

INFORMATION AND COMMUNICATIONS TECHNOLOGY

Standard IX

Part 1 $\frac{1}{2}$



Government of Kerala
Department of General Education

State Council of Educational Research and Training (SCERT), Kerala
2019

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

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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. J. Prasad
Director
SCERT, Kerala

CONSTITUTION OF INDIA

Part IV A

FUNDAMENTAL DUTIES OF CITIZENS

ARTICLE 51 A

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

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

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Icons used in this book for easy reference



For further reading
(Not to be evaluated)



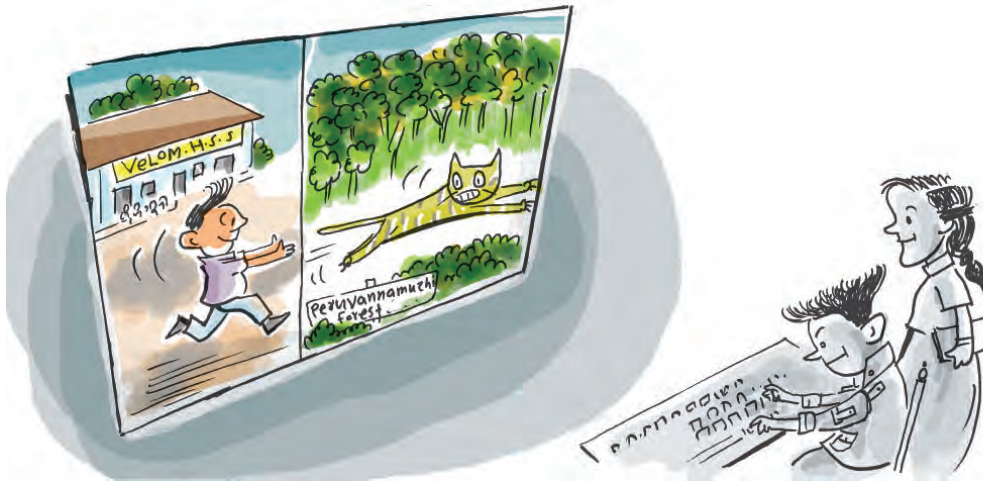
Let's evaluate



Extended activities

Chapter 1

Layout of Pictures



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

- Ken Robinson

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



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?

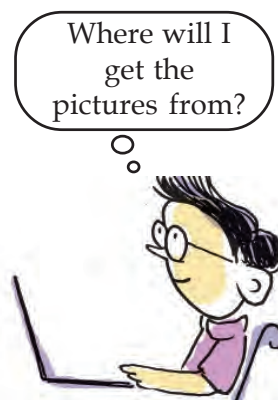
- ◆ Collect pictures required for preparing the poster in your computer.
- ◆ Provide suitable background colour for the poster.
- ◆ Include all the pictures/images or parts of the images based on the topic, on a canvas in such a way that they communicate the idea.
- ◆ Make the poster attractive using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



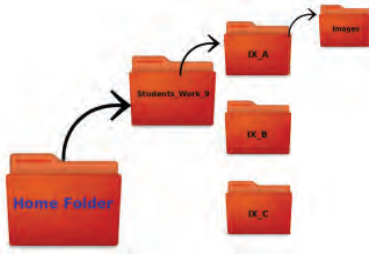


Illustration of the structure of the folder in which the file is to be saved

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 Fig. 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.

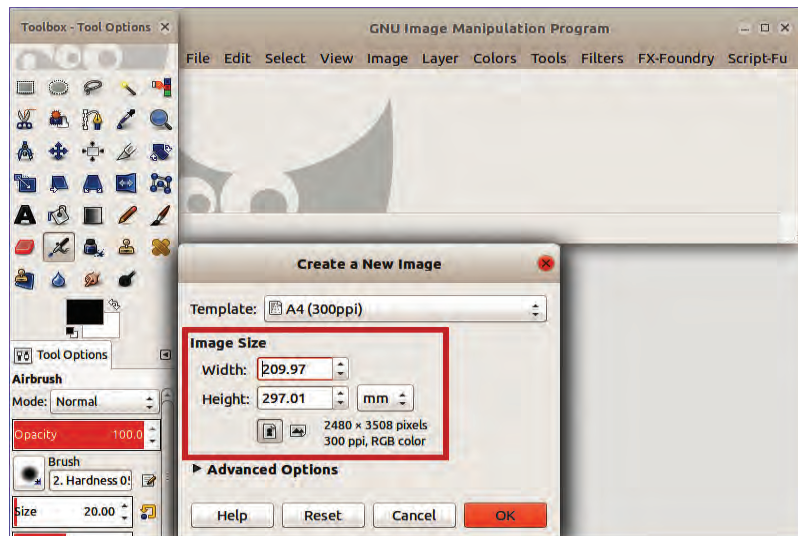



Fig. 1.1 Window and toolbox for creating a new canvas in GIMP

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. Observe the various *selection* tools in *GIMP* (Fig. 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 Fig. 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* (Fig. 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



Fig. 1.2
GIMP Toolbox

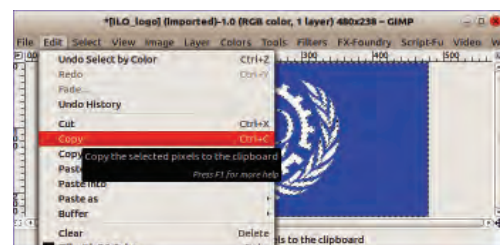


Fig. 1.3 Edit Window

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.

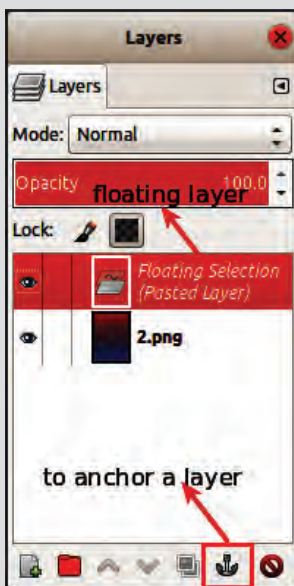


Fig. 1.4 Floating layer

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*. (Fig. 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* (Fig. 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 (Fig. 1.7). If the *Layer Palette* is not visible in GIMP then, select *Dockable Dialogs* from the canvas *Windows* menu and click on *Layers*.

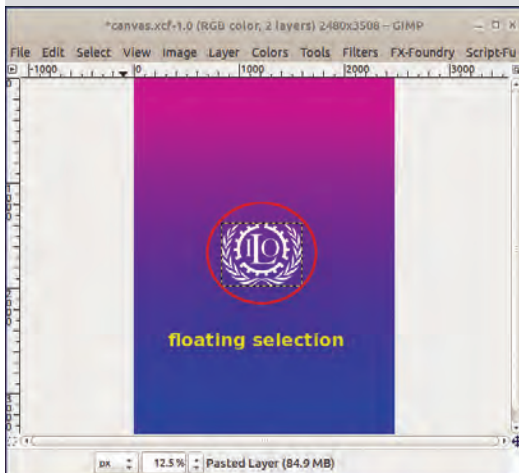


Fig. 1.5 GIMP canvas

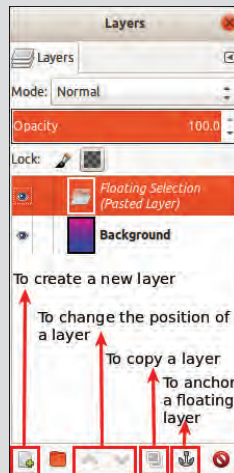


Fig. 1.6 Layer Palette

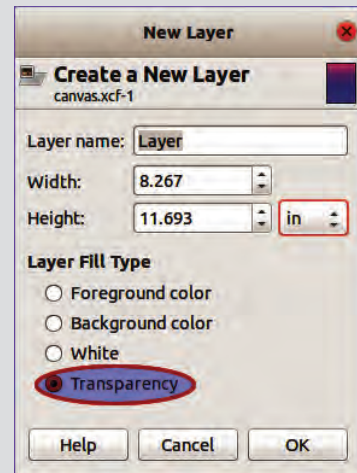


Fig. 1.7 Layer Properties window

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 select in rectangle shape
Ellipse Select
Free Select
Fuzzy Select
Select by Color
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 the icon *Create a new layer* on the *Layer Palette* before pasting the picture. (Fig. 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* (Fig. 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.





Fig.1.8 Poster

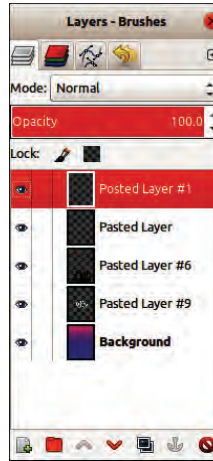


Fig. 1.9 Layer Palette

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 (Fig. 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. (Fig. 1.11) Can't you see more than one layer? When we copied the logo, only the active layer was copied.



Fig. 1.10 Logo

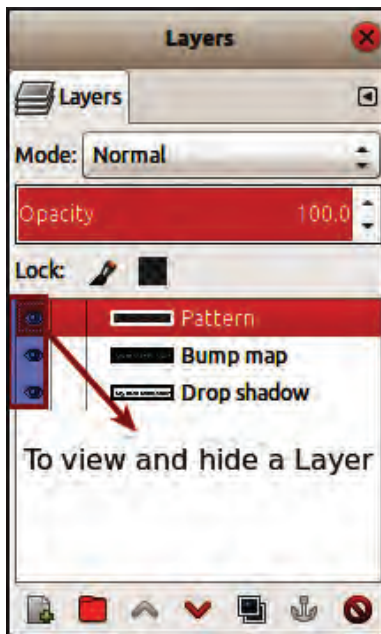


Fig. 1.11 Layer Palette

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?

Don't you see an eye shaped icon (*Eye Icon*) on the *Layer Palette* of the logo (Fig. 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 (Fig. 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 Fig. 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 (Fig. 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.

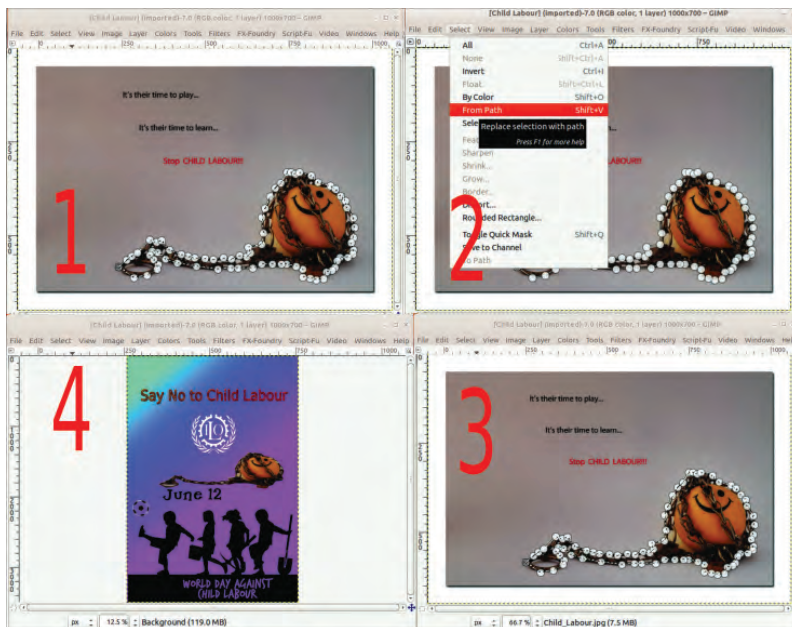


Fig. 1.12 Various steps/stages while using Paths tool



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.

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.



Let's evaluate

- 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?
 - The picture did not get pasted on the canvas.
 - The picture was pasted on the background of the canvas.
 - The Move tool did not function properly.
 - The picture format did not support the process.
- 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.
- From the procedures given below, choose the correct one which is used to rename a layer in *GIMP*.
 - Click on the *canvas*.
 - Click on the *Layer Palette*.
 - Right click* on the layer.
 - Click on the *Floating layer*.
 - Design a poster using *GIMP* to create awareness about the importance of organ donation. Make use of the details given below.

Hints:

- ◆ Include a message in the form of a logo on the importance of organ donation.
- ◆ Arrange the pictures of the organs of the human body in an attractive manner.
- ◆ Export the poster in png format.



Extended activities

- ◆ Your class is preparing a science magazine based on the unit *Protectors of Biosphere* of your Biology textbook. The magazine explains the contributions of scientists who explained the procedure of Photosynthesis. Prepare a cover page for the magazine using *GIMP*.
- ◆ Design and exhibit posters in *GIMP* that highlights the message *Cleanliness of the surroundings is as important as Personal Hygiene*.
- ◆ Organize a digital poster competition on the topic *Wars Lead to Total Destruction*.



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.

Complete the following table by finding out the letters used to coin the compound letters (Table 2.1).

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	

Table 2.1 Compound letters

Look at the following Table 2.2 and understand the keys used to arrange 'Chillaksharangal'.



ചില്ലക്ഷരങ്ങൾ	
ർ	\ റ്
ൻ	v ന് n
ൾ	* ഴ 8
ൺ	x ഴ് 6
ൽ	> ൽ .

Table 2.2 Keys used to arrange 'Chillaksharangal'

Type the following words.

കർഷകൻ, അവൻ, മതിലുകൾ, മൺപാത്രം, രാപകൽ.

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 (Fig. 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 (Fig. 2.2). Here you will see that they have made many improvements to the paper. What improvements have they made? Note down your observations.

മലയാള ചെറുകഥ
1889-ൽ വിദ്യാവിനോദിനി മാസികയിൽ പ്രസിദ്ധീകരിച്ച വേഷയിൽ കഞ്ഞിരാമൻ നായനാർ എഴുതിയ വാസനാവികൃതിയാണ് മലയാളത്തിലെ ആദ്യത്തെ ലക്ഷണമൊത്ത ചെറുകഥ. വേഷയിൽ കഞ്ഞിരാമൻ നായനാർ, ഒടുവിൽ കഞ്ഞിശ്ശേരമനോൻ, മുരിക്കോത്തു കമാരൻ, തുടങ്ങിയവരിലൂടെ വളർന്ന മലയാള ചെറുകഥാപ്രസ്ഥാനം, രൂപഭാവങ്ങളിൽ ഏറെ വൈവിധ്യം പുലർത്തുന്ന ഇന്നത്തെ എഴുത്തുകാരിലൂടെ അതിന്റെ ഏറ്റവും പുതിയ മുഖത്തെ പ്രതിനിധാനം ചെയ്യുന്നു. പത്തൊമ്പതാം നൂറ്റാണ്ടിന്റെ അന്ത്യഘട്ടങ്ങളും ഇരുപതാം നൂറ്റാണ്ടിന്റെ ആദ്യഘട്ടങ്ങളും ചാരതീയ സാഹിത്യത്തെ സംബന്ധിച്ചിടത്തോളം വളർച്ചയുടെ കാലഘട്ടമായിരുന്നു. യൂറോപ്യൻ സാഹിത്യത്തിൽ നിന്നും നിരവധി സാഹിത്യ രൂപങ്ങൾ ചാരതീയ ഭാഷകളിലേയ്ക്കു കടന്നുവന്നു. ചെറുകഥ, നോവൽ, നാടകം, ഭാഗീരതം, വിലാപകാവ്യം, ഖണ്ഡകാവ്യം എന്നിങ്ങനെ ആ നിര നിങ്ങളുപേക്ഷിക്കുന്നു. ആധുനികരീതിയിലുള്ള പള്ളിക്കൂടങ്ങളും അവയിലൂടെ പ്രചരിച്ച ഇംഗ്ലീഷ് വിദ്യാഭ്യാസവും തുടർന്നുണ്ടായ ഉന്നത

Fig. 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.
- ◆
- ◆
- ◆

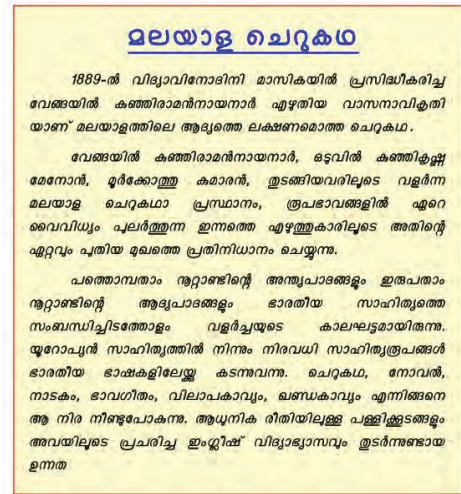


Fig. 2.2 A formatted page

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 Fig. 2.2) and save it.

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 arrange letters and numbers, select them and select *Superscript* or *Subscript* from Text in the *Format* Menu.

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 (Fig. 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.

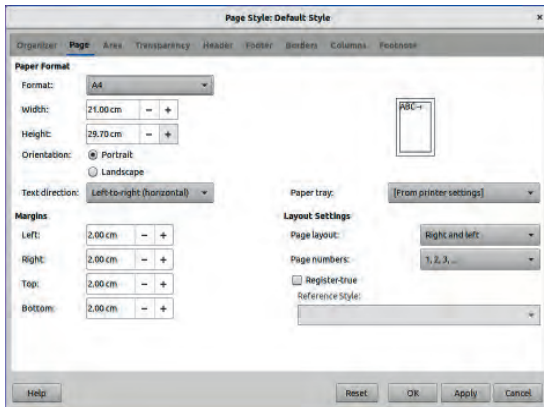


Fig. 2.3 Page Style window

- ◆ 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.

Background colour can be given to make the page attractive. For this, select a suitable colour from *Area* tab *Color* window of *Page Style* and then click *Apply* → *OK*.

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.
- ◆ Select *Style*, *Width* and *Color* to be given to the border from *Line* menu.

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?

Shall I make the page more attractive?



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 on* 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* → *Field* → *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?

After clicking Footer tab, ensure that there is no tick mark on '*Same content left and right pages*'. 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 on the left and right pages appear as you wished?

Activity 2.5 - Let's arrange in columns

Observe how the content of the previous IT textbook of Class 9 is presented (Fig. 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, click *Bitmap Area* tab, select the required picture and click *Apply* → *OK*.

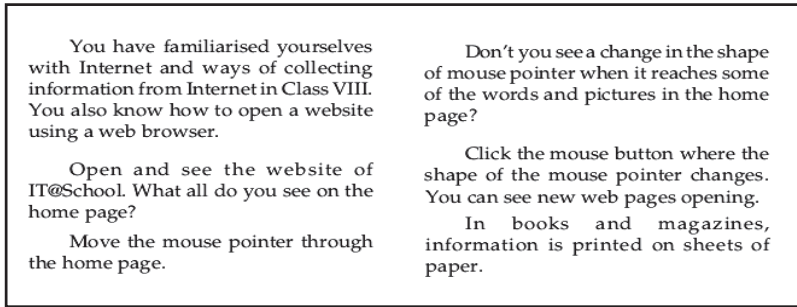


Fig. 2.4 A portion of ICT textbook

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. *Insert Image* tool in the Toolbar may also be used to insert an image (Fig. 2.5).

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



Fig. 2.5 - Word Processor Toolbar

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

How can we overcome such difficulties?

- ◆ Select the picture. Some squares can be seen around the picture. Click and drag on the squares 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.

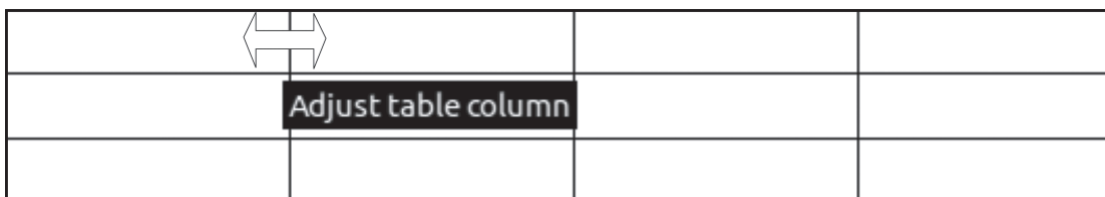
You may have to include information related to the seminar topic in a tabular format in your document. How will you insert a table?

Activity 2.7 Let's insert a table

You can use the *Insert Table* tool in the Tool bar (Fig. 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 (Fig. 2.6).



Pic 2.6 Adjusting column space

Adjusting the size of the picture

The size of the picture can proportionately be enlarged and reduced if clicked and dropped at the corners of the borderline which are seen around while selecting the picture. The height or width can be changed by clicking and dragging the other borders of the picture.

- ◆ 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 there? At times, we may have to merge more than one row or column and add the information to 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 the 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 *Export as* → *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.



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) <i>Footer</i>	b) <i>Merge Cells</i>	c) <i>Insert Rows</i>	d) <i>Header</i>
------------------	-----------------------	-----------------------	------------------
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) <i>Delete Cells</i>	b) <i>Merge Cells</i>
c) <i>Insert Columns</i>	d) <i>Delete Columns</i>



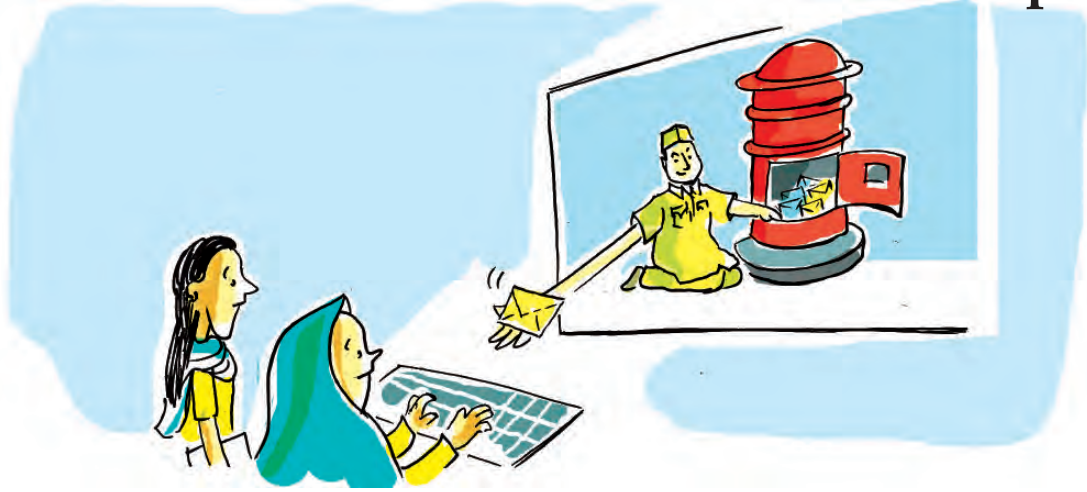
Extended activities

- ◆ 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 in the Word Processor the biographies of scientists like J J Thomson, Earnest Rutherford and James Chadwick who are discussed in your Chemistry text. Download the required pictures and details 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 of all, let's 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 the receiver should have an e-mail address.

Gmail is the e-mail service provided by Google. E-mail address can also be used for other services of Google. Let's see how an e-mail can be sent by creating a Google Account. Complete the following activities with the help of your teacher.

Activity 3.1 - Let's create a Google account

- ◆ Enter the site *www.google.com*
- ◆ Click on the link *Sign In*.
- ◆ Click on *Create Account* (Fig. 3.1).
- ◆ Enter your name and user name in *Create your Google Account*.
- ◆ Enter the desired Password and Confirm Password for your Google Account in the given boxes and click *Next*.
- ◆ Enter your mobile number in **Verify your phone number window** and then enter the Verification Code received from Google.



The figure consists of three vertically stacked screenshots of the Google Account creation process. The first screenshot shows the 'Sign in' page with the 'Create account' button circled in red. The second screenshot shows the 'Create your Google Account' page with fields for First name, Last name, Username, Password, and Confirm password. The third screenshot shows the 'Verify your phone number' page with a dropdown for country and a text input for the phone number.

Fig. 3.1 Google Account application

- ◆ The account creation process can be completed by agreeing to the conditions and privacy policies of the service provider.

When you create an e-mail account...

If the E-mail ID that you desire to create has already been used by someone else, you may not get it. Then make the required changes and give another 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

When internet services are used often you were asked to type in a space, as shown in Fig. 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.

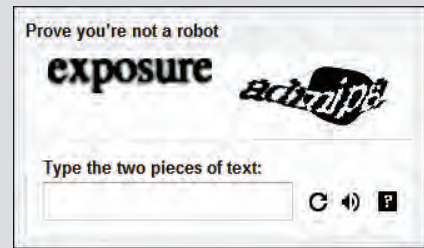


Fig. 3.2 CAPTCHA

Then we can enter the gmail account using Username and Password that we have created.

Now, you get an e-mail address.

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

- ◆ 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.

Now you have received your e-mail address. Let's see how e-mail can be sent using Gmail.

Activity 3.2 - Let's send an e-mail

- ◆ Click the *Compose* button in the Gmail 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.



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).

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.

- ◆ We can select the files to be sent and attach them following the instructions that appear when clicking *Attach Files* Tools (Fig.3.3) in the *New Message* window.
- ◆ 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.

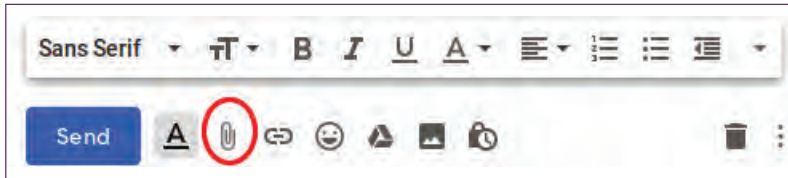
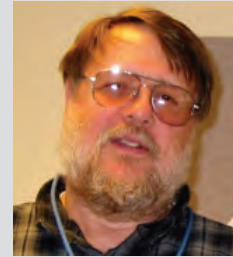


Fig. 3.3 Attach File Tools in Gmail



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 the 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.

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* 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).

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

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 KITE is *contact@kite.kerala.gov.in*

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 (<https://ml.wikisource.org>), Wiktionary (<https://ml.wiktionary.org>), Wikiquotes for quotations (<https://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 (<https://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.

In the info box of the school page in the schoolwiki (<https://schoolwiki.in>) in the page *Ente Naadu*, details of the following can be added:

- ◆ Geographical features of the locality.
- ◆ Natural beauty of the region
- ◆ Major job sectors
- ◆ Statistical data, tables and diagrams



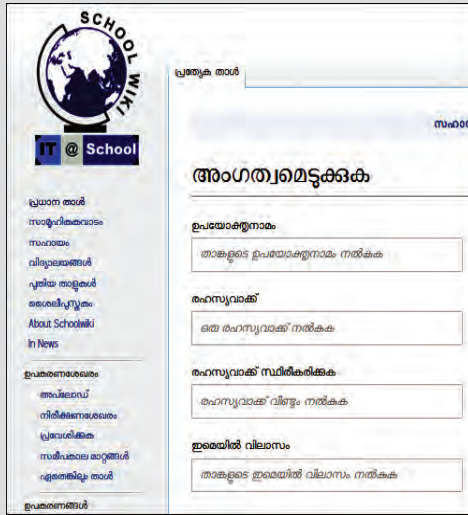
Let's build the pillars of knowledge



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

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

- ◆ Historical facts
- ◆ Institutions and organizations
- ◆ Eminent people and their contributions
- ◆ Developmental hallmarks and possibilities
- ◆ Heritage and tradition
- ◆ Art forms
- ◆ Language/dialect variations

Shall we include this information in your School Wiki page?

Activity 3.5 Souvenir of *Ente Naadu* in School Wiki

- ◆ Login to School Wiki (<https://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 (Fig. 3.5).
- ◆ Click on *Edit* seen at the top of the page. Provide the information you have collected and click on *Save*.

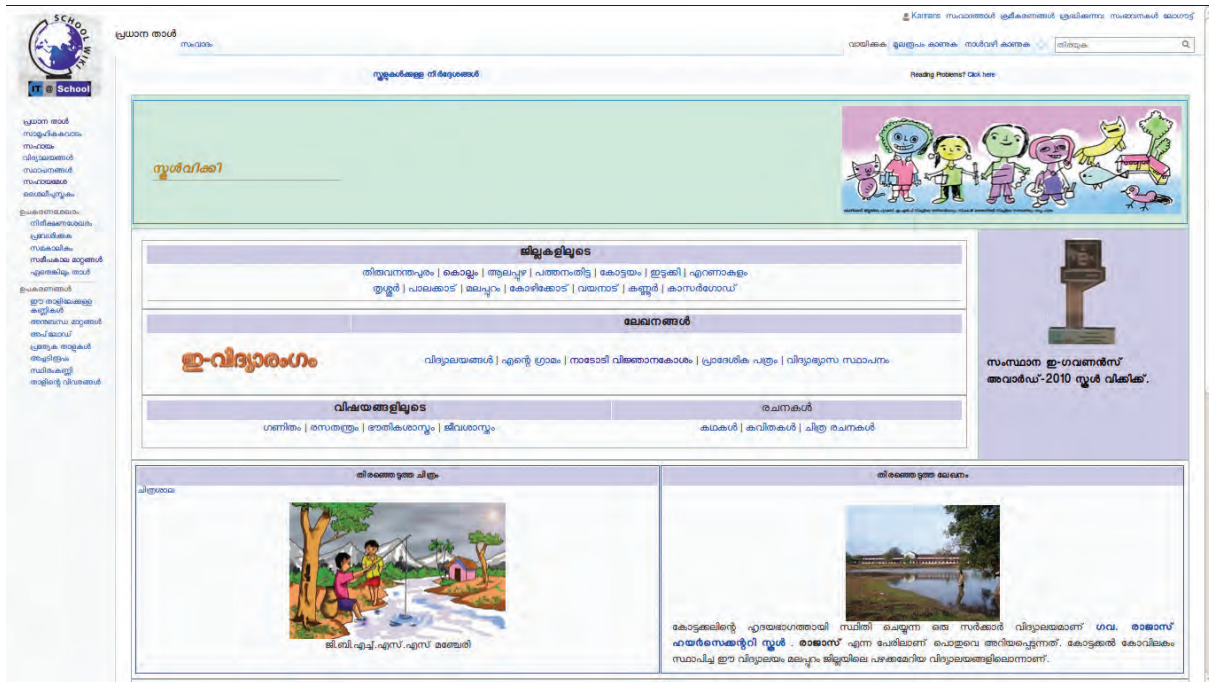


Fig. 3.4 Interface of a School Wiki page

- ◆ 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
 സൂര്യാശ്യാദീപ്തം പകൽപോലെതന്നെ

- കൽപ്പശാഖി



Fig. 3.5 The part of your school info box



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.

(നവയുഗോദയം)

വിളക്കു കൈവശമുള്ളവനെങ്ങും വിശ്വം ദീപമയം
വെൺ 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.

Activity 3.6 - Let's add contents in Wikiquotes

- ◆ Type the **URL** <https://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 Social Media

Social media have plenty of beneficial prospects. We get to know the latest news and current affairs through

Facebook, Twitter, WhatsApp and other online media. The information about your school can be shared with more people using the Facebook page of your school. It helps us share our own views and have social interactions with others. We can follow the pages of famous writers, artists, scientists and also organizations like NASA and ISRO through such social media. A lot of information is available through their blogs and posts.



Disaster Management through social media

Disaster Management activities carried out by social media were unique during the floods that occurred in Kashmir in 2014, Chennai in 2015 and our Kerala in 2018. The SOS system of Twitter (the system that handles messages for help during disastrous situations) saved many lives during the Kashmir floods. Many people made use of the WhatsApp calls, the safety checks in Facebook, hashtag in Twitter and the Person Finder of Google during the Chennai floods. The above mentioned systems of social media and the Official Web Portal of Kerala helped to mitigate the intensity of disaster during the Kerala floods to a great extent.

The social media groups can easily mobilize the manpower needed for disaster management activities and to communicate the current status of the victims of disaster to the people concerned. In disaster affected areas, where the Internet and mobile towers are hardly available, SOS messages (making use of system of SOS in mobile phones, SOS app, Ad-hoc network specially made to this end) can be brought to the outside world through social media, thereby help availing to the victims.

These social groups can mainly involve in the process of reconstruction subsequent to the disasters. These media can play a major role in the coordination of food supply, fund raising and its distribution, and also they can make provision for the services of skilled labourers for maintenance. During disaster,

- Strictly verify the authenticity of information and visuals received through social groups before sharing.
- Follow and share urgent warnings and directions given by the government through social and other media. Forward only the relevant and new messages.
- Make use of the official websites of government for further help.
- Instead of making calls, make use of SMS services to save the power of battery of mobile phones.

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 cyber crimes.

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 meity.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.





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.



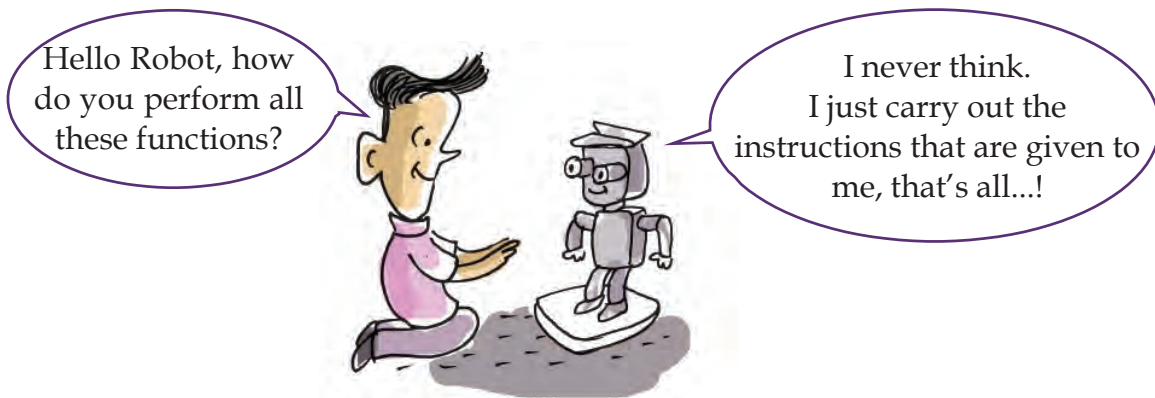
Extended activities

- ◆ 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.

Programs

The set of instructions given to a computer is called a program. Software such as GIMP, Libre Office Writer, Calc, Impress, etc., with which you are familiar are developed using different programming languages.

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.

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.



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.

If the computer understands only the binary language, shouldn't we convert all the instructions to this language?

You're right. Won't it be very difficult?



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.

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.

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 (Fig. 4.1).

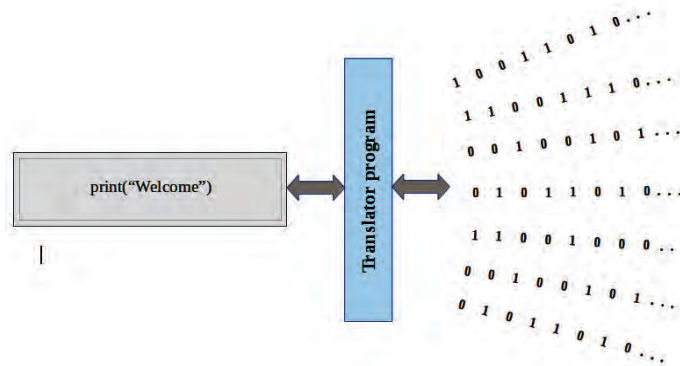


Fig. 4.1 Illustration of translator program

In each programming language there will be a translator program suitable for 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")
```

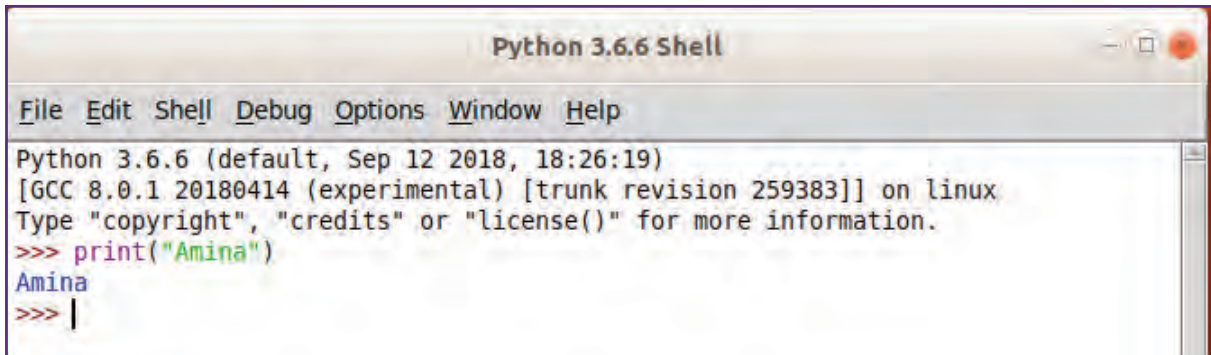
In this program, **print** is the instruction in Python for displaying the name, and the word in quotes is the word to be displayed.

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

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 open.
- ◆ Type `print("Amina")` in Shell Prompter and press the Enter key.
- ◆ Don't you get the output in the Python Shell window itself? (Fig. 4.2)



```

Python 3.6.6 Shell
File Edit Shell Debug Options Window Help
Python 3.6.6 (default, Sep 12 2018, 18:26:19)
[GCC 8.0.1 20180414 (experimental) [trunk revision 259383]] on linux
Type "copyright", "credits" or "license()" for more information.
>>> print("Amina")
Amina
>>> |

```

Fig. 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.

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.

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
```

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.


```
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 (Fig. 4.3) and save it in your folder. While saving give a suitable name to the file.

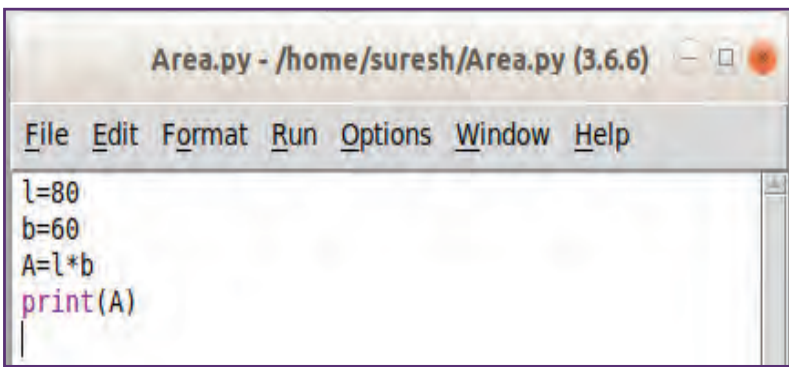


Fig. 4.3 Window for typing Python program

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?



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.

File extension

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



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.

If you wish to find the area using 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, corresponding with changes 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?

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).

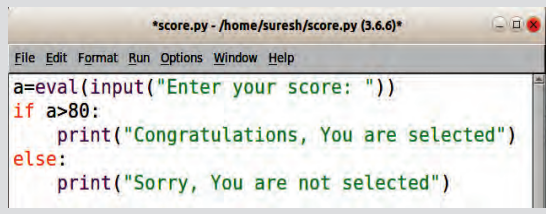
Combining strings

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.



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*.



```
*score.py - /home/suresh/score.py (3.6.6)*
File Edit Format Run Options Window Help
a=eval(input("Enter your score: "))
if a>80:
    print("Congratulations, You are selected")
else:
    print("Sorry, You are not selected")
```

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

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.



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 program.

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.

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*?

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)
```

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*



Let's evaluate

- 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
- 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)
- 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
- 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)
```



Extended 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 is progressing. 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.

Drifting 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 formation of continents ... will use animation.



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 (Fig. 5.1).

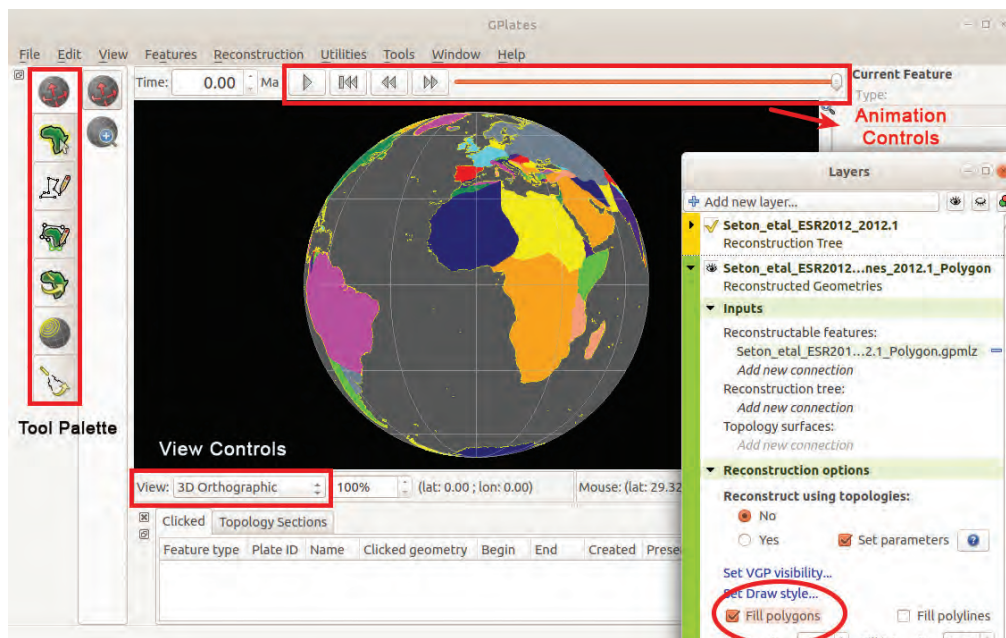


Fig. 5.1 GPLates Main window

- ◆ Click on *Toggle Visibility* (indicated by the 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.

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.

- ◆ 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.

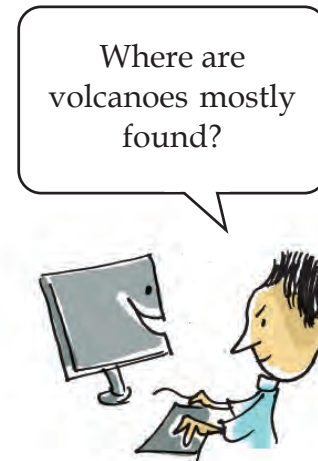
Activity 5.2 - Let's find volcanoes

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_etal_ESR2012_Coastlines_2012.1_Polygon.gpmlz' from Shapefile folder in the 'Gplatesproject' folder.
- ◆ Now, save this in your folder.

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

- ◆ Select tool in the order *Feature Inspection* → *Choose Feature* 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 (Fig. 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 (Fig. 5.3).

- ◆ Open the file that was saved in Activity 5.2.

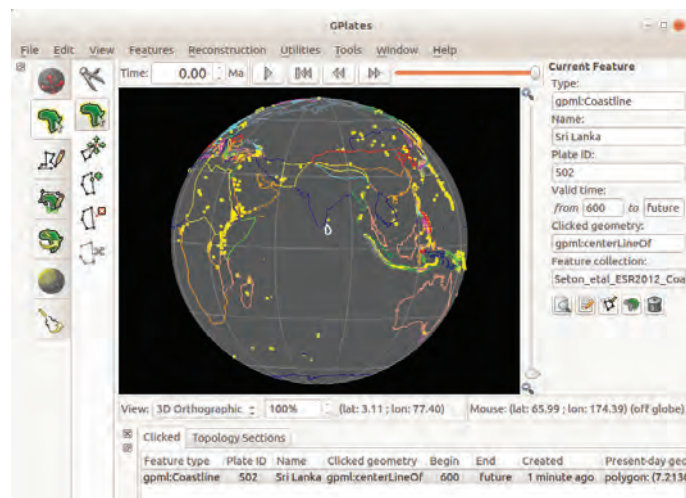


Fig. 5.2 Visualisation of volcano in GPlates

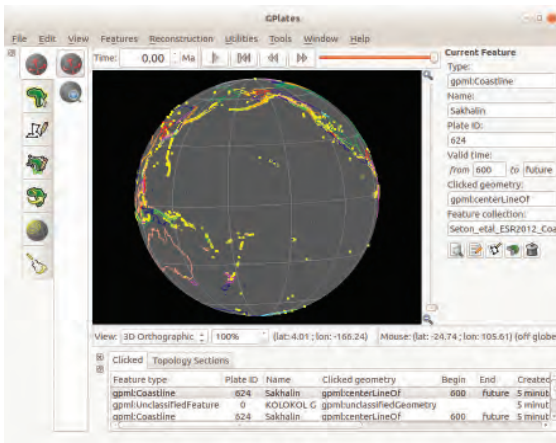


Fig. 5.3 GPLates image of ring of fire

- ◆ Arrange the Pacific plate in the globe (Fig. 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.
- ◆ Select *Add Export*. Click *Projected Geometries (and Rasters)* from *Choose Data Type*. Click *SVG* from *Choose Output File Format* and relevant resolution and give 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.

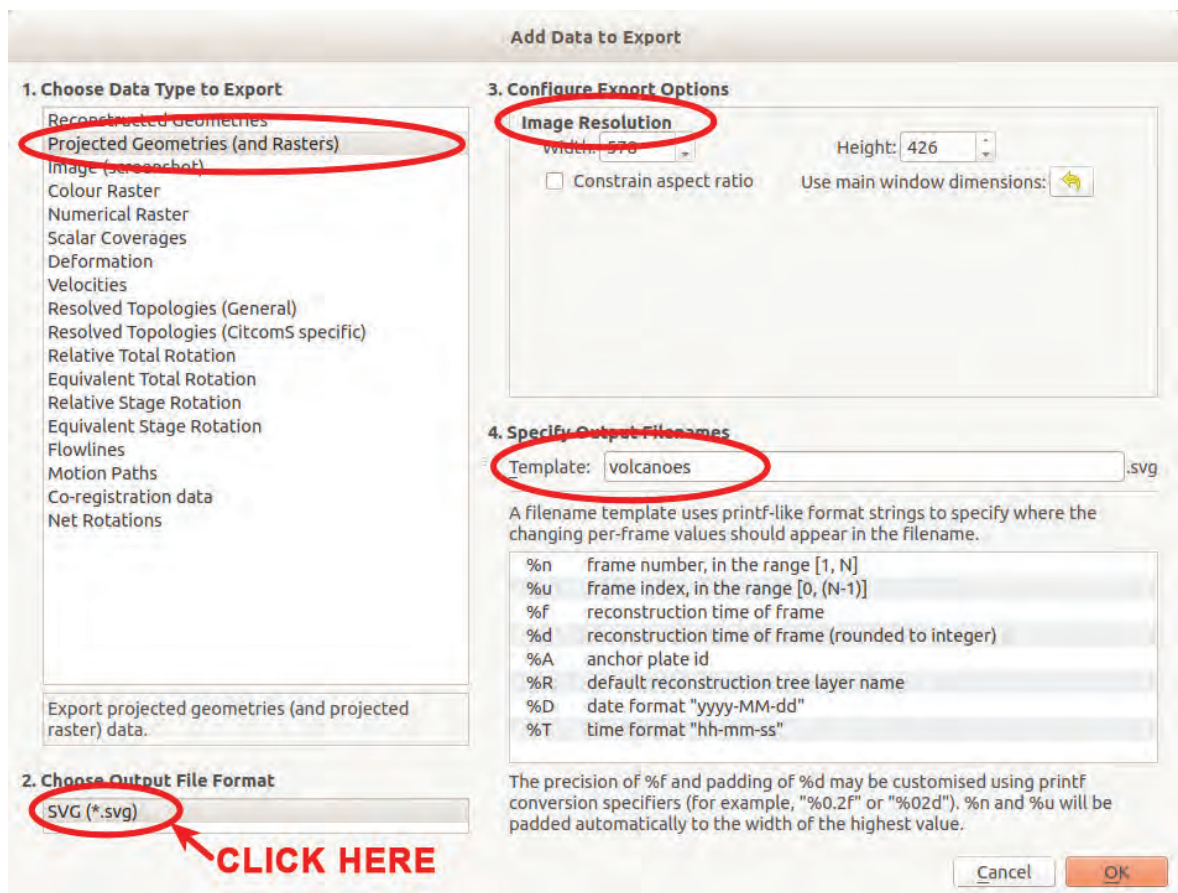


Fig. 5.4 Add data to Export window

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.



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.



Extended 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 (Fig. 5.5).

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.

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

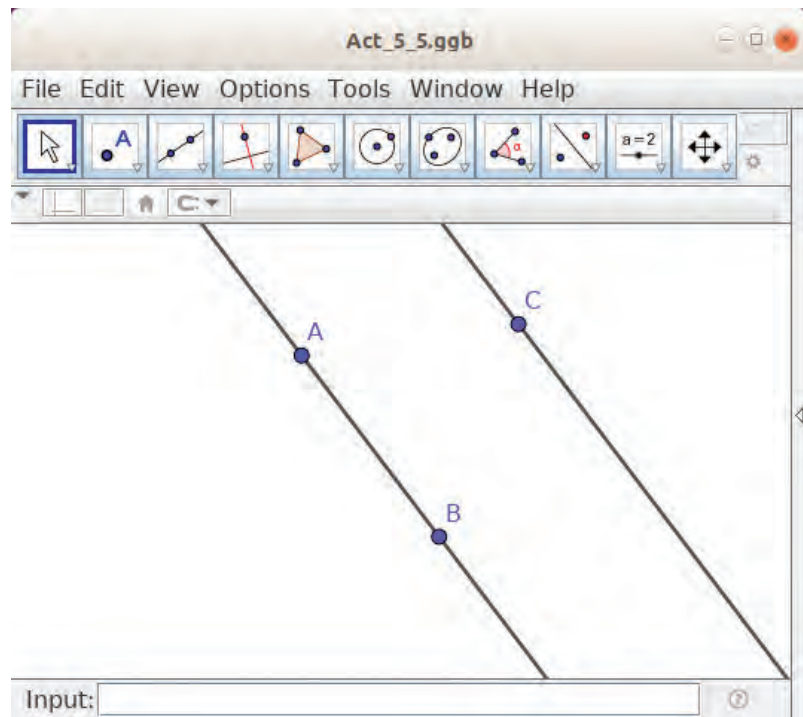


Fig. 5.5 Parallel lines

- ◆ 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? (Fig. 5.6)

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 Fig. 5.7.

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.

.....

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.

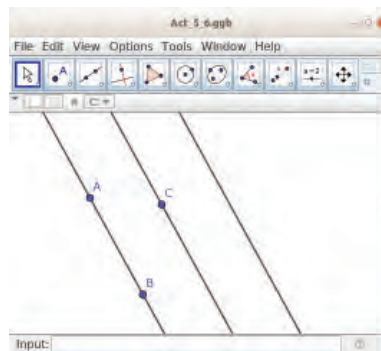


Fig. 5.6 Equidistant Parallel Lines

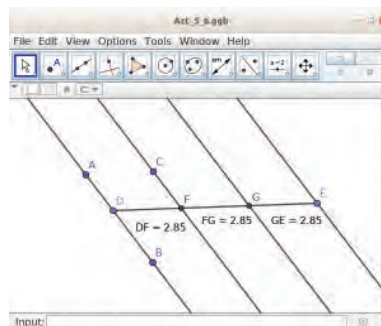


Fig. 5.7 Line Intersecting Parallel Lines

We have learnt how to draw circles of a given size in the eighth standard. What should be done to adjust the 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 Fig. 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, after entering the maximum value and increment, click *OK*. You can adjust the value of the Slider by dragging or using the arrow keys after selecting.

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 Fig. 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?

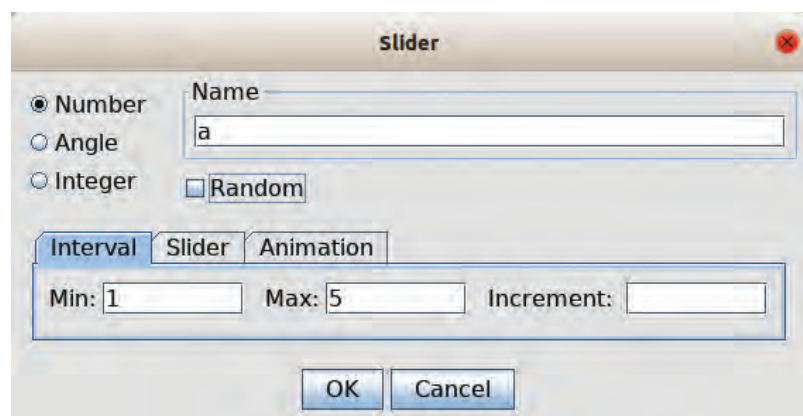


Fig. 5.8 Window for creating a Slider



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.

- ◆ When you enter Min : 1, Max : 5 and click *OK*, 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 same time? You need to right click on the circle and put a tick to *Trace on*.

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.



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.

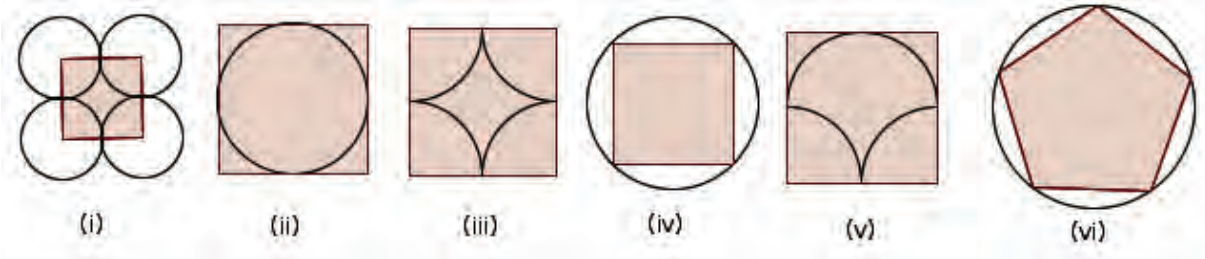
- ◆ Construct triangle ABC in the given measurement. $AB = 5$ units, $AC = 4$ units, $BC = 3$ units.

Hint: The tools such as *Segment with Given Length, Circle with Centre and Radius, Intersect* can be used.



Extended 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

You have understood the use of Education Software in Geography and Geometry. Let's get familiarized with some simulation software which are useful in the learning of Science. In the study of Astronomy, sky gazing is very important. We have limitations in observing stars and planets in the sky always. Stellarium is a simulation software which generates 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 (Fig. 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.



Status Bar

Fig. 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 at 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 (Fig. 5.10). You can also select from the list of locations given in the software. If necessary, click on the *Reset Location List*.

Activity 5.10 - Let's observe constellations

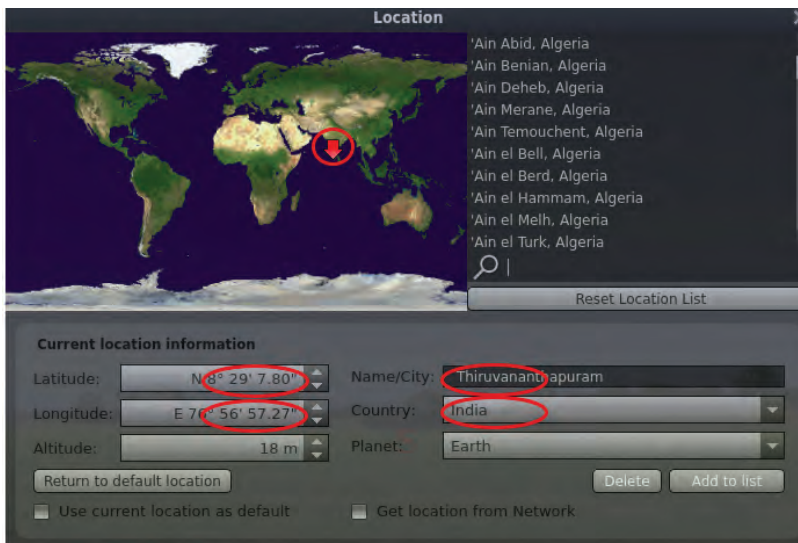


Fig. 5.10 To adjust the location of observation

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* (Fig. 5.10). Then, click *Add to list* button and close the window. (no need to make changes in the *Altitude* box).

Adjust day and time

Click on the *Date/Time window (F5)* (Fig. 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 (Fig. 5.11) and change the day and time.

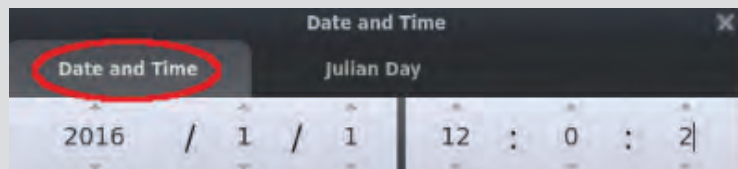


Fig. 5.11 Adjust day and time in the software



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)* (Fig. 5.12) tools that appear in the Status bar.

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

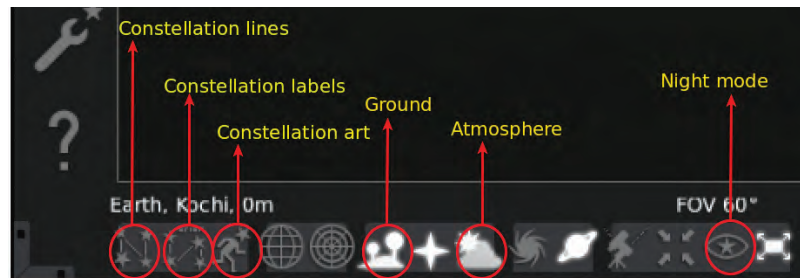



Fig. 5.12 Stellarium status bar

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

Activate *Atmosphere* tool (Fig. 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* (Fig. 5.9) in the tool bar.
- ◆ Type Leo in the *Search box* (Fig. 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.
- ◆ Observe carefully the Leo constellation (Fig. 5.14) by dragging the mouse or using the arrow keys in the keyboard.

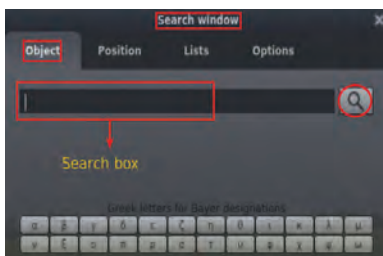


Fig. 5.13 Stellarium Search Window

- ◆ 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?



Fig. 5.14 Leo (Chingam), the constellation

Activity 5.11 - Let's find the ecliptic line

- ◆ Click on *Sky and viewing options window* tool (F4) (Fig. 5.9) in the tool bar in *Stellarium* software and reach the View window.
- ◆ Click on *Ecliptic (of date)* (Fig. 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 either by dragging the mouse or by using the arrow keys in the keyboard.

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

Table 5.1 - Stars in Leo constellation

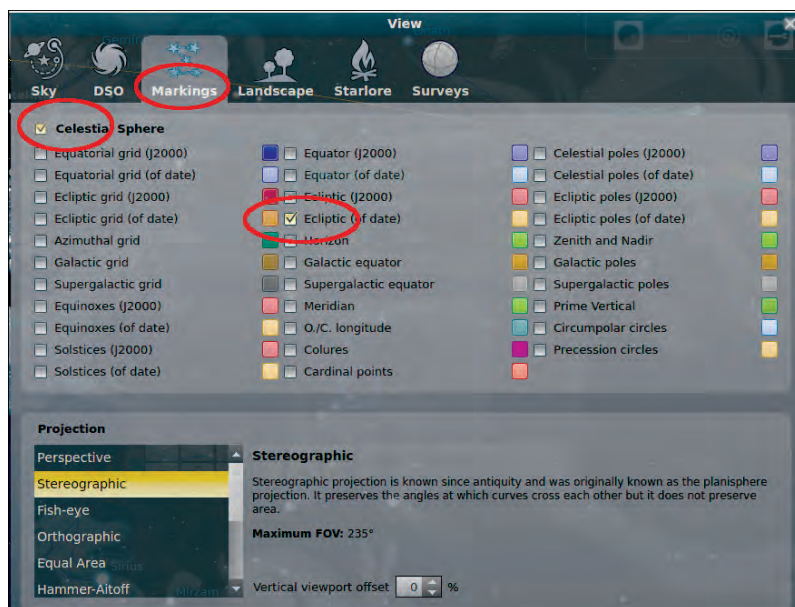


Fig. 5.15 View window

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.



Fig. 5.16 - Ecliptic line

- ◆ 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.



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.



Extended 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 *ghemical* 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 *ghemical* 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 (Fig. 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?

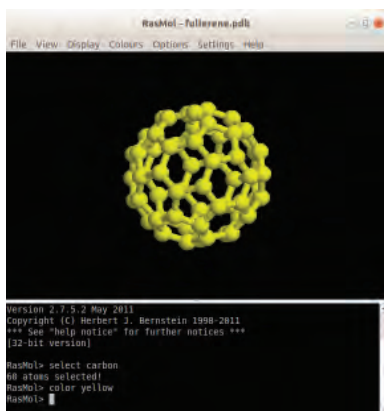


Fig. 5.17 Molecular structure of Fullerene

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.

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.

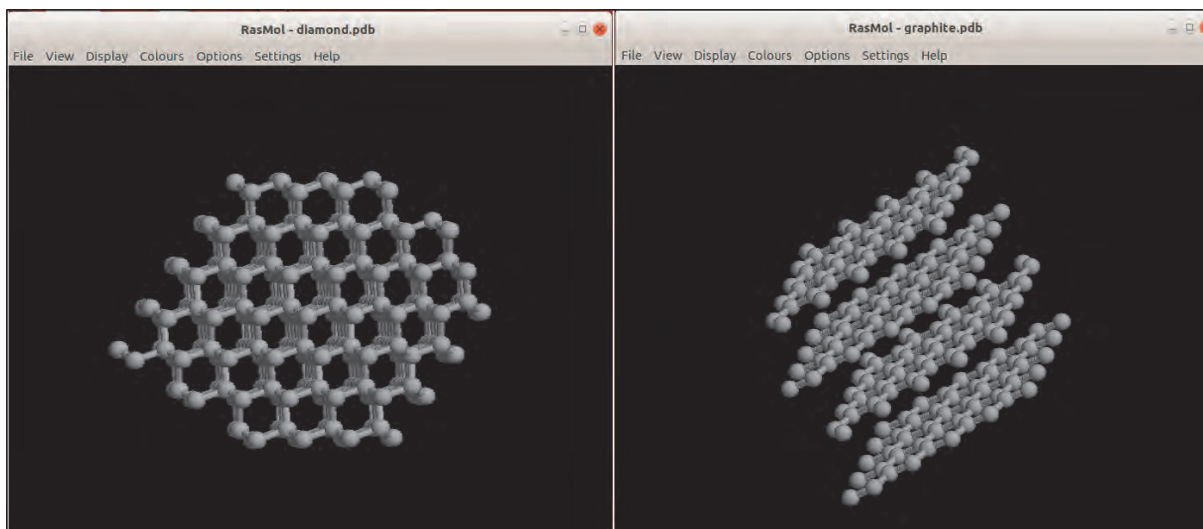


Fig. 5.18 Molecular Structure of diamond and graphite



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



Extended activities

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



Notes

A series of 20 horizontal dashed lines for writing notes.

Notes

A series of horizontal dashed lines for writing notes.

Notes

A series of 20 horizontal dashed lines for writing notes.

Let's know about cyber safety

There is absolutely no need to mention the advantages of Internet and Social Networking sites. We have embraced their potential for communication, entertainment and information seeking.

But over the period, it is seen that a lot of teenagers are being harassed and fall prey to the abuse of Social Media. You can easily prevent yourself from being a victim, if you take a few precautionary measures while being online.

▶ **How Social Networking sites can be dangerous**

- Sharing and posting too much of personal information such as phone number, address, location, photos, etc., can be misused.
- Trusting strangers believing their profile to be true can be dangerous, as they may not be the same as stated.
- Snapshots of chats, photos, videos, etc., are saved and will be used for blackmailing and threatening.
- Being cyber bullied by posting negative, derogatory comments, posts, photos, etc. to tarnish one's image.
- Lots of predators and adult criminals are lurking online to trap children.

▶ **Tips for safe Social Networking**

- Always keep your personal information strictly personal.
- Customize your privacy settings so that others can see only the basic information.
- Just know about and manage your friends. Don't trust all the online friends.
- Let your friends know that you are uncomfortable if they post something inappropriate about you.
- Do not publish any information that reveals your identity.
- Always use strong passwords. Don't share them with others.
- Never share your pictures, photographs, email accounts, etc., with anyone.
- Keep your personal messages strictly personal. Once posted they are published for ever.
- If ever threatened or bullied seek the help of parents/teachers.

Helpline Phone Numbers

Crime Stopper: 1090

Cyber Cell (Tvm): 9497975998

Control Room: 100

Child Helpline: 1098 / 1517