

INFORMATION & COMMUNICATIONS TECHNOLOGY

STANDARD IX

Part 2

2
2



GOVERNMENT OF KERALA
GENERAL EDUCATION DEPARTMENT

**INFORMATION & COMMUNICATIONS TECHNOLOGY
STANDARD**

IX

PART II



**GOVERNMENT OF KERALA
GENERAL EDUCATION DEPARTMENT**

**State Council of Educational Research and Technology (SCERT), Keralam
2025**

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 & COMMUNICATIONS TECHNOLOGY - IX

Prepared by :

Kerala Infrastructure and Technology for Education [KITE]

Poojappura, Thiruvananthapuram - 695012, Kerala

For **State Council of Educational Research and Training (SCERT)**

Poojappura, Thiruvananthapuram - 695012, Kerala

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Website : www.kite.kerala.gov.in, www.scertkerala.gov.in

email : contact@kite.kerala.gov.in, scertkerala@gmail.com

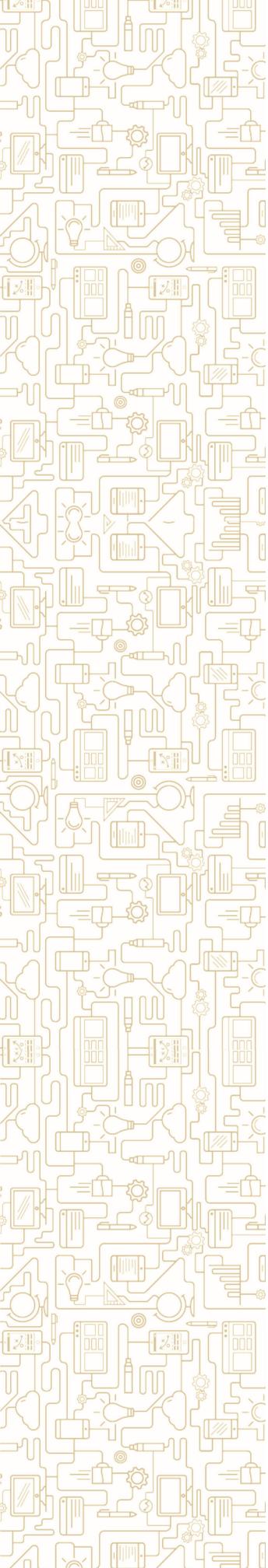
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A vertical decorative border on the left side of the page, composed of a dense pattern of small, light-colored icons representing various Information and Communication Technology (ICT) concepts. These icons include a smartphone, a laptop, a lightbulb, a gear, a network diagram, a document, a magnifying glass, a cloud, a percentage sign, a bar chart, a pencil, a ruler, a compass, a lightbulb, a gear, a network diagram, a document, a magnifying glass, a cloud, a percentage sign, a bar chart, a pencil, a ruler, a compass, a lightbulb, a gear, a network diagram, a document, a magnifying glass, a cloud, a percentage sign, a bar chart, a pencil, a ruler, a compass, and many others.

PREFACE

Dear Children,

Technology is paving the way for new changes in education. Today, it is expanding perspectives in knowledge, helping us grow as global citizens, and opening new doors before us. The 9th standard ICT textbook comes to you with these immense possibilities.

It is expected that this textbook will be a friend that makes your learning interesting and creative. This textbook describes the possibilities of different fields such as graphic designing, word processing, presentation, spreadsheet, webpage designing, networking, and internet services. Software such as Calcium, GeoGebra, PhET, and similar software you come across will help you comprehend the concepts in all subjects deeply and promote practical experience in using them.

This ICT textbook will certainly guide you, providing both wings to your imagination and light to your thoughts. As it explores new areas such as Artificial Intelligence in a simple and engaging manner, it will support your learning journey, making it easier to understand and excel in all subjects.

With regards,

Dr. Jayaprakash R.K.
Director
SCERT

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English Translation

Resmi M Raj, Master Trainer, KITE Idukki

Manu M Pillai, Master Trainer, KITE Kottayam

Swapna J. Nair, District Co-ordinator, KITE Ernakulam

Language Expert

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

Illustration

E. Suresh, Cartoonist, Pallikkara, Kozhikkode

Co-ordinator

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

Academic Co-ordinator

Dr. Renjith Subhash, Research Officer, SCERT Keralam



State Council of Educational Research and Training (SCERT)

Vidyabhavan, Poojappura, Thiruvananthapuram- 695 012



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Explanation of Illustration



Additional Reading



Let's Assess



Extended Activities

THE CONSTITUTION OF INDIA

PREAMBLE

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

JUSTICE, social, economic and political;

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

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

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

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

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



Chapter 6 Intelligent Machines

■ വന്യമൃഗശല്യം

വനാതിർത്തികളിൽ എഐ പ്രതിരോധം



■ സ്വന്തം ലേഖകൻ

വന്യമൃഗശല്യം പ്രതിരോധിക്കാൻ സംസ്ഥാനത്ത് വനാതിർത്തി പങ്കിടുന്ന ജില്ലകളിൽ എ.ഐ. വാണിങ്ങ് സംവിധാനം. വനാതിർത്തിയിൽ 10 കിലോമീറ്ററിലുള്ള എ.ഐ. വാണിങ്ങ് സിസ്റ്റത്തിന്റെ നിർമ്മാണോദ്ഘാടനം വനം മന്ത്രി നിർവഹിച്ചു. വന്യമൃഗങ്ങൾ ജനവാസ കേന്ദ്രത്തിൽ ഇറങ്ങുന്നത് പ്രതിരോധിക്കുന്ന 'എ.ഐ. സർവൈലൻസ് സിസ്റ്റം' പദ്ധതിയാണിത്.

ഒരു മാസത്തിനുള്ളിൽ നിർമ്മാണം പൂർത്തിയാക്കുകയാണ് ലക്ഷ്യം. വന്യ

മൃഗങ്ങൾ കാടിനടുമ്പോഴുള്ള പ്രകമ്പനങ്ങൾ വിശകലനം ചെയ്തും അവയുടെ സഞ്ചാരപഥം ഡ്രോൺ സാങ്കേതികവിദ്യ ഉപയോഗിച്ചു മനസ്സിലാക്കിയും കൺട്രോൾറൂമിൽ വിവരമെത്തിക്കുന്ന രീതിയിലാണ് സാങ്കേതികവിദ്യ. നിർമ്മിതബുദ്ധി ഉപയോഗപ്പെടുത്തി കാട്ടാന, കാട്ടുപന്നി, പൂലി ഉൾപ്പെടെയുള്ള വന്യമൃഗങ്ങളുടെ സാന്നിധ്യം തിരിച്ചറിഞ്ഞ് സൈറൺ മുഴക്കി കാട്ടിലേക്ക് തുരത്തുകയും ചെയ്യും. ഡ്രോൺ കാമറ, തെർമൽ കാമറ, ദീർഘദൂര ലേസർ ഇൻഫ്രാറെഡ് കാമറ എന്നിവ ഉപയോഗിച്ചാണ് വന്യമൃഗങ്ങളുടെ സാന്നിധ്യം തിരിച്ചറിയുക.

ജനവാസകേന്ദ്രങ്ങളുടെ അതിർത്തിയിൽ

നിന്ന് അരക്കിലോമീറ്റർ അകലെ വനത്തിനുള്ളിലുള്ള മൃഗങ്ങളെ ഉൾപ്പെടെയുള്ളവ കാമറകൾ തിരിച്ചറിയും. അക്രമകാരികളായ വന്യമൃഗങ്ങളെ തിരിച്ചറിഞ്ഞ് മുന്നറിയിപ്പ് സംവിധാനം സ്വയം പ്രവർത്തിക്കുകയാണ് പദ്ധതി. നിർമ്മിതബുദ്ധി അധിഷ്ഠിത സോഫ്റ്റ്‌വെയർ ഇതിനായി പ്രത്യേകമായി തയ്യാറാക്കിയതാണ്. മനുഷ്യ-വന്യജീവി സംഘർഷം ലഘൂകരിക്കാൻ വനംവകുപ്പ് പ്രഖ്യാപിച്ച വിവിധ മിഷനുകളിൽ പ്രധാനമാണ് നിർമ്മിതബുദ്ധി സാങ്കേതികവിദ്യ ഉപയോഗിച്ചുള്ള നിരീക്ഷണ സംവിധാനമെന്ന് അഡീഷണൽ പ്രിൻസിപ്പൽ ചീഫ്കൺസർവേറ്റർ അറിയിച്ചു.



Have you seen the news? It's about a surveillance system designed to reduce human-wildlife conflict. Drones flying over dense forests, along with the sensors attached to them, and cameras installed in the forest, scan the entire area below.

Through this system, we can observe elephants grazing, bears resting among the trees, and tigers moving through the shadows.

By analysing the images and data obtained from such a system, it is possible to monitor the movements of animals, detect and warn them when they cross the forest boundary. It can also be used to count the number of animals and monitor the hunting of animals by humans.

How is this possible?

This is possible by integrating machines with artificial intelligence techniques.

Let us explore in detail the various possibilities of artificial intelligence technology and how it is shaping our future.

What is artificial intelligence?

Artificial intelligence is a technology that enables computers and other machines to imitate human intelligence and problem-solving skills.

Take a look at how artificial intelligence technology is currently used for around us today.

- For road safety
- In device assistants
- For identifying individuals
- For classifying objects
- For translating
-

Many things that could only be done by humans are now being done more easily and accurately with the help of artificial intelligence.

AI is being used in many areas that help to improve human life, such as diagnosing diseases, manufacturing drugs, weather forecasting etc., This technology is not only used for language conversion, but also for writing stories and drawing. Novels written using artificial intelligence are available in the market today.



Artificial Intelligence (AI)

The term "Artificial Intelligence" was first used by American scientist John McCarthy. It was during a workshop held in 1956 at Dartmouth College in New Hampshire, USA, that this term was introduced. This workshop, known as the Dartmouth Conference, laid a strong foundation for the field of artificial intelligence and gave momentum to further research and studies related to it.

Have you ever wondered how artificial intelligence (AI) systems work?

AI systems learn and make decisions based on three main steps.

- Data Collection
- Pattern Recognition
- Decision Making

For example, consider Table 6.1, which deals with the drone camera, a key tool in the security system we discussed earlier.

Steps	Activity	Example
Data Collection	Information is collected to a large extent	Collects the pictures of animals in the forest.
Pattern Recognition	Identifies the pattern in AI algorithm data	Learns to distinguish between tiger, elephant and deer.
Decision Making	This pattern is being used for completing a work	Counts the animals. Identifies the listed animals

Table 6.1 Working of Drone Camera

Have you understood how artificial intelligence works ?

The main part of artificial intelligence systems is a model. An AI model is a program that has been trained to analyse data and make predictions or decisions. An AI model is like the brain of artificial intelligence systems.

They are trained using large quantity of data for specific tasks.

For example,

- an AI model for wildlife surveillance system is trained to recognize animals using thousands of images of animals.

- a language AI model, such as ChatGPT, which is a chatbot, is trained using millions of sentences to understand and produce text.

AI models improve over time, becoming better and more accurate by learning from new data.

Language AI Models

Language models are AI models for predicting words. While weather models predict the weather, language AI models predict words by detecting patterns in human language. Chat GPT, Gemini AI, and Meta AI are all AI techniques that work based on language models.

Natural Language Processing

NLP is a branch of artificial intelligence that helps computers understand, interpret, and respond to human language. NLP involves training machines to read, write, and speak like humans.

How does NLP Work?

It combines the principles of linguistics with the techniques of programming and machine learning to process language. Its function can be simply divided into the following (Table 6.2).

Step	Activity
Understanding the sentence	Attempts to understand the meaning of sentences by breaking them down into words or phrases (tokens).
Analysing the structure	Examines grammar, syntax, and the relationships between words.
Creating responses	Based on what is understood, the computer can generate a response or perform an action.

Table 6.2 Working of NLP

In short, NLP is a field of technology that teaches computers to 'use human language'.

There are many systems around us that utilize NLP. Try adding more to the ones given below.

- Google Assistant
- Amazon Alexa
-
-

Chatbots, translation apps, and video game characters that we use for services on the Internet are all NLP based systems.

Such models, which are trained using large amounts of text data using NLP technology, are called Large Language Models (LLM).

Today, there are powerful language models that have acquired information and knowledge in all areas where humans interact. These LLMs can present the information once learned in a different way.

Let's Interact with NLP

We interact with NLP-based systems using the normal language that humans use to communicate. There are many NLP systems available today that are capable of understanding and responding to our native language, Malayalam. However, many of them are not fully functional. We can hope that in the near future, NLP systems capable of handling Malayalam will be available.

When Interacting with NLP

In an NLP based system, the answer received when a student asks, "What will the weather be like in Kerala tomorrow?" will not be the same as the one a meteorologist would receive.

While the student may get a simple reply like "There is a chance of rain tomorrow," the meteorologist would receive a detailed response analysing various factors that affect the weather—such as the movement of rain clouds, atmospheric temperature, humidity, and wind speed.

Prompts

A prompt is a sentence or question that we provide to an NLP system to get a response instead of the search queries we usually use in a search engine on the Internet. The more precise the prompt we provide, the better the response we receive.

The chapter named “Into Life Processes” in your biology textbook explains about Photosynthesis.

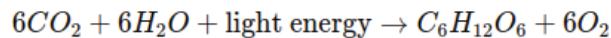
On a computer with internet connectivity, give the following prompt to any NLP system on the internet to learn about photosynthesis.

- *What is Photosynthesis ?*

What is photosynthesis?

Photosynthesis is the process by which green plants, algae, and some bacteria convert light energy into chemical energy. It takes place in the chloroplasts of plant cells, where chlorophyll (a green pigment) captures sunlight.

Photosynthesis Equation:



(Carbon dioxide + Water + Light → Glucose + Oxygen)

Steps of Photosynthesis:

1. Light-dependent Reactions (in the thylakoids):

- Sunlight is absorbed by chlorophyll.



Fig 6.1 Response Obtained When the Prompt ‘What is Photosynthesis’ was Given in NLP

Did you notice the answer given by the NLP system? (Figure 6.1). We have got a general explanation now regardless of who asked the question.

How about explaining the same thing a little more? Try the prompt given below.

Prompt:

What is photosynthesis? Explain the light phase and the dark phase.

What is photosynthesis? Explain the light phase and dark phase.

Photosynthesis is the process by which green plants, algae, and some bacteria convert light energy into chemical energy. It occurs in the chloroplasts of plant cells and involves two main phases:

1. Light Phase (Light-Dependent Reactions)

This phase occurs in the **thylakoid membranes** of the chloroplast and requires light to take place. The key steps are:

- **Absorption of Light:** Chlorophyll absorbs light energy, exciting electrons.
- **Water Splitting (Photolysis):** Water molecules break down into oxygen, protons, and electrons. Oxygen is released as a byproduct.
- **ATP and NADPH Formation:** The excited electrons move through the **electron transport chain (ETC)**, leading to the formation of **ATP (Aden. ↓ ie Triphosphate)** and **NADPH (Nicotinamide**

Fig 6.2 Response Received When Prompt for Explaining Photosynthesis more in Detail was Given

Now you got a more detailed answer, didn't you?(Fig 6.2)

Now, as a ninth standard teacher, what would be the explanation that NLP would give?

Use the prompt below to do this.

Prompt:

You are a high school teacher. Can you explain what is photosynthesis and its dark phase and light phase ? (Act as high school teacher and explain What is photosynthesis ? Also explain the light phase and dark phase.)

Act as high school teacher and explain What is photosynthesis?
 Also explain the light phase and dark phase

Alright class, today we're going to learn about **photosynthesis**, one of the most important processes on Earth. 🌱☀️

What is Photosynthesis?

Photosynthesis is the process by which **green plants, algae, and some bacteria** use sunlight to make their own food. It happens in the **chloroplasts** of plant cells, which contain a green pigment called **chlorophyll**.

In simple terms, plants take in:

- **Carbon dioxide (CO₂)** from the air through their leaves
- **Water (H₂O)** from the soil through their roots
- **Sunlight** from the Sun

And they produce:

- **Glucose (C₆H₁₂O₆)** – a type of sugar used for energy
- **Oxygen (O₂)** – which is released into the air for us to breathe! 🌿

Fig. 6.3 Response When Act as was Added in the Prompt

Look at the response received now (Figure 6.3). Have you understood the difference in the responses received for the prompts we gave.

There are some things to be noted when interacting with artificial intelligence based systems. Let's examine what they are.

The following are the things to keep in mind while designing prompts. Give the prompts given in the examples in NLP and understand the differences in the responses received.

Be clear and precise: Avoid vague and ambiguous language in the prompt.

For example:- Instead of asking "Tell me about history", say clearly "Explain the causes of World War II".



Prompt Engineering - Possibilities

Accurate prompts should be given, if you want to get better responses from Artificial Intelligence system. Prompt engineering helps a person to prepare accurate prompts. It opens good job possibilities as Artificial Intelligence spread across all areas.

Make the persona clear: Give a hint as to who the person is responding to.

For example, the prompt "Simply explain what prime numbers are" will be better than the prompt "You are a math teacher." The prompt "Simply explain what prime numbers are" will be better.

Provide context: Give the AI some background information.

For example, imagine you are a teacher explaining gravity to a 70-year-old.

Use examples: Show the AI what we need.

Eg:- Write a poem like this: Roses are red, violets are blue...

Test and refine: If the AI doesn't give the correct answer, adjust your prompt and try again.

Ask AI

You have understood how to design precise prompts to interact with NLP. Now, using these ask an NLP system for more details about the Swedish evolutionary geneticist Svante Paabo, mentioned in the chapter on "Behind the Motion" in your biology textbook, and the field of Paleogenomics that he established.

NLP is not just a technique for analysing information or answering questions, it also has the potential to become a creative assistant. NLP systems can write stories, create poems, and summarize large sentences in a simple way. It has the potential to act not only as a teacher, but also as a poet and a storyteller!

After giving the following prompts, examine the responses -

- *Write a story about a book seller and a fisherman.*
- *Write a 20 line poem about Kerala's scenic.*

You have got the newly created story and poem, right ?

Drawing with AI

AI systems can not only draw pictures and give textual responses but also create pictures and movies. You can search

the Internet for online AI systems that can help you create pictures and movies in the best way.

Open any artificial intelligence system for creating pictures. Then, give the necessary prompt to create a picture of a child planting a tree to be included in a poster to be displayed in connection with the celebration of Environment Day (Figure 6.4).

Prompt:

Draw an image of an Indian girl planting a tree.

Generate the image to be included in the presentation using AI

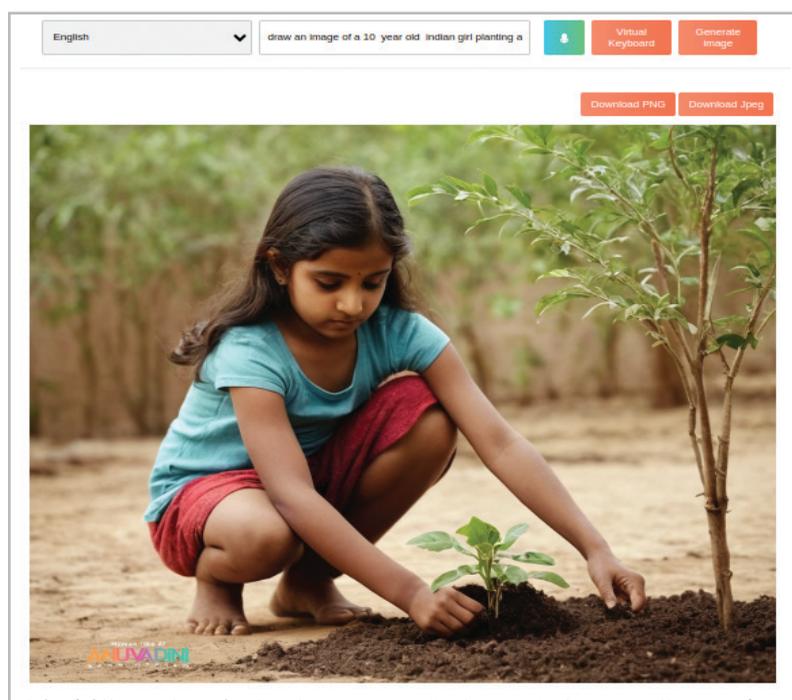


Fig 6.4 Image Received as Response to the Prompt – Draw an Image of an Indian Girl Planting a Tree

Did you get the image that matches the prompt you gave? If not, you need to re-prompt it accordingly to get the correct images.

AI-based systems like these are excellent companions capable of assisting us in such ways.

Artificial intelligence can even create imaginary images that are usually not available on the Internet.

Look at the picture of a kitten selling bangles drawn by an AI (Figure 6.5).

Prompt : *Draw an image of a cat selling bangles.*

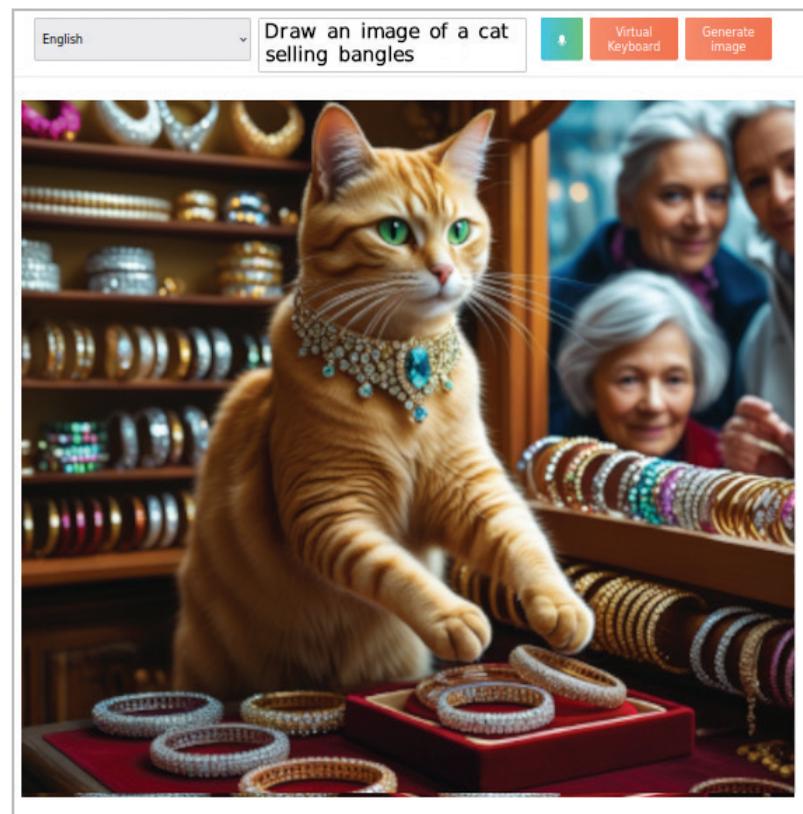


Fig. 6.5 Image Received as Response to the Prompt – Draw an Image of a Car Selling Bangles

When Using AI Systems

Our creative abilities—such as story writing, poetry, drawing, music, and singing—grow and improve through continuous practice and application.

It is important to ensure that the excessive use of artificial intelligence does not hinder the growth of these skills.

Each of us should strive to use AI systems as tools to enhance and improve our own abilities.

We have discussed some of the techniques that work based on artificial intelligence. Record the details of the AI systems you have used for the above tasks in Table 6.3.

You should also search the Internet for new ones and try them out.

Use	AI system	We address
To prepare images	Anuvadini	https://anuvadini.aicte-india.org/
To prepare videos		
To prepare 3D models		
To create text	ChatGpt ,	
To prepare translations		

Table 6.3 AI Systems for Different Uses

NLP Systems in Learning Activities

We have come to understand that the NLP-based systems we have been familiar with so far can be used effectively for learning activities. Let's look at some of the benefits of A.I.

- Answering doubts - at any time

If you want to learn more about the subject by discussing it in class, you can use NLP-based AI techniques.

- Simplifying the learning

These can explain complex things in a simple way, according to our intellectual level.

For example- Give the prompt - Act as a 14 year old student, explain what are Transition Elements. This section "Transition elements" in our chemistry textbook will be explained in a simple way.

- Language learning assistance

AI systems can help us understand language usage errors and teach us other languages.

AI systems can also provide a personalized learning experience and inspire and build confidence by encouraging creativity.

Responsible Use of Artificial Intelligence

While AI and NLP are powerful technologies, it is important to use them responsibly. It is important to consider how their use affects others and to ensure that AI is used in a fair, safe, and ethical manner.

Dont Trust Blindly !

Artificial intelligence systems respond based on the data they are trained on. The information they provide may not always be true and accurate. Therefore, the information they provide should be used only after verifying it. There may also be systems that operate based on the vested interests of companies or individuals who created them. Therefore, we need to be more careful when dealing with them.

Responsible AI Use - Key Principles

Avoid Harm : Don't use AI to create content that is harmful or misleading. For example, don't use AI to create and spread fake news or create content that is disruptive to others.

Respect Privacy : Never share your or others' personal information with AI systems that are not sure to be safe.

Be Honest : When creating content for learning activities with the help of AI, you must always give credit for it. It's wrong to pretend that it's all your own work.

Think Critically : Always review the content that comes from AI carefully. AI gives us some possibilities. So mistakes can happen. It is important to verify the information provided by AI.

AI Agents

We often seek the help of travel agents to book train and bus tickets when we have to go for a journey. They book tickets for us, arrange accommodation, and make the payments on our behalf. Later, we pay them for the service. We don't need to know anything else.

Similarly, AI agents coordinate several systems and do things automatically for a specific purpose. For example, if we give a prompt like "Arrange a two-day trip to Munnar for me on 22nd" the AI agent will book everything we need, including the travel tickets, hotel rooms, food, park entrance passes, etc., and pay the money for it from our bank account.

It is impossible to predict how much artificial intelligence will impact humanity in the coming years.



Let's Assess

- ◆ Which of the following does not include in Responsible AI ?
 - a) Avoid harm to others
 - b) Respect the privacy
 - c) Be honest
 - d) Trust AI blindly
- ◆ Which among the following is the most correct one regarding AI Agents ?
 - a) AI-based system that helps you buy tickets
 - b) AI-based system that helps you book rooms
 - c) AI-based system that helps you deliver food
 - d) AI-based system that does all these together as needed



Follow up Activities

1. Prepare a prompt to get the list of Chief Ministers of Kerala and their tenures in table form and prepare the said list using NLP system.





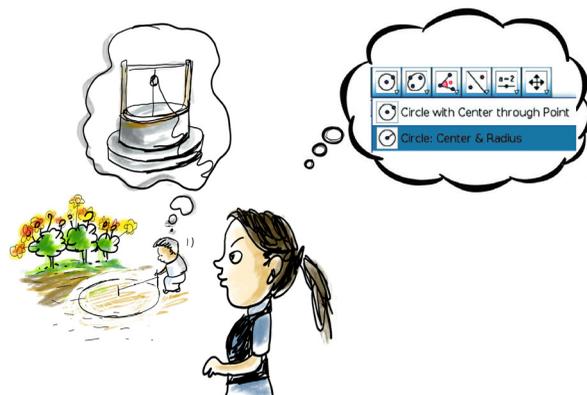
Chapter 7

Laboratory within the Computer

As you know, there are many educational software available now that can be used effectively for learning and other educational activities. Simulation software, virtual labs, and interactive tools help you make the learning of science and mathematics more lively, fun, and easy.

This chapter will introduce you to some of the activities using such educational software that can be used as a learning aid.

7.1 Study of Mathematics Using GeoGebra



We have been familiar with the characteristics of geometric shapes and the activities related to their construction in mathematics classes. In the olden days, various tools were used

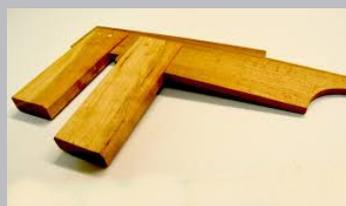
to construct geometric shapes. String was used to draw circles and Try Square was used to make angles. This method is still used today to draw circles in playgrounds and other places. Later, many tools were developed for mathematical drawings. With the growth of ICT technologies, various software are also used for accurate geometric constructions.

GeoGebra, which we have been familiar with in the previous classes, is one of the software that can be used for geometric constructions and activities. Why not try creating some of the structures you come across in your mathematics classes using GeoGebra software?

Tools in GeoGebra

The tools in GeoGebra software are arranged in different groups. Open the GeoGebra software on your computer, check the tools, find the uses of the ones given below and record them in Table 7.1.

Try Square



Carpenters use different types of square. A Try square, also known as a square, is a tool used to mark and check 90° angles on pieces of wood.

Tools	Uses
 Group 2	<ul style="list-style-type: none"> ▪ To mark a point ▪ to mark the midpoint ▪ to mark the intersection point of two lines
 Group 3	
 Group 5	
 Group 6	
 Group 8	
 Group 10	

Table 7.1 Uses of Tools in GeoGebra

Parallels and Perpendiculars

The properties of parallel lines are discussed in mathematics textbook. Parallel lines are lines that go on forever without meeting each other as far as we could know. Similarly, a line that intersects another line at an angle of 90° is a line perpendicular to it.

Find out which tool is used to draw parallel lines in GeoGebra software.

Properties of Parallel Lines

Let's observe some properties of parallel lines?

Open GeoGebra software, draw 4 parallel lines at equal distances, and then draw another line that cuts them (Figure 7.1). Find the distance between the points where the line intersects.

Parallels and Perpendiculars



To draw perpendiculars and parallels in GeoGebra, simply select the tool and click on the line you want to draw the parallel or perpendicular, and then click on the point where the parallel/perpendicular line should pass.

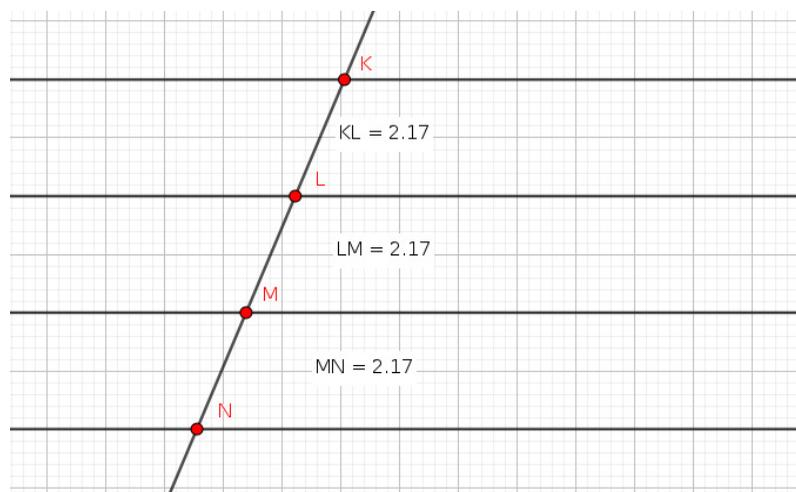


Fig.7.1 A Line that Cuts the Parallel Lines

Is there anything special about the lengths of the segments when a slanting line intersects equidistant parallel lines?

Use the Move tool to slightly change the position of the slanting line. Write your conclusion below.

.....

.....

.....

.....

Activities using Parallel Lines

Open and run the applet triangle.ggb provided in the School Resources folder on your computer. In the applet, a line is drawn parallel to the side AB of the triangle.

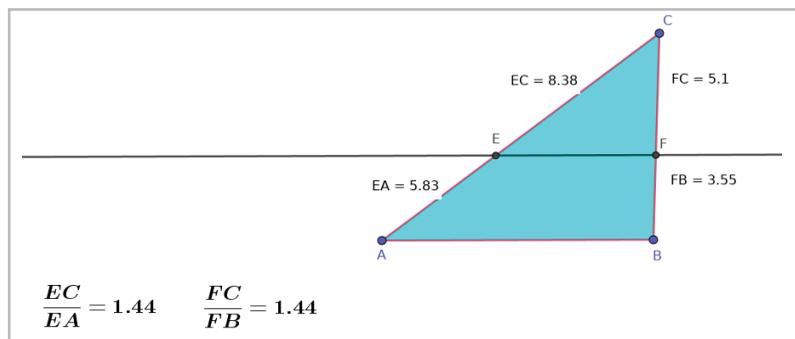


Fig.7.2 Line Parallel to the Side AB of the Triangle

Look at the ratio of the other two sides that this line divides. What is special about this?

.....

Use the Move tool to drag the vertex of the triangle and observe the ratio in the different triangles.

Now, let's see how to prepare some constructions using the parallel lines that you have come across in mathematics class with the help of GeoGebra software.

How to divide a short line into equal segments?

Let's see how to divide a line of 19 units in GeoGebra into 3 equal parts. To do this,

- Select the tool for drawing line with given length in GeoGebra and draw a line of 19 units in length.
- Draw another slanting line from one end of this line (Figure 7.3).
- Use the Segment with Given Length tool to place 3 marks on the slanting line at fixed intervals.
- From the last mark, draw a line of 19 units to the other end of the line to complete the triangle.

Can we divide every length into as many equal parts as we want?



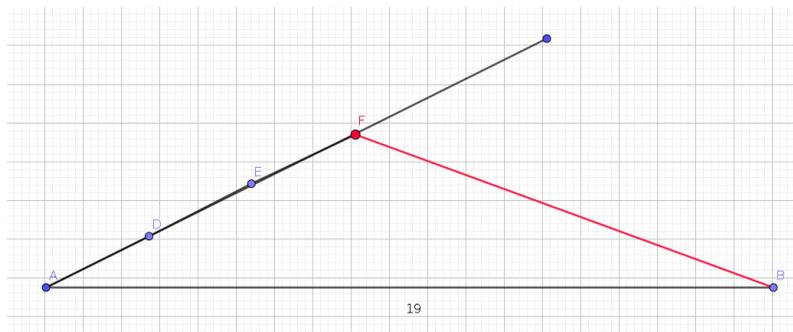


Fig 7.3 Method to Divide a Line Into 3 Equal Parts

- Draw parallel lines to the third side through the marks placed at equal distances on the slanting line.
- Now, using the Distance or Length tool, measure the lengths of the segments formed when the parallel lines intersect the line of length 19 units.
- Save the construction.

Similarly, try doing other activities mentioned in the mathematics textbook with the help of GeoGebra software.



Let's Assess

- ♦  What is the use of the given GeoGebra tool ?
 - a) to draw parallel line
 - b) to draw perpendicular line
 - c) to draw a rectangle
 - d) to draw a circle
- ♦  What is the use of this GeoGebra tool ?
 - a) to draw a polygon
 - b) to draw a perpendicular line
 - c) to draw a circle
 - d) to draw an angle



Follow up Activities

1. Prepare a triangle of perimeter 17 units and sides with ratio 2:3:4 in GeoGebra software.
2. Create rectangles, squares, parallelograms etc., of different dimensions using the tools to draw parallel lines and perpendicular line in GeoGebra software.

7.2 Let's Unlock the Secrets of Elements

The mystery of how objects around us came into existence can be understood by learning about the elements that make them up. The Periodic table of elements helps us do that.

Kalziium is a fun and interactive software designed for the study of Chemistry, based on the Periodic table of elements. In this, the periodic table is not like a chart hanging on the wall, but a digital system that provides detailed information about each element at your fingertips.



Let's Find the Position of Elements in the Periodic Table

The Periodic Table is discussed in our Chemistry textbook. To understand the Periodic Table interestingly in detail, we shall use the Kalziium software. See Figure (7.5).

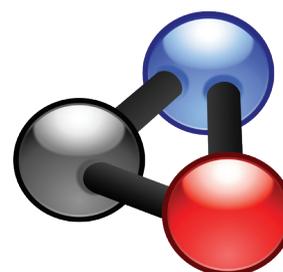


Fig 7.4 Logo of Kalziium Software

		Groups																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18						
Periods	1	H																	He						
	2	Li	Be											B	C	N	O	F	Ne						
	3	Na	Mg											Al	Si	P	S	Cl	Ar						
	4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
	5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
	6	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn						
	7	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og						
												Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
												Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Fig 7.5 Periodic Table

Open the Kalzium software on your computer and check the number of elements in each group and period of the Periodic table.

Now, find the answers to the following questions.

- Which groups have the most elements?
- Which period has the fewest elements?

Let's Understand the Electron Configuration of Elements

Which is the first element in the third period of the periodic table? How do you find its properties using Kalzium software?

Try the activities given below -

To Find the Properties of an Element in Kalzium Software

- Open the Kalzium software and click on the element whose properties you want to find (here, the element Sodium - Na, the first element in the third period).
- In the menu that opens, click on each item of the menu on the left side and explore them. (Fig 7.6)
- Find out what all details of the element are available.

[Na] Sodium (11 - Block s) — Kalzium		
Data Overview	Melting Point	371 K
Atom Model	Boiling Point	1156 K
Isotopes	Electron Affinity	0.5479 eV
Miscellaneous	Electronic configuration	[Ne] 3s ¹
Spectrum	Covalent Radius	154 pm
Extra information	Van der Waals Radius	240 pm
	Atomic mass	22.9898 u
	First Ionization energy	5.139 eV
	Electronegativity	0.93
	Oxidation states	1

Fig 7.6 Peculiarities of Sodium

By clicking on the name of any element in the digital Periodic Table, Kalzium, we can understand a lot about it, such as its atomic number, atomic mass, electron configuration etc.,

Let's View the Atom Model

Click on the Atom Model menu in the window shown in Figure 7.6.

In the window that opens (Figure 7.7), we can see the electrons of the element arranged in each shell. Each circle represents a shell and each yellow dot represents an electron.

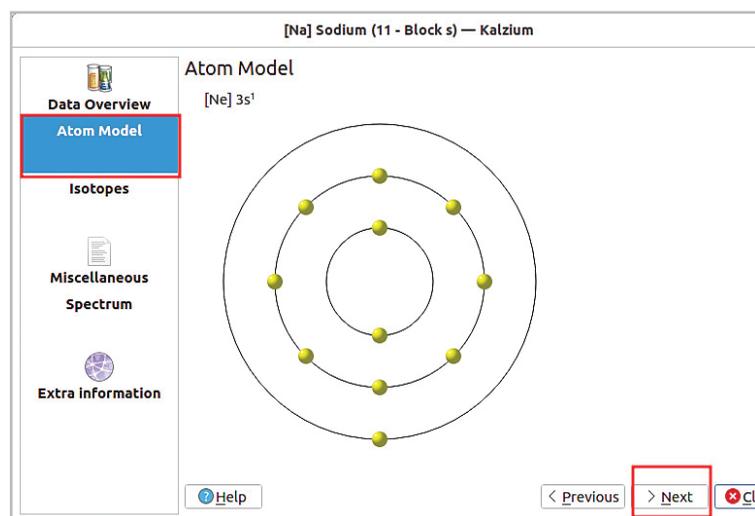


Fig. 7.7 The Atom Model of Sodium

Peculiarities of Elements

In the window of each element, Kalzium provides a detailed information about the physical and chemical properties, history, and its uses.

Now, record the main details regarding Sodium in the Table 7.2 -

	Symbol	Atomic Number	Group	Period	Electron configuration
Sodium	Na				

Table 7.2 Sodium Atom - Details

Click the Next button in this window to see the properties of the next element. You can also check the details of the other elements in this way.

Now complete the table given below (Table 7.3).

Name of the element	Symbol	Atomic Number	Group	Period	Electron configuration
Lithium		3		2	
Potassium	K			4	
Rubidium	Rb		1		2,8,18,8,1
Beryllium	K				
Magnesium		12			
Calcium	Ca		2		2,8,8,2

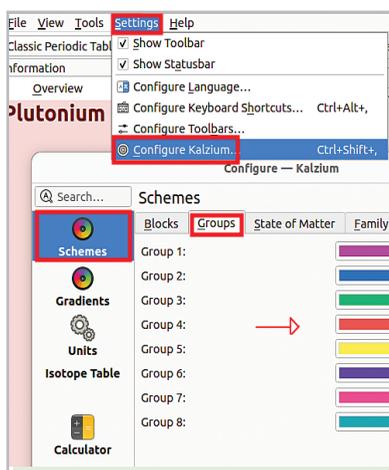
Table 7.3 Peculiarities of Elements

As you can see from the table, the chemical properties of elements are based on the number of electrons in their outer shell.

Main Group Elements

We have learned that the elements in groups 1, 2, 13, 14, 15, 16, 17 & 18 of the Periodic Table are considered as Main Group elements.

Let's check the classification of Main Group elements and their position in the periodic table using Kalzium. The colour coding system in Kalzium can be used for this.



Give Colour

We can give any colour we want to the groups, element families, etc. in the periodic table. To do this, open Settings→Configure Kalzium→ Gradients and change the colour.

To Find Main Group Elements

- Open Kalzium and click on the Scheme tab just below the main menu bar.
- Click on Groups from the drop-down menu.
- Only the elements in that group will be displayed in specific colours (Fig7.8)..

The screenshot shows the Kalzium software interface. The 'Scheme' menu is open, with 'Groups' selected. The periodic table is displayed with main group elements highlighted in various colors. The legend at the bottom shows color-coded groups 1 through 8.

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8																				
Li	Be	B	C	N	O	F	Ne																				
Na	Mg	Al	Si	P	S	Cl	Ar																				
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr										
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe										
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn										
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og										
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Fig 7.8 Main Group Elements

Now click on Family in the Scheme tab. What changes can you see?

When you click on each element in the Legend tab below, doesn't the corresponding element family appear in separate colours?

On selecting Gradients - State of Matter next to the Scheme tab, we can see that the elements are classified based on the state they are found in the nature.

Isn't the year of discovery of the element recorded in the same tab?

Now try to find out the answers to the questions given below-

1. Which main group elements are you familiar with?
2. Write two examples of each of the following main group elements in Table 7.4.

In Solid state	1.
	2.
In Gaseous state	1.
	2.
Non-Metals	1.
	2.
Metalloids	1.
	2.

Table 7.4 Main Group Elements - Categories

Iconic View

There are many elements that you are not familiar with. Have you ever wondered what their uses might be? Click on Scheme → Iconic in Kalzium.

All elements are represented by symbols that indicate their main uses.

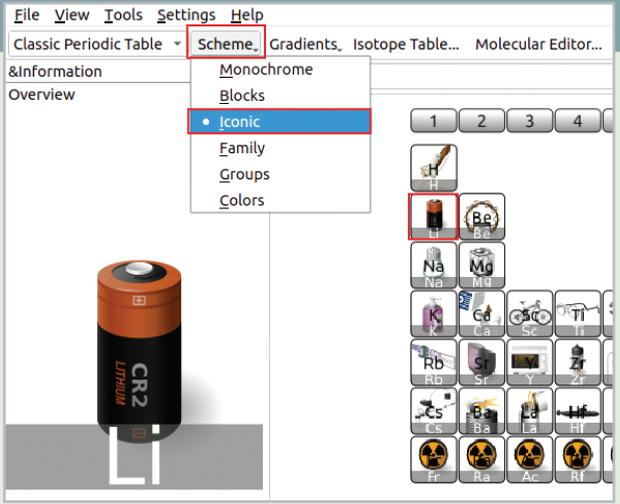


Fig 7.9 Iconic View

We have found out more details about the main group elements. In addition to these, try to understand more about the Transition elements, the Lanthanoids and Actinoids that are part of the transition elements in groups 3 to 12, and the noble gases which are elements in groups 18-10 using the Kalzium tools you have learned so far.

Search Function

You can find elements in the periodic table by searching for their names. To do this, type the name of the element in the search bar below the toolbar and enter it. For example, to search for potassium, type Potassium in the search bar and enter it (see Figure 7.10).

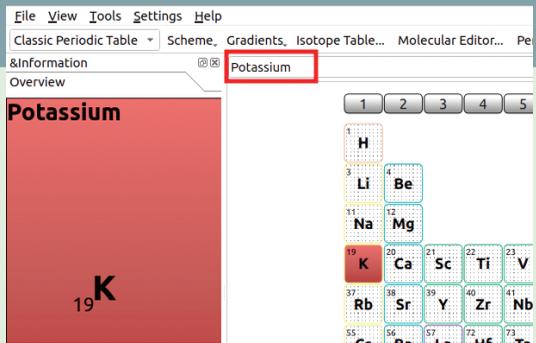


Fig 7.10 Search Option

We have become familiar with the features of Kalzium software. Now complete the following table 7.5 using the software.

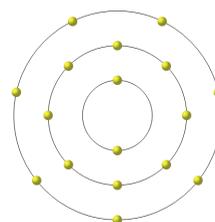
Name of the element	Symbol	Atomic Number	Period Number	Year of discovery	Element Family	Peculiarities/ Uses
Lithium	Li				Alkali metals	
	Al		3	1825		
Zinc				1746		Making of alloys (Brass)
Tin	Sn		5		Main group	
Polonium	Po	84				Radioactive

Table 7.5 Peculiarities of Main Group Elements



Let's Assess

- ♦ Atom model of an element is given. Check the electron configuration of the element and find out answers for the following questions.
 - a) Atomic number of the element
 - b) Number of outermost elements
 - c) Element family
 - d) Period and group to which the element belong



Follow up Activities

1. Using Kalzium software find and list the details about the elements in any two chemicals we use in our daily life.
2. The atomic number of an element belonging to the 2nd period and 18th group of the periodic table is 10. Find the answers to the following questions about this element using Kalzium software -

- i. The symbol and electron configuration of this element.
- ii. The ability of this element to participate in chemical bonds.
- iii. An example of the use of this element in daily life.

7.3 Along the Path of Light...



We have learned in the chapter on Refraction of light, that a pen partially immersed in a container of water appears curved due to the bending of the light path.

The PhET virtual lab software that you learned in the previous class can be used to observe the bending of light path as it passes through different media. The Bending Light in PhET is a wonderful science simulation for this (Figure 7.11).

Science Simulations

Scientific simulation software is used to recreate a real scientific phenomenon on a computer using software. Simulation allows us to observe it without actually performing the activity. Simulation software allows us to closely observe and study scientific phenomena that are complex, dangerous, or occur in places that we cannot reach.

Open the PhET software on your computer, select Physics → Bending of light and observe the bending of light using the Intro session.

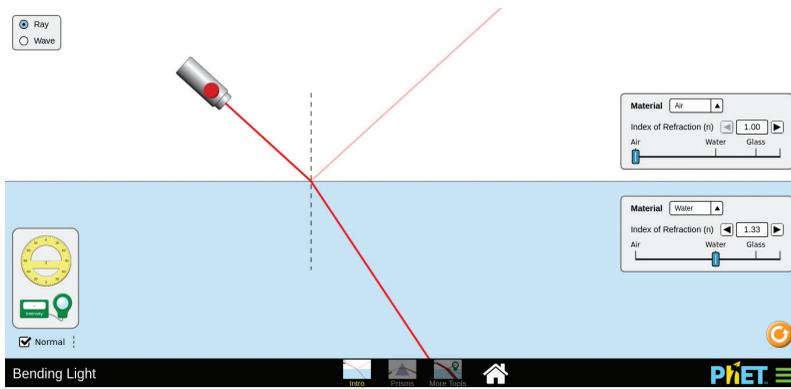


Fig. 7.11 Bending Light Simulation

The source of light in this simulation can be moved used mouse.

What do you observe in this activity ?

- Ray of light coming closer to the normal.
-
-

Let's Find the Angles Measures

Observe the difference in the angles between the two media (air and water) through which light passes in the two sliders to the right of the simulation window.

Using the protractor tool in the simulation window, you can find the angle of incidence and angle of refraction (Figure 7.12). Record the difference in the angles of refraction as the media change in Table 7.6.

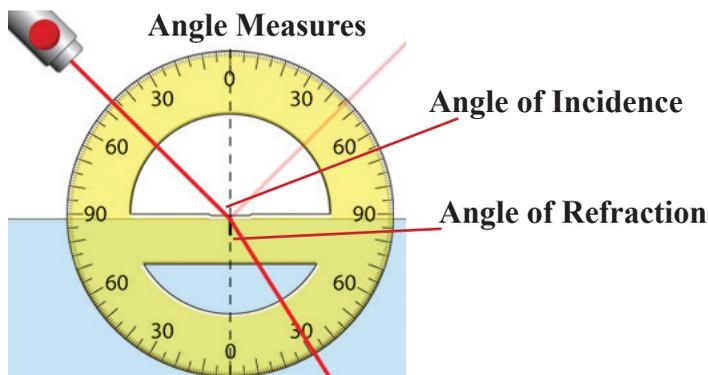
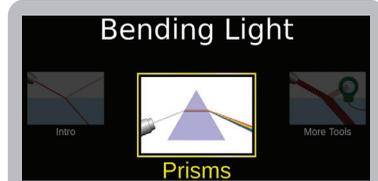


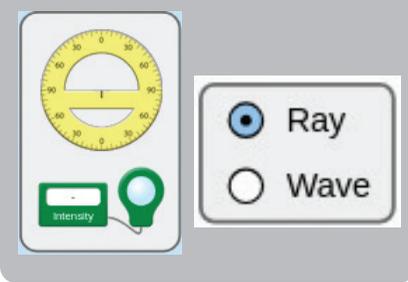
Fig 7.12 Method to Find the Angle of Incidence and Angle of Refraction



We can observe the refraction of light through different prisms via the window Prisms in the Bending Light simulation.

Deviation of the Path of Light and the Intensity of Wave Form

You can use the tools on the left side of the Intro simulation window to understand the variation of the path of wave nature of light and the intensity of light.



Medium 1	Medium 2	Angle of incidence	Angle of refraction
Air	Water	45	30
Air	Air	45	
		45	
		45	

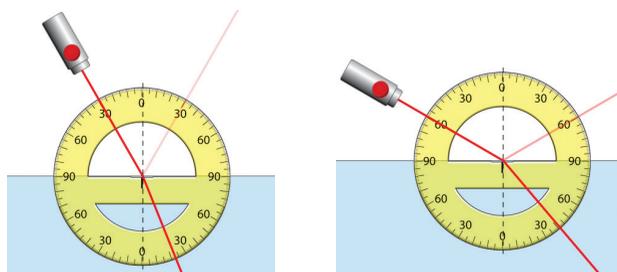
Table 7.6 Difference in the Angle of Refraction According to the Media

From this, we can understand that when light travels from air to water, the path of light becomes closer to the normal and if the medium is the same, there will be no change in path of light.



Let's Assess

- ♦ The images of the two cases obtained when the angles of incidence are measured using Bending Light simulation are given below. What is the conclusion that can be drawn from this?



- The angle of refraction increases as the angle of incidence increases.
 - The angle of refraction decreases as the angle of incidence increases.
 - The angles of incidence do not change.
- ♦ What is the characteristic of the refracted ray if the angle of incidence is 90° ?
 - It comes towards the normal.
 - It goes away from the normal
 - The path does not change.



Follow up Activities

- Using the bending light simulation in FET, illustrate the change in the path of light when it passes through the prisms.





Chapter 8

The Infinite Scope of Presentation

Ebin is preparing to present a topic in an awareness class being conducted at school for the parents on the subject “Bad habits and heart health”. This is also a follow-up activity related to the lesson 'Digestion and Nutrient Transport' in class 9. Ebin wishes to make his presentation impressive in front of the audience which includes his mother and father.

A good presentation can make the presenting better. What are the advantages of such a presentation?

- Systematic presentation of ideas by combining text, images, and audio/video
- Simple presentation of complex information
- Variety in communication styles
-

Why not help Ebin prepare such a presentation by utilizing the unique features of the LibreOffice Impress software?

You have already learned how to prepare a presentation using LibreOffice Impress in previous classes.



Presentation Skills

Presentation skills are one of the most important soft skills that individuals need in their fields of work. While technical skills are only acquired according to their chosen fields, presentation skills are to be developed by any individual. Presentation skills enable us to communicate things clearly, accurately, and effectively. Our presentation skills can be gradually enhanced and improved through continuous practice.

Let's see how to prepare a multimedia presentation on the topic of "**Bad habits and Heart Health**" using some other techniques in Impress.

We have to prepare Storyboard.



The idea is presented in various slides, which is usually used in software based presentations. The design of each slide should be in a way that attracts the attention of the audience.

What preparations are needed for this?

- Based on the topic, information, images, and videos to be included in the presentation should be collected..
-

Once the preparations are complete, the presentation can be created.

What if the first slide in the presentation is prepared with only a symbolic image? Starting the presentation with a thought-provoking image or text like this is a way to make the presentation attractive. We have practised in the previous class how to insert an image into a slide.

In LibreOffice Impress, select a Blank Slide layout and insert an image into the first slide of our presentation.

The image namely Intro.png provided in the School_Resources/Class_9 folder can be used for this.

Include Image in an Impress Slide

- Click on the Insert Image icon in the toolbar and insert the image Intro.png (Figure 8.1).
- We can also use the **Insert** → **Image** method in the menu bar for this.
- Adjust the image to the desired size on the slide.

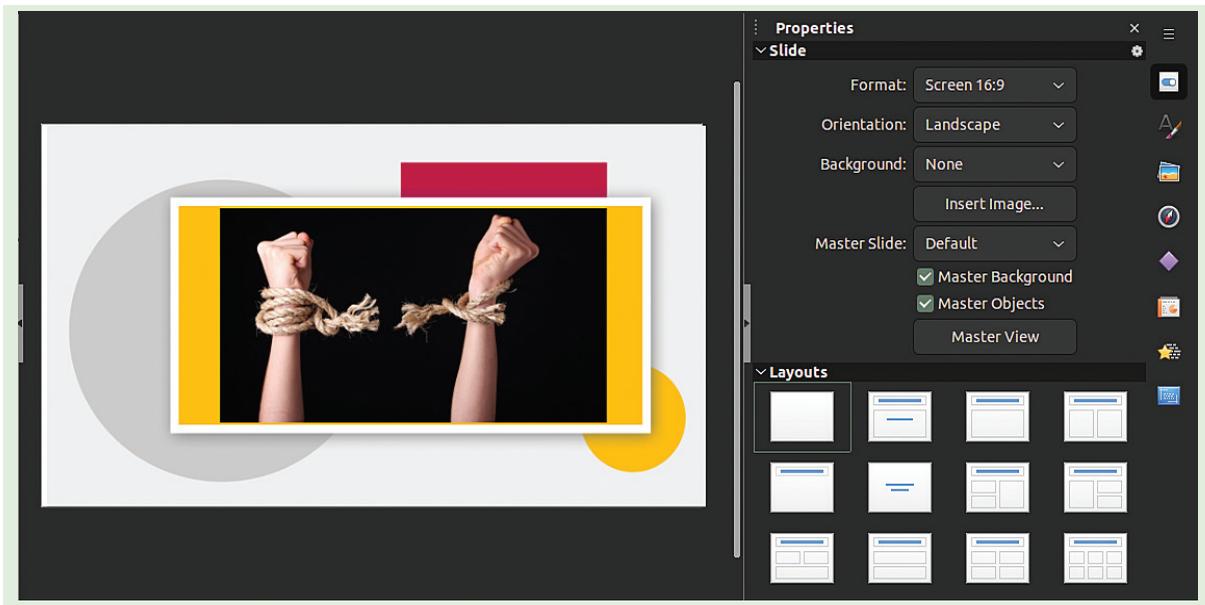


Fig 8.1 Model of the Slide with Image Included

After completing the task, save the presentation with an appropriate name.

Now we need to present the topic.

In the previous class, we also learned how to add text to the slides and animate them to make them attractive. Add a title to the first slide just prepared and animate it.

To Include Text in the Slide and Animate

- Using the **A** tool in the toolbar, insert a textbox and type the title. (Insert→ Textbox method can also be used.)
- Choose the font style, size and colour that suits the title.
- Select the text and select **Animation** from the sidebar.
- Click the **Add** button and adjust the Category, Effects to give a suitable animation (Figure 8.2).

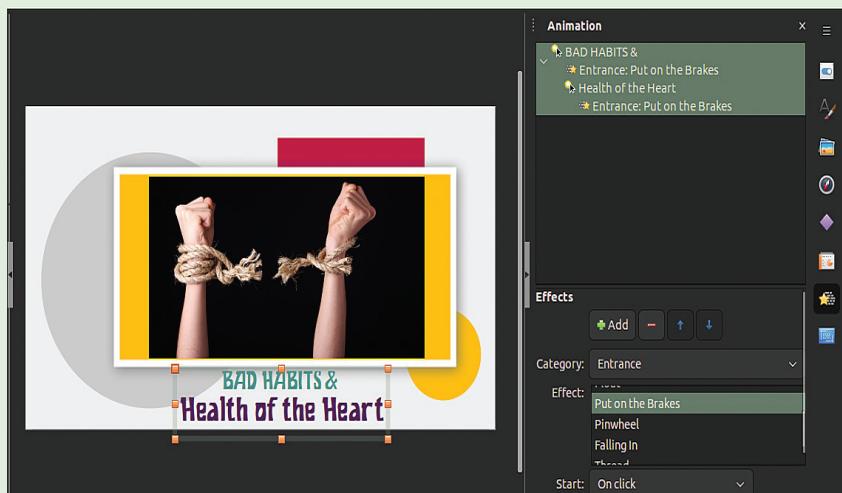


Fig 8.2 Method to Give Animation to the Text

Starting the presentation this way gives it a uniqueness, right ?

Let's start explaining the topic in the following slides.



We know that different layouts are available in Impress to present content in various ways.

But what if we want to use our own designs on different pages according to the content?

LibreOffice Impress provides a system for creating a template design for continuous and uniform slides and using it wherever needed. These are called Master Slides.

Let's Design a Master Slide

Let's see how to prepare the design of some slides required for a presentation as a master slide. It is advisable to design the master slide on a new page. Prepare a master slide according to the instructions below.

Master Slides

Master slides are template slides that serve as the basis for all slides in a presentation. A master slide helps to give all slides the same style. To change the layout of slides using this technique, you just need to change the master slide in question.

To Prepare Master Slides

- Include a new slide.
- Select the lay out with Title, Content.
- Click on the **Master View** from **Slide bar Settings** → **Slide Properties** (figure 8.3).

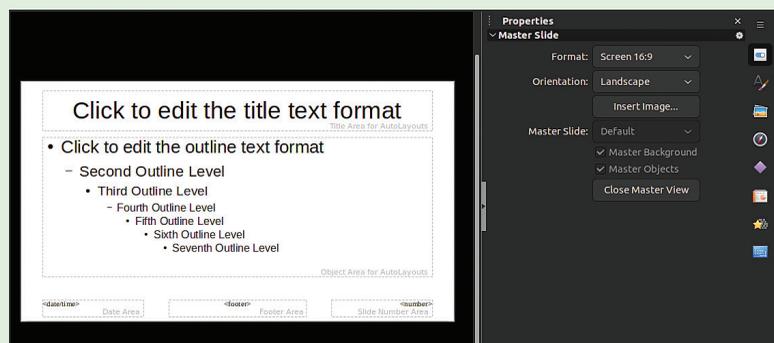


Fig 8.3 Master View – Selected Slide

The Master View has pre-defined positions for various text levels, 2-digit year, Date & Time, Footer, and Slide Number on the selected slide. We can make the necessary changes to these and design them. Look at the design of a master slide prepared for our presentation in Figure 8.4.

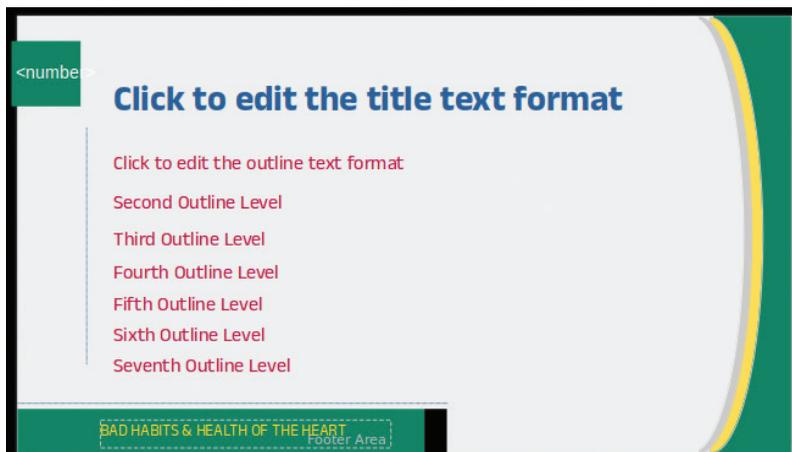


Fig 8.4 Model of Master Slide

How do you design a slide like this?

First, you need to choose the color and size you want for the content. We have already seen how to adjust it. Complete the table below by determining the formats you want to give to the titles and subtitles of your presentation

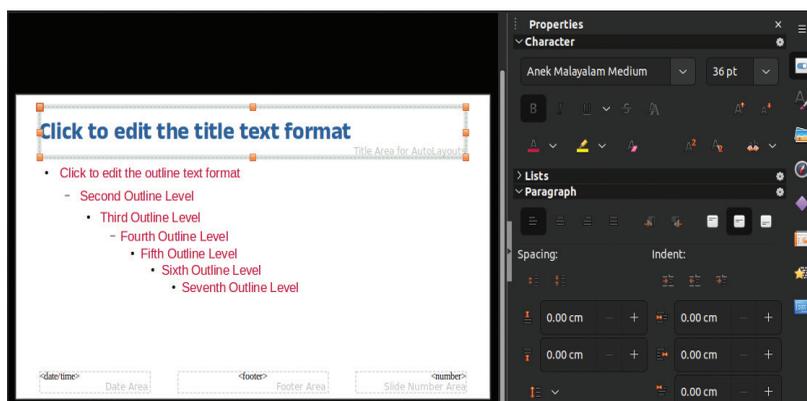


Fig 8.5 Master Slide Formatting

Title	Font Type	Font Size	Font Colour	Style
Heading 1	Anek Malayalam	36	Blue	Bold
Heading 2				

Table 8.1 Formats for Content

Have you finished the list? Now format the content on the slide according to this list (Figure 8.5). Save the changes.

How can we create the designs in the master slide shown in Figure 8.4 ?

Slide Design

Imagination and colour awareness are key factors in designing slides. Using a consistent theme that prioritizes key information and avoids unnecessary embellishments will enhance the presentation. Effective use of blank space on the slide and choosing complementary colours to ensure readability make the slides attractive.

We can create such designs using the Shape tools available in the Insert menu of LibreOffice Impress. Shape tools help you create beautiful designs according to your creativity. The design in Figure 8.4 is created using Rectangle and Moon shapes.

Let's Design Using Shapes

We have completed the design of the texts in the master slide. Now let's try designing using shapes.

To include Shapes

- Select the **Rectangle** shape from the Drawing Toolbar.

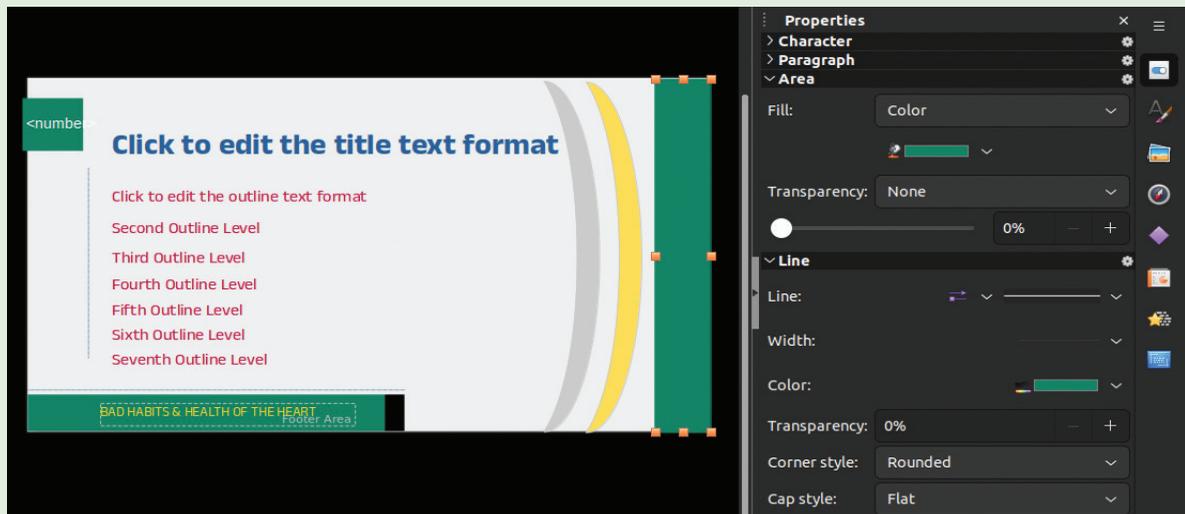


Fig 8.6 Master Slide with Shapes Includes

- Click and Drag from the required position of the slide.
- Apply suitable colour to the Shape by clicking on **Area** and **Line** from the **Properties** window.
- To change the size, click and drag the rectangular boxes that appear while selecting it. (Figure 8.6).
- To add the design on the right in Figure 8.4, select **Moon** from the **Symbol Shapes** and then click and drag.

(Shapes can also be included in the order of Insert → Shapes).

Include Slide Number

Adding slide numbers can be useful when you need to include information across multiple slides in a presentation. Adding slide numbers to the master slide gives all slides a consecutive number.

To include Slide Number

- From the Insert menu, select **Field** → **Slide Number** and insert it appropriately (Figure 8.7).

Date, Time, and Slide Title can also be inserted in this way.

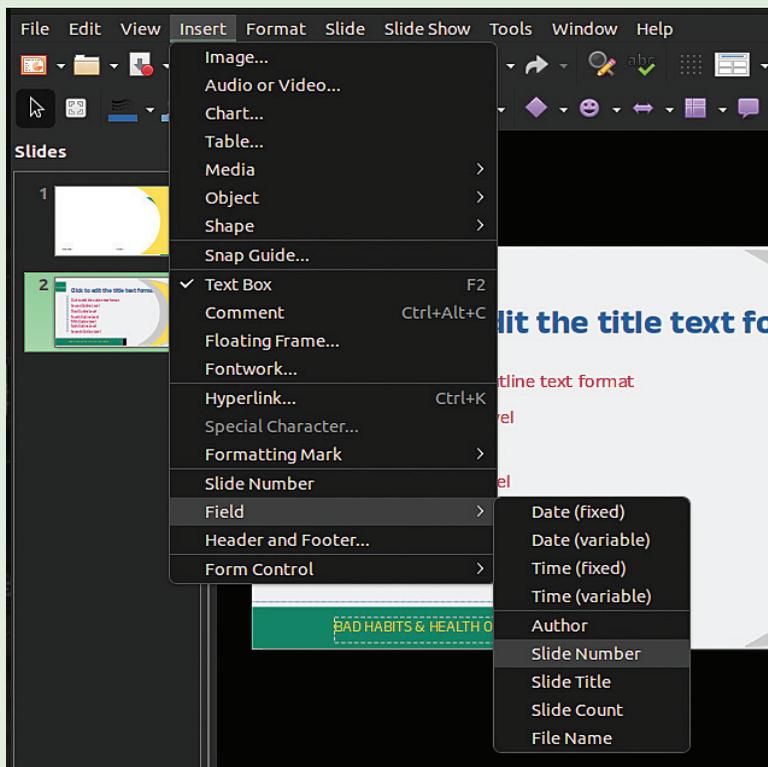


Fig 8.7 Method to Include Slide Number

Master slides cannot be seen in between other slides.



What all arrangements have we done in the Master slide now?

- We have determined the size, style, and colour of the texts.
-
-

Once you have finished designing the master slide, you can turn off editing mode by clicking **Close Master View**. (If any

object/text frame on the slide is selected, Close Master View will not be visible. If so, click anywhere outside the slide.)

Now you have a master slide that can be used on other slides in the presentation. You can create multiple slide templates using **Master Slides**.

To Name Master Slides

The master slides that are created are named Default 1, Default 2, ... etc. To rename them, you can use the Rename Master option that appears when you right-click on a slide in the Slide Pane. The Delete Master option is also available here to get rid of unnecessary master slides.

Master slide design can be used in other slides

How do we include the master slide in a newly added slide that we have designed? Try the following steps :

To Use Master Slide in other Slides

- Click Slide -> New Slide. (new slide can be included by right click on the Slide Pane).
- The Master slides we have prepared will be displayed in the window that appears on clicking Slide → Change Slide Master (Fig 8.8). Select the required Master Slide from here.

(We can also select the required one by clicking on it from the ones listed against the Master Slide in Slide Properties.)

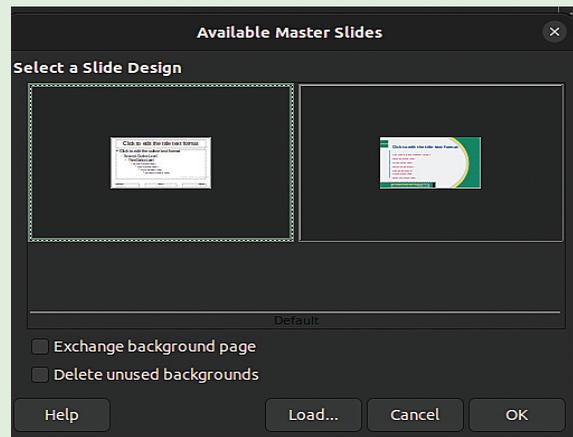


Fig 8.8 Master Slide Window

By including the master slide in this way, we can easily make the required design available in all slides. If we want to change the design later, we just need to select the Master View and change the master slide. It will be reflected in all other slides.

Slides can be designed in various ways according to the characteristics of our presentation. Following a style or colour scheme that unites all slides will help make the presentation attractive.

Observe the design of the following slides (Fig 8.9).

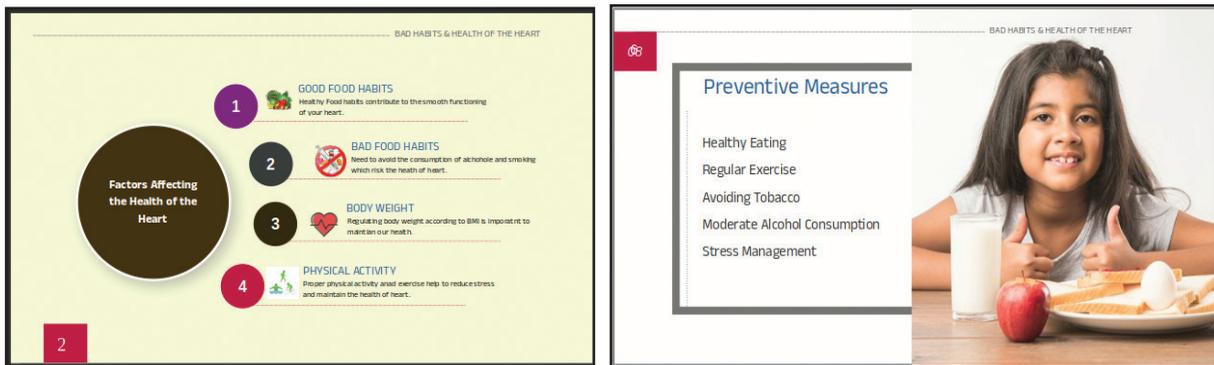


Fig 8.9 Model Slides

Although these Slides are different, they are designed in a way that maintains overall unity in the presentation. What are the factors that contribute to this ?

- Colour composition
- Content distribution
-
-

Create the subsequent slides in this way.

Is the attractiveness of the design the only thing that makes a presentation good?

The systematic and proportional arrangement of contents are also factors that make a presentation appealing.

Bullet Listing

The content of the slides should be concise and suggestive, allowing the presenter to elaborate further. For this, bullet list techniques can be used to list the main ideas.

We have come to understand that data analysis related to the topic being presented can be included in the presentation with the help of charts. Such a chart related to our presentation topic is given in figure 8.10. This is an analysis of some of the factors that put the heart health of adults in India at risk, based on various studies.



Fig 8.10 Chart

Also examine the change that occurs when the same information is included in the presentation as infographics instead of a regular chart (Figure 8.11).

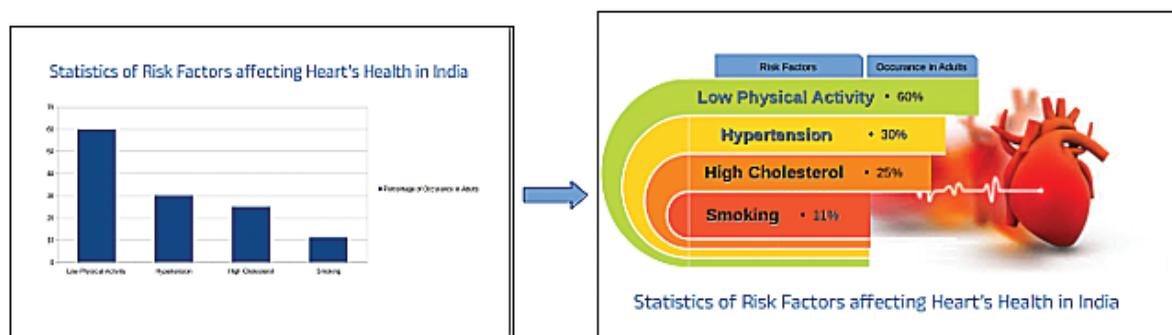


Fig 8.11 Contents of Chart when Included as Infographics

images present the information in the same analytical way. However, the infographics method is more attractive. It allows complex ideas to be presented in a simple way.

Infographics Techniques

Infographics can be prepared using image editing software such as LibreOffice Draw.

Let's see how to prepare infographics using the Gallery system in LibreOffice Impress.

Infographics

Infographics is the short term for Information Graphics. Infographics is a way of presenting complex information in a clear, simple, and engaging way. Infographics combine images, charts, and minimal text to easily present comparative and analytical data.

To Include Infographics

- Select the Blank Slide lot to insert a new slide.
- Select Gallery from the Sidebar Settings on the right.
- Select Diagrams from here (Figure 8.12).
- Click and drag a design from the list to the slide.
- To convert the data given in Figure 8.10 to infographics
 - Select the design Goal-List-Colourful from the Gallery.
 - Double-click on the text boxes to enter **Risk Factors** and **Percentage of Occurrence** (Figure 8.13).
 - While typing, adjust the size of the shapes to fit the space required (Figure 8.14).

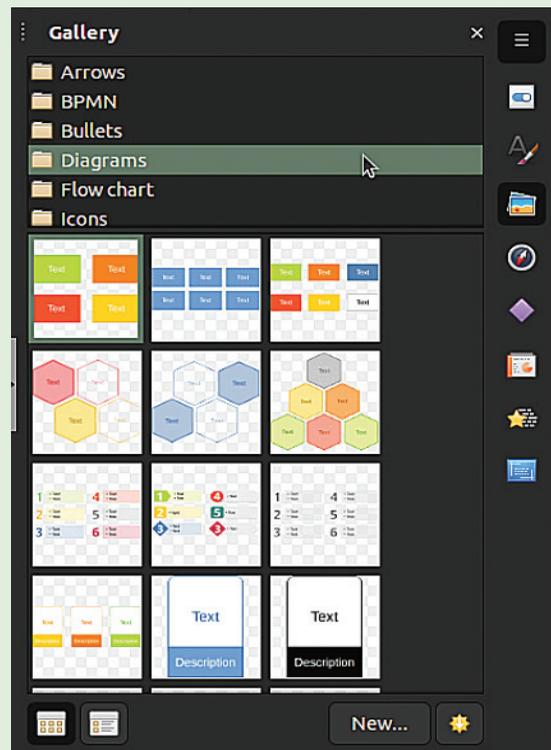


Fig 8.12 Gallery in Impress software

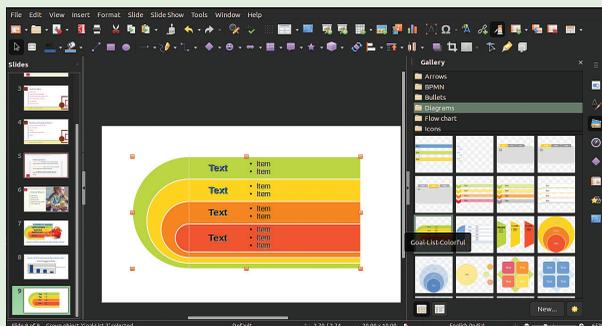


Fig 8.13 Text Included in Shape



Fig 8.14 Method to Adjust the Size of the Shape

Include Titles and Images

It is better to add titles also that clarify what the included information refers to? Since there is no space for that in the current design, try adding another shape (e.g. Rectangle-Cut-2) from the Gallery and adding titles to it (Figure 8.15).

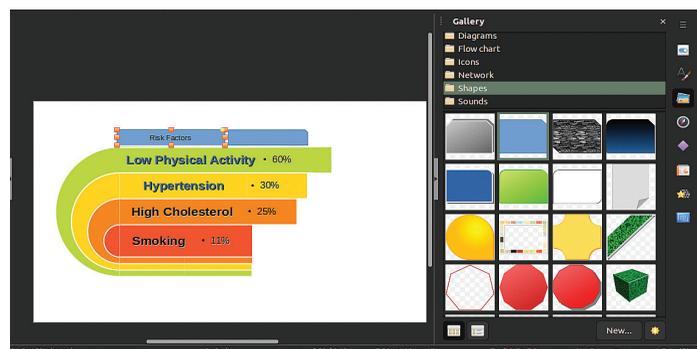


Fig 8.15 Text Included in Shape

Now, you can add the image namely Heart.png given in the School_Resources folder.

If the shapes or images on the slide are hidden while adding the image, right click on it and use the Arrange tool to arrange it appropriately (Figure 8.16).

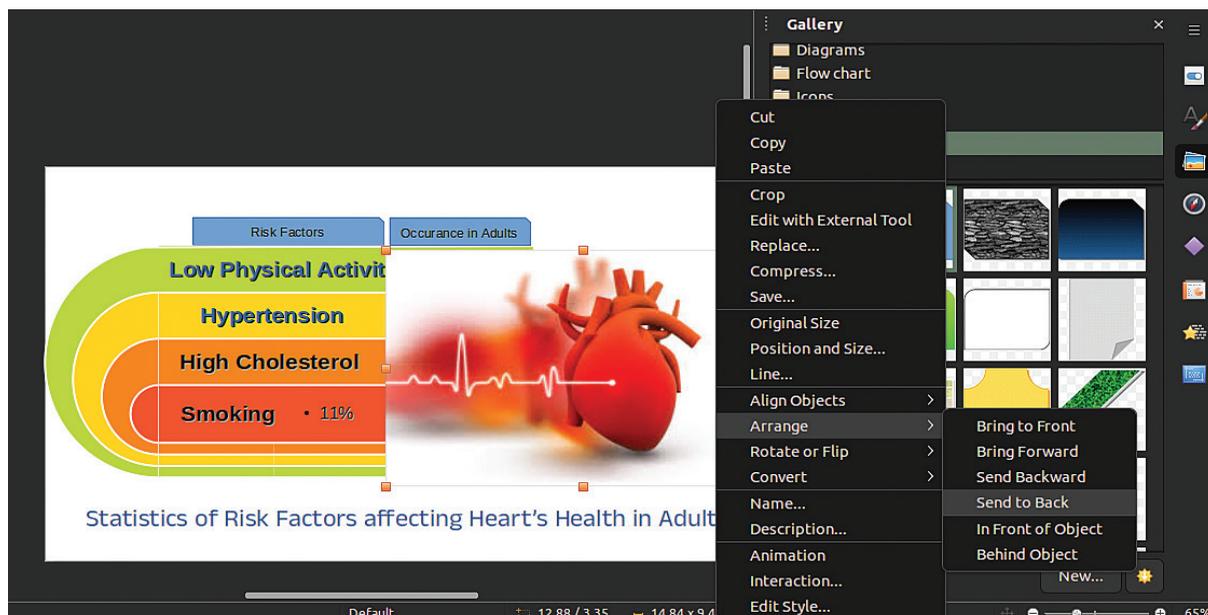


Fig 8.16 Image Included in Infographics



Collaborative Platforms

Collaborative platforms that allow multiple people to create presentations are also available online today. Google Slides, Prezi, Cava, and Slidego are some of these online platforms.

Add the text below the slide as shown in Figure 8.16.

We have now prepared the infographics using the design techniques available in Impress software. We can create our own infographics according to our imagination by combining other techniques available in the Gallery in LibreOffice Impress. In this way, create more slide and make the presentation more appealing by preparing infographics and using the techniques already learnt in the previous years.

Present the prepared presentation in front of your friends as a slide show.



Online Platforms for Presentations

Beyond the workplace, presentation skills are essential for every individual to present their ideas to the wider world. From popular platforms like TEDx to online resources like YouTube and Toastmasters, public platforms are now available to anyone. We have seen people like Malala Yousafzai and Greta Thunberg sharing their ideas around the world and inspiring many.



Presentation Creation Using Artificial Intelligence

The new technology, artificial intelligence, is also being used in the presentation sector. Today, many systems are available online that create presentations within minutes using AI technology, including all the techniques from content to slide design, animation, and interaction. Only those who have a basic understanding of presentation software can use the presentations created in this way by making corrections as needed. Therefore, it is essential to get training in software like Impress.



Let's Assess

- ♦ What happens when you insert a master slide design into a slide with content?
 - a) All the contents on the current slide will be deleted.
 - b) The master slide design will be applied, while preserving all the contents on the current slide.
 - c) Only the contents on the current slide will be hidden.
 - d) The contents on the current slide will be formatted according to the new slide design.
- ♦ What are the characteristics of a slide that cannot be defined through the use of master slides?
 - (a) Background Colour
 - (b) Font Size and Colour
 - (c) Paragraph Style
 - (d) Slide Transitions
- ♦ Which among the following is the main use of the Master Slides ?
 - (a) To give each slide in a presentation a specific animation.
 - b) To define the overall layout and style that can be used for other slides in a presentation.
 - c) To control navigation between slides.
 - d) To give each slide a specific background colour.



Follow up Activities

1. Prepare a presentation master slide using LibreOffice Impress to help you present a speech on the need for nature conservation, which is given as a supplementary activity for the lesson "Waiting for Rain" in the English textbook.

- Using the information provided in the table below related to internet usage, create an infographic using the tools available in LibreOffice Impress. You may add additional relevant information if needed.

Region	Internet Penetration (%)
Asia	60
Africa	36
Europe	85
North America	92





Chapter 9

Creating a Webpage

Reshma and her friends have completed the task of creating a poster using GIMP for the school's fruit festival promotion. They are now considering how to utilize the internet's potential to convey the fruit festival's message to the public. During their discussion, the idea was also raised that in addition to social media, a webpage could be created for promotion and directly added to the school website.

You have probably visited various websites on the Internet. Usually, a website has several webpages.

How to Create a Webpage?

How a Webpage Works

When we want to watch a video or play a game on the Internet, we usually visit the webpage of that video or game. This page includes images, text, buttons, animations, and more.

A webpage is a digital page that can be viewed on the screen of a computer, phone or tablet.

So, how is this webpage displayed on our computer or mobile phone?

A webpage on the internet is actually a file stored on a computer in a special format. This computer is called a server. A phone or computer sends a request to the server saying, "Show this page." The server then sends the page to the device. All of this happens in an instant.

How do we borrow books from the school library?

When we ask for a book, the teacher finds it and gives it to us, right? It's the same with a webpage. When we ask for it, the server sends the page to us.

But how are these pages stored on the server? How is each page identified?

Just like every book in the library has a unique code, each webpage stored on the server has a unique URL. We can view the page only if that URL is typed correctly.

URL (Uniform Resource Locator)

To view a webpage on the internet, the details of where it is stored (the web address) must be known. This address is called the URL.

For example, "https://www.schoolwiki.in" is a URL. When this URL is entered into a web browser on a phone or computer, the corresponding webpage can be accessed.

This URL has three main parts;

1. https://: This indicates how to access the webpage..
2. www: This refers to a part of the server.
3. schoolwiki.in : Name or Domain of this webpage.

How can a webpage stored on a computer be viewed?

Different software programs are used to perform different tasks on a computer. A web browser is the specific software that allows users to access and view webpages from the internet.

Web Browsers

Web browsers are software programs that help display the content of webpages on a computer.

Mozilla Firefox, Chromium, Google Chrome, Safari, and Microsoft Edge are some examples of web browsers.

When we type a URL into the browser's address bar, the browser interprets the URL, retrieves the corresponding webpage from the server, and displays it in the browser window.

The primary function of a web browser is to read the instructions written in a special language on the webpage, convert them into images and text, and display them on the screen.

Let Us Examine the Code of a Webpage

A sample webpage prepared for the school has been provided in the Webpage folder inside School_Resources, named

“school.html”. Double-click the file to open it in your browser (Figure 9.1).

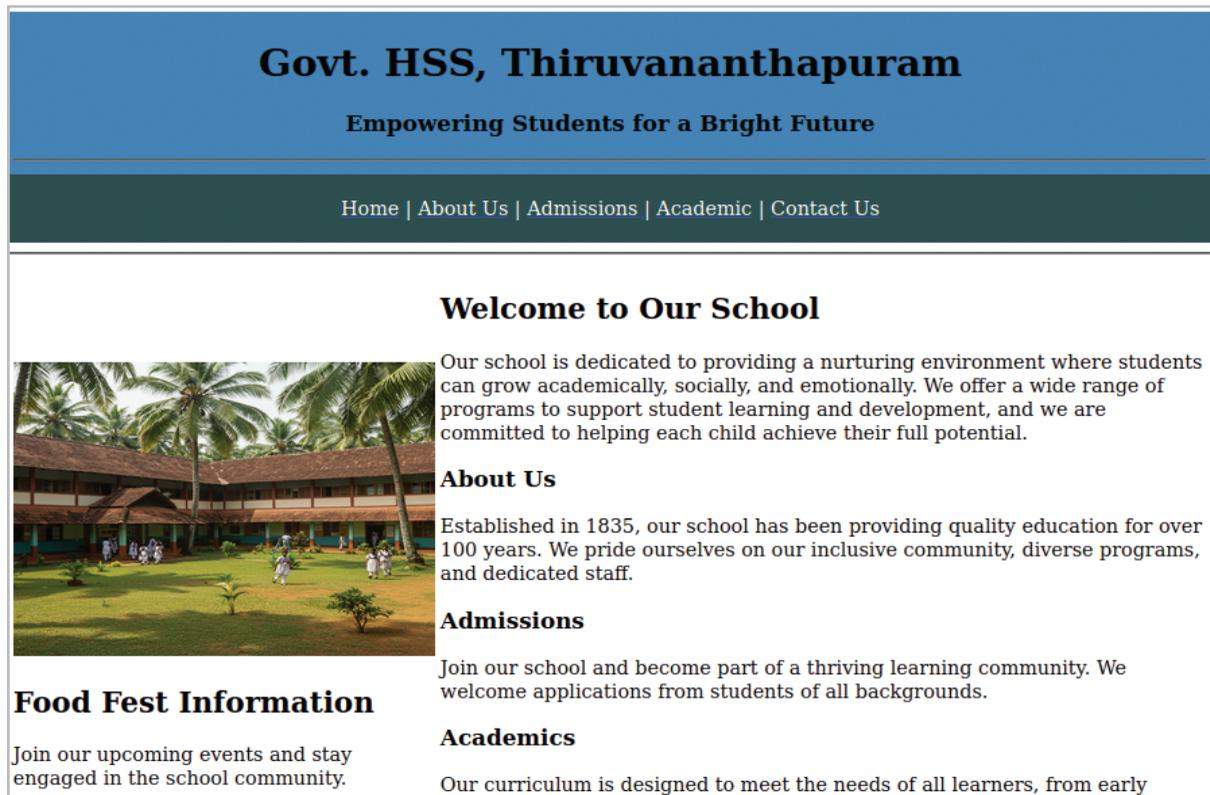


Figure 9.1 Example of a School Webpage

Take a look at the main elements displayed on the page.

- Main Heading or Primary Heading
- Subheadings
- Content
- Images
-

Sir Timothy John Berners-Lee (TimBL) is the computer scientist who invented the HTML markup language. He has served as a professor and research fellow at the University of Oxford and as a professor emeritus at the Massachusetts Institute of Technology (MIT).



Now, on this page, use Right Click → View Page Source to examine the instructions used to create the webpage.

How HTML Works

The instructions (tags) used to create the school webpage can be seen. See if the function of each instruction can be

understood. This page was created using HTML.

Modern websites are mainly created and function with the help of HTML along with other technologies. HTML (Hyper Text Markup Language) is a markup language used to give instructions to the browser on how to correctly display the content on webpages.

Let us understand how HTML is created and arranged, and how it helps in shaping the overall structure and appearance of a webpage. Now, let us create a webpage similar to the model we have recently learned about and examine this activity.

HTML Tags

HTML tags are instructions used in the HTML language to define the content and layout of a webpage. They are written using angle brackets (<>) (for example: <html>). An HTML element consists of a tag and the content enclosed within it.

Eg: <h1>This is a heading</h1>

Let Us Create a Webpage

The template webpage includes details about the school along with an image.

Such content should be prepared in advance before adding it to the webpage.

Basic Structure of an HTML Page

Let us examine the basic structure and tags of an HTML page.

Observe the tags used in the page you have reviewed. At the beginning, the <html> tag is given, and at the very end of the page, the </html> tag is provided. These act respectively as the opening tag and the closing tag of the HTML element. All other HTML elements are placed between these tags.

Now, identify the other tags used in this webpage and complete Table 9.1 based on your observations.

Opening Tag	Closing Tag	Usage
<head>	</head>	<head> is the container used to include information about the metadata of the page.
<title>		The title or heading of the document is added here, which appears in the browser's title bar.
<body>		To include the content to be displayed on the webpage
	</h1>	To add the main heading of the page.
<p>		To organize the content into paragraphs

Table 9.1 Some HTML tags and their usage

The general structure of HTML tags in a webpage is given below (Figure 9.2).

```
<html>
  <head>
    <title>Title of the Web Page</title>
  </head>

  <body>
    Contents of the Web Page
  </body>
</html>
```

Figure 9.2 General Structure of html Tags



METADATA

Metadata is data about data. It refers to the details of a piece of data.

Open the Text Editor software on the computer and try to create a webpage like this one for your school (Figure 9.3).

```
<html>
  <head>
    <title> Govt. HSS Thiruvananthapuram - Home Page </title>
  </head>

  <body>
    <p> <h1> Govt. HSS Thiruvananthapuram Welcomes you </h1> </p>
  </body>
</html>
```

Figure 9.3 Basic HTML Instructions for SchoolPage

Save the file in your folder with the name schoolMain.html. Then, you can close the Text Editor window.

Now, double-click the saved file to open it. Then, check how the information you entered in the text editor is displayed on the webpage (Figure 9.4).



Figure 9.4 Webpage with only the School Name Added

To Edit an HTML file HTML

To edit an HTML file, right-click on the file → Open With Other Application → Text Editor — open it in the text editor and make the necessary edits..

You might have noticed that the contents in your textbooks have headings and subheadings. In the same way, let us try adding headings and subheadings to our webpages too.

Let us Add Headings

We have already discussed that the <h1> tag is used to add the main heading. For other headings, we can use tags from <h2> to <h6>.

Open the file schoolMain.html that we created in the text editor. Just like the <h> tag is used in Figure 9.3, use other tags to add headings and subheadings to your page for details related to schools.

Have you ever thought about how the background color of a webpage can affect its appearance? Try adding a background color to your webpage.

Attributes

Attributes are instructions given within a tag for additional settings. They must be included in the opening tag.

Background Colour can be Given

The content to be displayed on the webpage should be included in the <body> tag. To give the page a background color, the bgcolor attribute can be used along with this tag, as shown below.

```
<body bgcolor="blue">
```

The background color should be one that allows the page content to be read clearly. Instead of color names, hexadecimal color codes can also be used (e.g:- <body bgcolor="#0000ff">). These codes represent a combination of the three primary colors—red, green, and blue. Check the output using the code given below for the background of the webpage you created, and complete Table 9.2

Code	Colour
#ff0000	Red
#00ff00	
	Blue
#000000	
#ffffff	

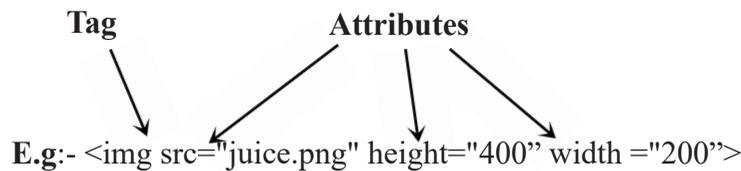
Table 9.2 Some Hexadecimal Codes

Inserting an Image

We need to add pictures to our webpage. Pictures that match the page content make the layout more attractive.

To add pictures, the `` tag is used. Technically, pictures are not added inside the webpage; instead, they are linked to it. Attributes are used to specify where the picture is saved and the size of the picture to be displayed on the page.

Try adding the picture called `juice.png` from the Webpage folder to your webpage using the instructions below.



When giving such instructions, the image to be inserted must be saved in the same folder where the webpage is saved.

Haven't you added the image to the page? Now, check the attributes you used and their values, then complete the table given below (Table 9.3).

Attribute	Value	Usage
src	juice.png	Name of the image file to be included
height		
width		

Table 9.3 Use of Some Attributes

```

1
2 <html>
3   <head>
4     <title>Govt. HSS Thiruvananthapuram - Home</title>
5   </head>
6
7   <body bgcolor="green">
8     <h1> Govt. HSS Thiruvananthapuram Welcomes You.</h1>
9     <p><h2>Our school is dedicated to providing a nurturing environment where students
10      can grow academically, socially, and emotionally.</h2></p>
11     <h2>About Us</h2>
12     <h3>Established in 1835, Our school has been providing quality education for
13      over 100 years. We pride ourselves on our inclusive community, diverse programs,
14      and dedicated staff.</h3>
15     <p><h3>Food Fest Information.</h3></p>
16     <p></p>
17     <p>Join our upcoming events and stay engaged in the school community.</p>
18     <p> Last date for applying stalls for food fest is Feb 20.</p>
19   </body>
20 </html>

```

Govt. HSS Thiruvananthapuram Welcomes You.

Our school is dedicated to providing a nurturing environment where students can grow academically, socially, and emotionally.

About Us

Established in 1835, Our school has been providing quality education for over 100 years. We pride ourselves on our inclusive community, diverse programs, and dedicated staff.

Food Fest Information.



Join our upcoming events and stay engaged in the school community.

Last date for applying stalls for food fest is Feb 20.

Figure 9.5: The Created Webpage and its HTML Instructions

Make the Content Attractive

Have you noticed how the content included in webpages is made attractive?

Some HTML tags and their uses, which help make the content on webpages more appealing, were given in Table 9.4.

Review them, use the necessary ones, and format the content on your webpage to make it look more attractive.

Tag	Attribute	Usage
	color	To apply colour Eg:-About US
	face	To format the font Eg:-Food Fest
	size	To adjust the size Eg:-Item1
 		To end a line and start a new line
...		To make bold Eg:-text
<i>...</i>		For italic formatting Eg:-<i>text</i>
<u>...</u>		To underline Eg:-<u>text</u>

Table 9.4: Some Text Formatting Tags

Let's Add a Table

Suppose you want to display the details of the items prepared for sale at the fruit festival in a tabular format on your web page. To add a table, you need to use the <table>...</table> tag.

At the end of the webpage you have created, try arranging these items in three rows, as shown in Table 9.5. The HTML instructions for this are given in Figure 9.6.

Item	Description	Price
Jack Fruit Jam	100 grams	Rs.150
Mango Squash	100 grams	Rs.100
Tapioca	500 grams	Rs.100

Table 9.5 The Table to be Included in the Webpage

```

<p>
<table border=2>
<caption><font color="blue" face="Comic Sans MS" size=5>Product Catalogue</font></caption>
<tr>
    <th>Item</th>
    <th>Description</th>
    <th>Price</th>
</tr>
<tr>
    <td>Jack Fruit Jam</td>
    <td>100 Grams</td>
    <td>Rs.150/-</td>
</tr>
<tr>
    <td>Mango Squash</td>
    <td>100 Grams</td>
    <td>Rs.100/-</td>
</tr>
<tr>
    <td>Tapioca</td>
    <td>500 Grams</td>
    <td>Rs.100/-</td>
</tr>
</table>
</p>
    
```

Product Catalogue		
Item	Description	Price
Jack Fruit Jam	100 Grams	Rs.150/-
Mango Squash	100 Grams	Rs.100/-
Tapioca	500 Grams	Rs.100/-

Figure 9.6 HTML Instructions for Adding a Table and Its Output

You have now added the table to the page. The tags used to format the table and their usage are given below (Table 9.6), and after reviewing them, you can evaluate the output you have received.

Page Layout Using a Table

It is possible to create a web page layout using a table. For this, a table with rows and columns is designed, and text, images, videos, and other elements are inserted into it.

Tag	Usage
<table>...</table>	Defines a table.
<th>...</th>	Defines a table header cell
<tr>...</tr>	Defines a table row.
<td>...</td>	Defines a table cell.

Table 9.6 Different Components of the <table> Tag

To Include a Video

To include a video file in a webpage, use the <video>...</video> tag.

```

Eg:-<video width="320" height="240" controls>
    <source src="video.mp4" type="video/mp4">
</video>
    
```

Using the suggestions given above, include the video named fruits.mp4 located in the Webpage folder on your computer into the webpage.



Let's Assess

- ◆ Complete the table given below .

Tag	Usage
	Heading
<hr>	
	
	Link

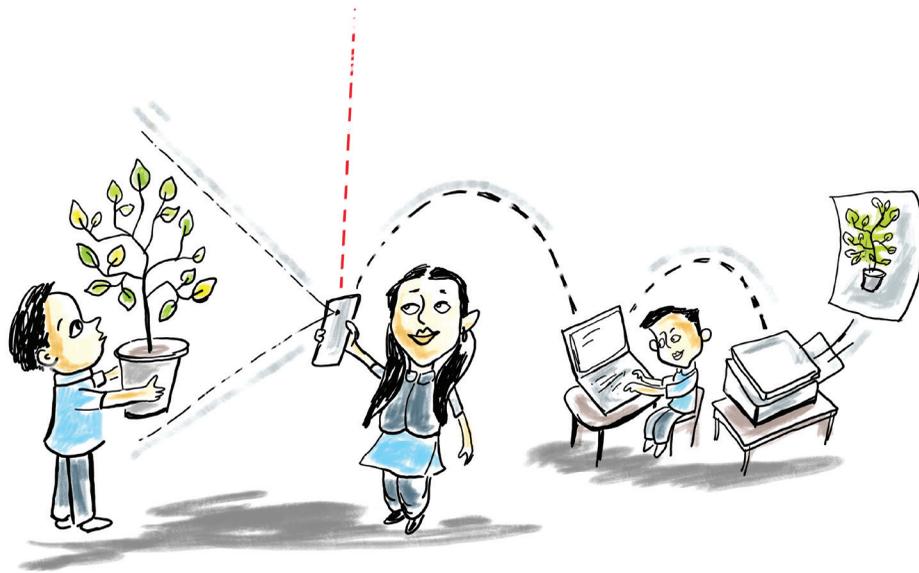
- ◆ An image has been inserted into a webpage using the tag ``. To replace this image with another one, which part needs to be changed??
 - (a) img
 - (b) width
 - (c) src
 - (d) height



Extended Activities

1. Friends, you have heard about the Little KITES IT Club, haven't you? Create a webpage for the Little KITES Club in your school.





Chapter 10

A Network of Computing Devices

Imagine that it is the birthday of a friend who lives far away, and it is the very next day. If you wish to send a birthday message in the form of words, a picture, a sticker, or a reel, which method would you choose?

- It can be sent as SMS (Short Message Service) on a mobile phone.
- It can be sent via e-mail from a phone or computer.
-
-

The messages we send in this manner will pass from one device to another through some medium. These media may include various types of cables and wireless systems. Just like vehicles travelling continuously on a road network must follow certain rules, there are also specific rules that messages must follow while being transmitted.

Often, these messages are transmitted through the Internet. How is the exchange of information communication made possible through the Internet?

Road Network

Observe the movement of vehicles on roads. They travel from one place to another through different routes, based on place names and directional signs.

Whether at busy junctions where many roads meet and diverge, or on narrow roads up hilly slopes, clear traffic rules and signboards have been designed to ensure smooth and efficient flow of vehicles.

In short, a network functions much like a system of roads that includes various types of vehicles heading to different destinations, along with signboards that indicate traffic rules.



Internet

We all use the Internet, don't we? We are quite familiar with it. We are used to accessing Internet services through both phones and computers. Have you ever thought about how a computer in our school's lab gets access to the Internet?

To make the Internet available on a computer, we need an Internet Service Provider. It is this service provider that connects our computer to the vast network of computers known as the Internet. The following are some of the major Internet service providers in India.

- BSNL
- Jio
- Airtel
- Vi

We are all quite familiar with them as mobile phone service providers. As mobile phone technology advanced to include large visual displays and touch-sensitive systems, the same infrastructure developed for phones began to be used for the Internet as well.

Nowadays, even phone calls are increasingly being made using Internet-based systems.

The role of an Internet Service Provider is to connect our device to a network that includes countless computers across the world.

But how are these computer networks built?

Cables

Haven't you seen Internet and telephone cables laid along the sides of our roads? These are usually of two types.

- Optical Fibre Cables – These are thin glass fibres coated with plastic. The data to be transmitted is converted into light signals, which travel through the glass fibres with minimal loss during transmission.
- Plastic-Coated Copper Cables – These use copper wires covered in plastic. Here, the data is converted into analogue signals for transmission over longer distances.
- Addition to these, data is also transmitted to our computers and mobile phones through wireless signals. The services of artificial satellites are used for this.

Different Types of Signals and Converters



Figure 10.1 Media Converter

In a computer, information is stored and processed in digital form. However, digital signals cannot travel long distances through transmission media without significant loss. Therefore, digital signals need to be converted into other forms. The devices used for this conversion are called media converters.

The analogue, optical, and wireless signals that arrive through these cables need to be converted into digital signals that the computer can process (and vice versa). Media converters are the devices used for this purpose. Check if a similar device is used to connect the computers in your lab to the internet.

In this way, we become part of the vast global network that links millions of computers around the world and gives us access to the various services they offer.

Let's examine how this is technically possible.

Let's Share

The same systems mentioned above are used to distribute the information and services available on one computer from the service provider to other computers in the lab.

To transfer data from one computer to another, we establish

a permanent connection through this method. Through the communication enabled by this,

- Files can be transferred from one device to another.
- The internet can be shared.
- Devices such as printers and scanners, even if connected to a single computer, can be used by others.
- As seen in online meetings, audio, video and even the computer screen can be shared.
-

A wide range of possibilities opens up from this point onward.

When computers are connected in such a way that resources like information, hardware, and services can be shared among them, it is called a computer network.

Let's Build a Computer Network

We have already discussed that a medium is required to connect two computers. We have also seen that this can be either a cable or a wireless signal.

Now, let us examine how to create a network using cables. For this, the following devices are required.

UTP Cable (Unshielded Twisted Pair Cable)

The cables used to connect computers within a network are called UTP cables (Unshielded Twisted Pair Cables). These are bundles of wires, twisted into pairs and enclosed in a plastic covering, bound together to form a single cable. (See Figure 10.2)

The commonly used UTP cables contain four pairs of thin wires in different colours. Observe the cable sample available in the lab and complete Table 10.1 based on the order in which the wires are twisted into pairs.

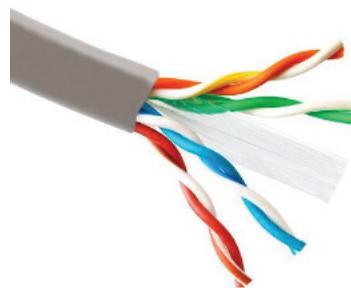


Figure 10.2 UTP cable

Cable Pairs	Colour	Usage
1	Green Solid	White-green stripped.
2		
3		
4		

Table 10.1 Wires in a UTP Cable

Arrangements for Connecting a UTP Cable to a Computer

A port is a system used to connect external devices to a computer. Figure 10.3 shows the port where a UTP cable is connected.

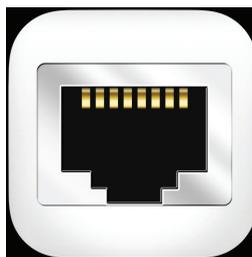


Figure 10.3 Port



Figure 10.4 RJ45

But, the cable we saw earlier cannot be directly attached to this. For this, a connector like the one shown in the picture will have to be attached to the end of the cable. This is called a jack. The connector jacks used in computer networks are technically known as RJ45 (Registered Jack 45). RJ9 and RJ11 are used in older types of telephones.

Data Communication in a Network

Even if a cable like the one mentioned above is connected between two computers, a computer network can be established. However,

- Where different types of connections are used, the data sent from one computer should be received by another, shouldn't it? So, would it be enough for both the sending and receiving computers to simply have identical ports?
- Often, it's not just two computers that need to be connected in a network. More than two computers may need to be used. When setting up a network from one computer to another in this way, wouldn't the computers in between need to have two network ports?
-

For the reasons mentioned above, computer networks are usually set up by connecting all the computers to a single common device. This device is called a switch. We can buy

switches that have as many ports as needed for the computers we want to include in the network.

Hub and Switch

Hub and switch are two devices used to manage a network. However, they do not function in the same way. A hub sends copies of the data being transmitted in the network to all the computers connected to it.

A switch, on the other hand, sends the data only to the specific device it is meant for. As a result, network traffic is reduced and the speed of communication increases. Nowadays, switches are used more commonly.



Figure 10.5 Network switch

In this way, not only can computers be connected to each other, but even computer networks can be interconnected. This is how the Internet is technically defined a large network that connects computers all over the world.

Look at Figure 10.6. Observe and identify what other devices, apart from computers, are present in this network, and record them in Table 10.2.

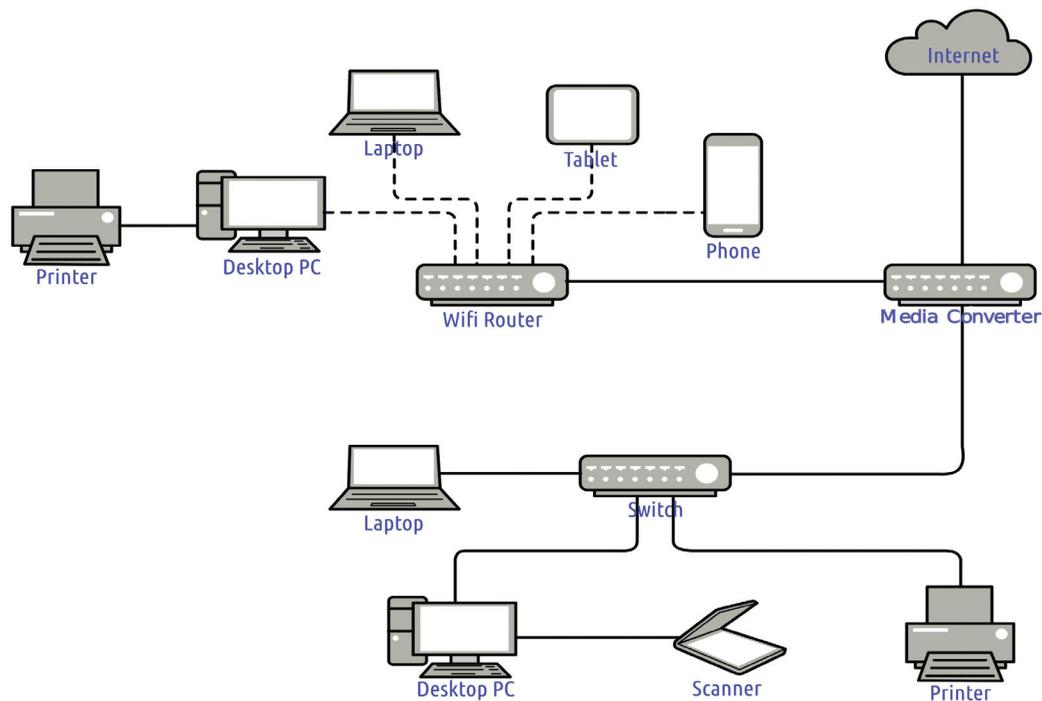


Figure 10.6 Network

	Devices	Numbers
1	Desktop computer	
2		
3		
4		
5		
6		
7		
8		

Table 10.2 Devices Included in the Network

LAN, WAN, PAN

Based on coverage area and the devices included, networks are classified into different types.

Local Area Network (LAN)

A LAN is a setup where computers are connected to each other within a single building or even within a single room. The computer network in your school's computer lab is an example of a LAN.

Wide Area Network (WAN)

You may have heard about the computer networks used by railways, banks, and similar organisations. Most of these networks extend across the entire country, and even beyond national borders. Such large-scale computer networks are called WAN.

Personal Area Network (PAN)

A PAN is a small network surrounding an individual. It is typically used to connect personal devices such as computers, smartphones, tablets, and similar gadgets.

Devices That Can Be Connected Without Cables – Wireless Network

The devices used in the network shown in Figure 10 have already been identified. Was it not observed that some of these devices are connected without using cables?

Cables are generally not used in mobile phone networks. Such networks are known as wireless networks. Instead of cables, RF

waves (Radio Frequency Waves) are used for communication. Wireless technologies such as Wi-Fi and Bluetooth are used to network devices placed within short distances.

Identifying Devices in a Network

We have already become familiar with the devices required for networking. But when there is more than one computer in a

network, how can each one be identified? How can a file be sent to only the required one?

As an example, let us consider the road network we discussed earlier.

Imagine that the destination of a vehicle travelling through this network is your school.

The person driving the vehicle would have a clear idea about the destination. That would be the address or location of your school.

Now, write down the address of your school below :

.....

Every vehicle on the road has a unique destination address, which allows it to reach the correct location. Similarly, each of us has a unique address for correspondence.

In the same way, computers on a network must be assigned unique addresses so they can identify one another. Two such methods of assigning addresses to computers in a network are given below.

MAC Address

Every computer and every device that can be connected to a network is assigned a unique address by its manufacturer. This address is known as the MAC address (Media Access Control address). Whether it is your computer, smartphone, or any other electronic device, the MAC address is used as a unique identification number that distinguishes it from all other devices

Wi-Fi & Bluetooth

Wi-Fi

Range: Typically covers a house or a small office; up to 150 metres.

Speed: Depends on distance, interference, and the number of connected devices.

Devices: Laptops, smartphones, tablets, gaming consoles, smart home devices, etc.

Bluetooth

Range: Short range (about 10 metres).

Speed: Lower than Wi-Fi.

Devices: Headphones, speakers, keyboards, mouse, smartwatches, fitness trackers, etc.

in the world. This is why, when computers or mobile phones are stolen or lost, their MAC address can be helpful for police investigations.

Number Systems

We know that the number system which uses only the symbols 0 and 1 is called the binary system, and the one that uses digits from 0 to 9 is the decimal system. Another such number system is the hexadecimal system. In this system, the symbols used to write numbers are 0, 1, 2... 9, A, B, C, D, E, F, making a total of 16 symbols. Such number systems are used in situations where the number of digits must be limited, but the maximum number of values still needs to be represented.

MAC Address

A MAC address is a hexadecimal number made up of digits from 0 to 9 and letters from A to F. It is usually separated into six pairs (e.g.:00:1B:44:11:3A:B7). Each pair of letters or digits represents a single hexadecimal number. With the emergence of IoT (Internet of Things) technology, it became possible to include a large number of devices in a network. Naturally, each of these devices needs to be assigned an IP address. Now you can understand why hexadecimal numbers are used for MAC addresses.

Try to find the MAC address of the computer you are using in the following way.

- If the computer is connected via a wired connection, open Settings → Network.
- If it is using a wireless connection, open Settings → Wi-Fi.
- From there, open the window of the active network connection.
- In the Details section of the window, the MAC Address can be seen next to the Hardware Address field.

Hardware Address **20:C1:9B:82:02:4E**

Figure 10.7 MAC Address

MAC addresses are assigned by the manufacturers and are usually difficult for us to remember. Instead, there is a system where we can assign addresses to each device that are easier to remember and can be changed.

IP Address

An IP address is the address given to each device in a network so that they can identify each other. All devices connected to networks around the world must be assigned an IP address in a specific standard format.

- We commonly use IPv4 (Version 4) in networks, where an IP address is usually given as a combination of four numbers. These numbers are separated by dots. For example: 192.168.1.1
- There is also a requirement that the numbers in these sets can only be one of the 256 numbers from 0 to 255.

Just like how the school address of each student in a class differs only by their name, the IP addresses of devices in a network differ only in one or two numbers. For example, in most home networks and computer labs using LAN networks, the IP addresses of the devices differ only in the last two numbers. There is also a condition that the first two numbers must not be changed. (Example: In the IP address 192.168.1.15, the part 192.168 should not be altered).

Protocols

We have already discussed how traffic signals are installed on roads to make travel smooth and efficient. These signals are set according to the traffic rules of each country.

However, the basic nature of all systems will be the same.

That is why a traveller moving from one country to another can understand the signals easily and travel smoothly.

It is exactly the same with rules in networks. Computers usually operate on different operating systems such as GNU/Linux, Apple OS, and Microsoft Windows. The software used for



IPv6 (Version 6)

Compared to IPv4, which handles 32-bit IP addresses, IPv6 is a system that can accommodate a significantly larger number of devices. It uses hexadecimal numbers.

An IP address of a computer in IPv6 format is: 2001:0db8:85a3:0000:0000:8a2e:0370:7334. With the rapid increase in the number of devices connecting to the internet, switching to the newer version has become inevitable to accommodate them all.



Figure 10.8
Giving way
Traffic sign -
in India and China

networking in these systems may be different. Even so, a device with one operating system can communicate over a network with a device using another operating system.

This is possible because the networking software in all these operating systems functions based on a set of common guidelines, called protocols.

Let us take DHCP (Dynamic Host Configuration Protocol) as an example.

Even if devices in a LAN network are connected without assigning a specific IP address to each one, data communication is still possible. This happens because the networking software in that computer automatically assigns it an address. In a network, there could be computers with different operating systems. But the address provided should be acceptable to all of them. In such situations, each networking software must follow certain common rules regarding assigning temporary addresses in the network. These rules are defined by the DHCP protocol.

Below are some other such protocols.

Network Protocols

- **TCP/IP (Transmission Control Protocol / Internet Protocol):** These are a set of standard rules used for the exchange of information between devices connected in a normal network or the Internet.
- **SSH (Secure Shell) Protocol:** Software used to control (Remote Login) and operate a computer from another computer located far away is developed based on this protocol.
- **HTTP (Hyper Text Transfer Protocol):** A set of rules that control how software transfers web pages and related information, which are created in hypertext format, across a network. Web browsers work based on this protocol.
- **FTP (File Transfer Protocol):** FTP is a standard network protocol used to transfer files between computers over a TCP/IP-based network, such as the Internet.

Let us connect a computer to a network

Let us see how to connect a laptop, which is not part of the wireless network in our computer lab, to that same network. Follow the steps given below and try it out.

Connecting through Wi-Fi network

- Open the Settings window in the GNU-Linux operating system.
- Open the Wi-Fi window. If it is not active, turn it on by clicking the button.
- From the Visible Networks section in this window, select the network you want to connect to.
- When prompted for a password, enter the Wi-Fi password.

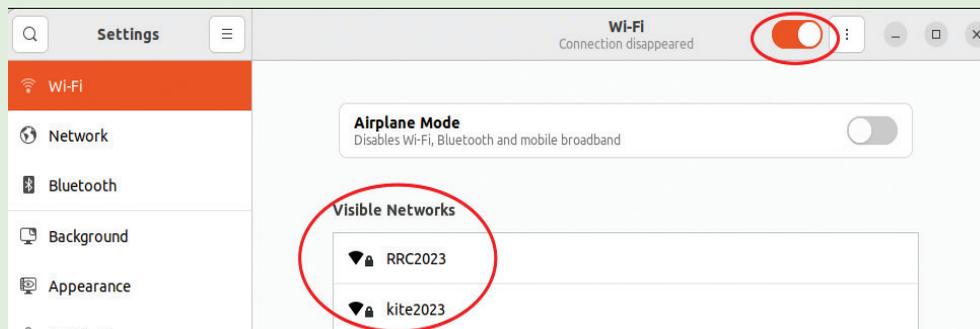


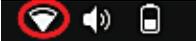
Figure 10.9: Available networks

Hasn't the laptop been connected to the network? In this way, once a computer is connected to a network, an IP address is automatically assigned to it through DHCP. The computer then begins to function on the network. This address can also be used for other operations.

Finding the IP Address

It was earlier mentioned that the connected computer might have automatically received an IP address. If files need to be transferred from another computer on the same network, or if the computer is to be controlled over the network, its IP address must be known.

How can the IP address of a computer be found?

Don't you see an icon related to the network on the top panel of your computer's desktop? This is called  the nm-applet (Network Manager Applet). This applet can be used to find the IP address.

To Find the IP Address

- Click on the Network Manager Applet. From the menu that appears, click the arrow next to the name of the connected Wi-Fi device. From the options shown, select Wi-Fi Settings. (If the device is connected through a cable, select Wired Connected instead.)

CONSTITUTION OF INDIA

Part IV A

FUNDAMENTAL DUTIES OF CITIZENS

ARTICLE 51 A

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

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

CHILDREN'S RIGHTS

Dear Children,

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

Let's see what your rights are:

- Right to freedom of speech and expression.
- Right to life and liberty.
- Right to maximum survival and development.
- Right to be respected and accepted regardless of caste, creed and colour.
- Right to protection and care against physical, mental and sexual abuse.
- Right to participation.
- Protection from child labour and hazardous work.
- Protection against child marriage.
- Right to know one's culture and live accordingly.
- Protection against neglect.
- Right to free and compulsory education.
- Right to learn, rest and leisure.
- Right to parental and societal care, and protection.

Major Responsibilities

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



Contact Address

Kerala State Commission for Protection of Child Rights

'Sree Ganesh', T.C.14/2036, Vanross Junction

Kerala University P.O., Thiruvananthapuram-34, Phone : 0471 - 2326603

E-mail : childrights.cpcr@kerala.gov.in, rte.cpcr@kerala.gov.in

Website : www.kescpcr.kerala.gov.in

Child Helpline - 1098, Crime Stopper - 1090, Nirbhaya - 1800 425 1400

Kerala Police Helpline - 0471 – 3243000/44000/45000

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

- In the Wi-Fi window that appears next, click on the Settings button.



What information is provided in the Details window that opens?

- Look closely at the line where the computer's IP address is displayed (Figure 10.10).

Details	Identity	IPv4	IPv6	Security
Signal Strength	Good			
Link speed	270 Mb/s (2.5 GHz)			
Security	WPA, WPA2			
IPv4 Address	192.168.1.15			
IPv6 Address	fe80::db2a:efa4:d871:ab30			
Hardware Address	20:C1:9B:7D:60:63			
Supported Frequencies	2.4 GHz / 5 GHz			
Default Route	192.168.1.1 fe80::1			
DNS	8.8.8.8 8.8.4.4			

Figure 10.10 the computer's IP address.

Now that you have found the IP address, find the IP addresses of the other computers in the lab and write them in Table 10.3.

System Number	IP Address
1	
2	
3	
4	
5	
6	

Table 10.3 IP Addresses of Different Computers

Assigning a Static IP Address

For transferring files from one computer to another over a network and for carrying out other network-related tasks in a systematic and reliable manner, assigning a fixed (Static IP Address) IP address to each computer is more convenient and effective.

While assigning IP addresses to all computers, the order in which the computers are arranged in the lab or any other easily memorable method can be used as a reference.

As we discussed earlier, only the last two numbers of the IP address usually change for each device in a network.

Assign a static IP address to the computer you are using, as shown below.

To Assign Static IP Address

- In the Network Settings window of the connected network connection, click on the IPv4 tab.
- After selecting Manual under the IPv4 Method, enter the IP address you intend to assign to the computer. (For example: 192.168.1.204)

(Any number from 2 to 254 can be entered in place of 204. The numbers 0, 1, and 255 are technically reserved for other purposes)

- Netmask : 255.255.255.0
- Gateway : 192.168.1.1
- DNS servers : 192.168.1.1

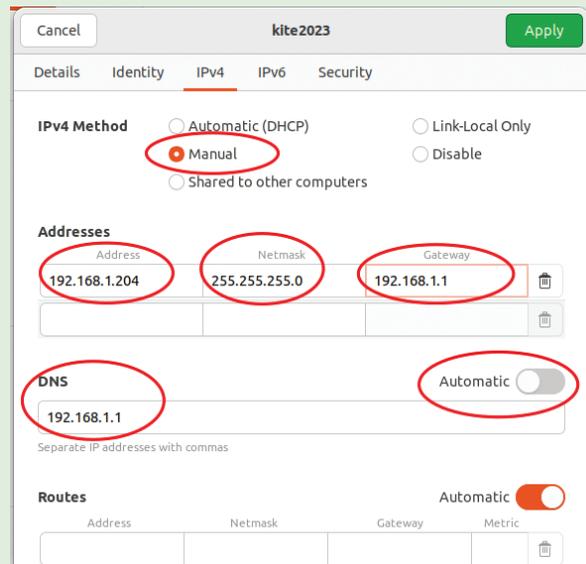


Figure 10.11 Method of assigning a static IP address

Do not forget to turn off the Automatic option for DNS.

Click the Apply button.

In the same manner, assign static IP addresses to all computers on the network by keeping the first three parts of the IP address unchanged (in this case, 192.168.1.) and modifying only the last part (here, .204). There is no need to change the Netmask, Gateway, or DNS servers.

Files can be Transferred

Assume that the computer used during the last IT lab period is different from the one currently being used. Would it be possible to access the files saved during that previous session via the network from the current computer?

What information is required for this?

- Name of the file to be transferred
- Location of the file on the computer
- IP address of the computer where the file is stored (e.g., 192.168.1.15)

- Username and password of the computer where the file is stored.

After gathering all this information, follow the given steps in order.

Let us Check the network functionality

The computers in your lab have already been networked. How can it be verified whether the network is functioning properly? To do this, open a terminal on any computer in the network.

Then, type the ping command followed by the IP address of another computer, and press the Enter key. For example, to check whether a connection can be established with the computer having the IP address 192.168.1.15, use the command; ping 192.168.1.15. If the terminal displays data exchange messages, it indicates that the network is functioning properly.

To Transfer Files

- Click the Files icon from the dock on the desktop.
- In the window that appears, click on Other Locations.
- In the window that opens, under Connect to Server, enter the IP address of the computer where the file is stored in the Server Address field, using the format: ssh://192.168.1.15. (We are using the SSH protocol for the connection.)

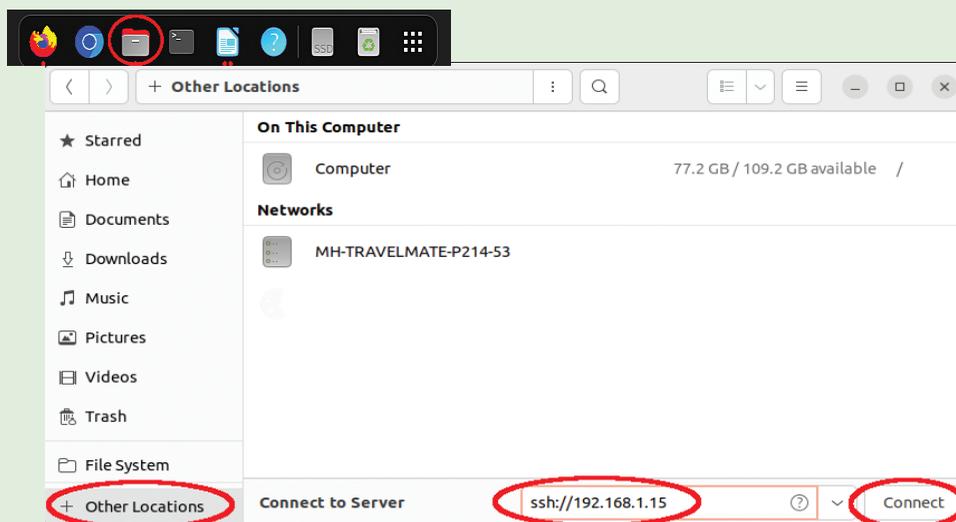


Figure 10.12 Connecting via SSH

- Then, click the Connect button (Figure 10.12).
- When prompted for a username and password, enter the username and password of the computer to which the connection is being made.
- Isn't the file system of that computer now open on your computer? Open the folder where the file is stored and access the required file.

Let's Share the Desktop

In your teacher's online classes, you might have noticed that the activities on their computer screen could be viewed on your computer or phone. Similarly, let us see how the activities on one of the lab computers can be viewed from another computer.

This process uses a protocol called VNC. An internet connection is not required for this. Follow the steps given below.

To View one Computer's Screen on another Computer

- On the computer from which the screen is to be shared, open the Settings window and enable **Sharing**.
- Click on **Remote Desktop (Off)**. In the window that appears,
 - Turn **Remote Desktop** to **On**.
 - Tick the checkbox for **Enable Legacy VNC Protocol**.
- On the computer where the screen needs to be viewed, open the application **Remmina**.
- In the window that appears, select **VNC**.
- In the text box next to it, type the IP address of the computer that is sharing the screen and press **Enter**.
- On the computer that is sharing the screen, a window will appear asking for permission. Click the **Accept** button. The screen of the other computer will now be visible.

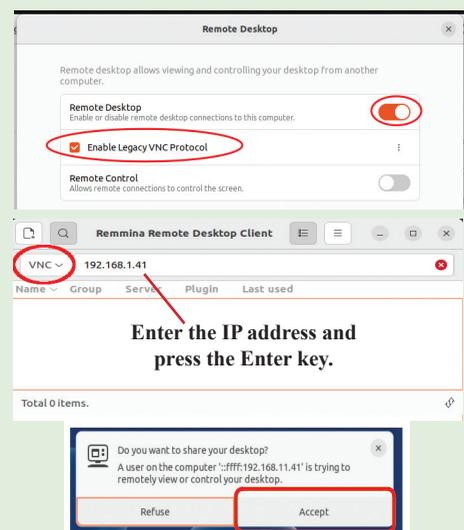
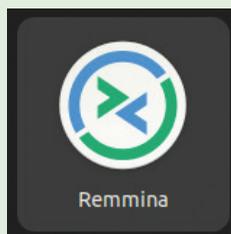
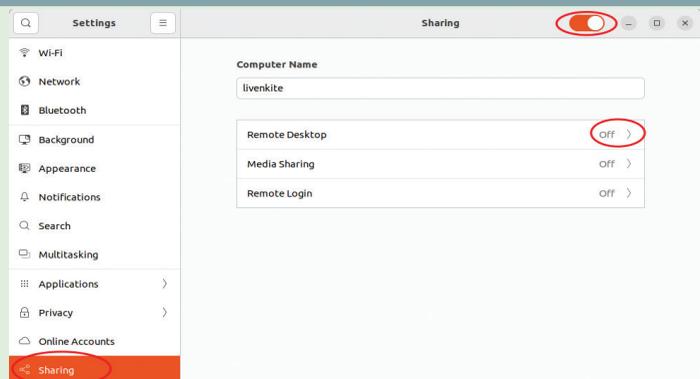


Figure 10.13 Screen sharing settings via Remmina

You have now understood how to view the screen of one computer on another. Next, check whether it is possible to open an application on the connected computer from your own computer.

When Connected to the Internet

The internet is a large-scale extension of the network technology we have studied so far. It is a vast system formed by connecting small and large computer networks across the world. The benefits of being connected in this way are already familiar to you. The internet services and conveniences that humanity is currently enjoying highlight the vast reach of this enormous network.

Servers

The primary purpose of any network is to share data and services. On the internet, high-performance computers configured by service providers store the software needed to deliver data and services to users who request them. These computers are part of the network like any other, but since they provide services, they are called servers. The websites we create are stored on servers, and they can be accessed using the server's IP address.



Figure 10.14 Internet Server

Domain Names

To view websites stored on internet servers and to use the services they offer, the IP address of the server must be entered.

For example, 210.212.233.54 is the IP address of a website on the internet. Type this IP address into a browser's address bar and press Enter.

Next, in a new tab, type `https://cusat.ac.in` and press Enter. Which institution's website opens?

It's the same website in both cases. This means that the website of the Cochin University of Science and Technology (CUSAT) can be accessed using either method.

Which method is more convenient for us? In the first method, it can be difficult to remember the address.

In the second method, software is used to convert IP addresses into names that are easier to remember. These names are known as domain names. Every website will have such a domain name.

IoT (Internet of Things)

There was a time when the internet was used only on computers. But today, many modern electronic devices around us are capable of being connected to the internet and operated through it.

Take a look at the list below:

- Smart televisions.
- Some refrigerators and washing machines.
- Bulbs and fans that can be controlled via the internet.
-

These kinds of devices are called **smart devices**. The main difference between them and ordinary devices is the inclusion of a **microprocessor**. This allows the devices to connect to a network and be controlled even from a distance. Such a system is known as **IoT (Internet of Things)**.



Let's Assess

- ♦ Identify the example of an IP address from the options given below.

A) 192.168.1.257	B) 192.168.1.256
C) 192.168.256.1	D) 192.168.1.254
- ♦ Which of the following devices is used very rarely nowadays?

A) Switch	B) Router
C) Hub	D) Media Controller
- ♦ Based on usage, which of the following does not belong to the group?

A) Switch	B) Router
C) Hub	D) Media Controller

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- Right to participation.
- Protection from child labour and hazardous work.
- Protection against child marriage.
- Right to know one's culture and live accordingly.
- Protection against neglect.
- Right to free and compulsory education.
- Right to learn, rest and leisure.
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'Sree Ganesh', T.C.14/2036, Vanross Junction

Kerala University P.O., Thiruvananthapuram-34, Phone : 0471 - 2326603

E-mail : childrights.cpcr@kerala.gov.in, rte.cpcr@kerala.gov.in

Website : www.kescpcr.kerala.gov.in

Child Helpline - 1098, Crime Stopper - 1090, Nirbhaya - 1800 425 1400

Kerala Police Helpline - 0471 – 3243000/44000/45000

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