switch on the computer?
 - Hard disk
 - SMPS
 - DVD drive
 - BIOS chip
- Which one of the following does the speed of the computer depend on?
 - Frequency of the processor
 - Storage capacity of the RAM
 - Cache memory of the processor
 - All of these



Follow-up activities

- ◆ Conduct a hardware exhibition in your school collecting the unused or damaged parts of the computer as part of the school IT corner activities. Exhibit the computer parts with their details in writing.
- ◆ Compare the features like storage capacity, processor, RAM, etc. of various smartphones from the details you can collect from newspaper advertisements.
- ◆ Conduct a seminar in your class on the changes that had occurred to the following components. You may collect details from the Internet. You may divide the class into groups and assign each component to each group. You can present it including pictures with the help of the presentation software.
 - mouse
 - keyboard
 - processor
 - monitor
- ◆ List down the E-waste materials in your school and house. Suggest ways to eradicate them safely and publish the details in the school notice board.

