As per
NEP 2020 and NCF 2023

Tech Ninja

WINDOWS 11 & OFFICE 2021

A Textbook of Computer Science
for Joyful and Experiential Learning

1

By
Editorial Team
Inventant Education

Inventant Education
Present Meets Future
(A Unit of EDULABZ International)

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Introduction

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Aligned with NEP 2020 and NCF 2023

FEATURES OF NEP 2020

21st Century Skills

Learning Skills (4Cs)
- ✓ Critical Thinking
- ✓ Creativity
- ✓ Communication
- ✓ Collaboration

Literacy Skills (IMT)
- ✓ Information Literacy
- ✓ Media Literacy
- ✓ Technology Literacy

Life Skills (FLIPS)
- ✓ Flexibility
- ✓ Leadership & Responsibility
- ✓ Initiative
- ✓ Productivity & Accountability
- ✓ Social Interaction

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In NCF 2023, **curriculum** means not only what is given in the books, but also how the learners learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

The Six Pramanas

Inference | Perception | Comparison | Verbal Testimony | Non- Apprehension | Postulation

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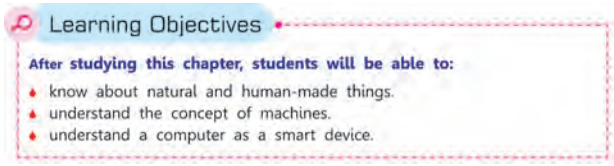

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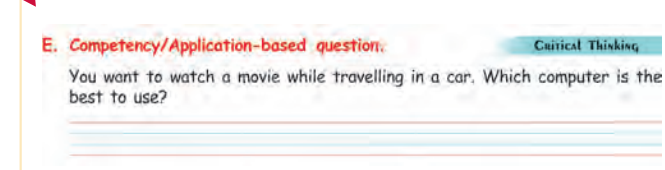
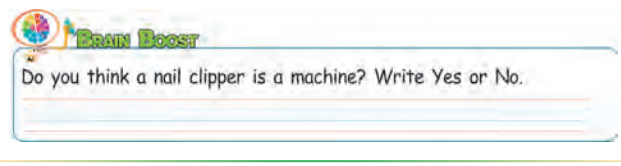


Competency/Application-based questions

Assesses the learners analytical and critical thinking abilities

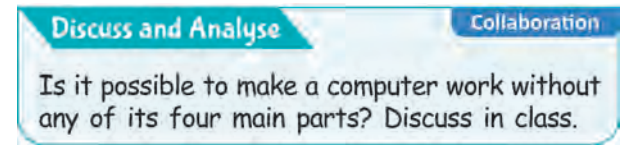


Brain Boost

An interesting question to think out

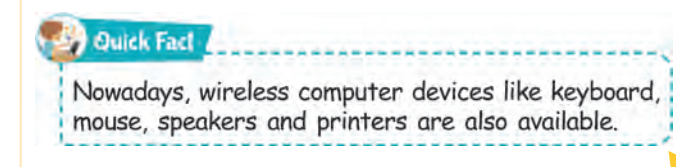
Get Ready

Warm up activities that sparks curiosity and engagement



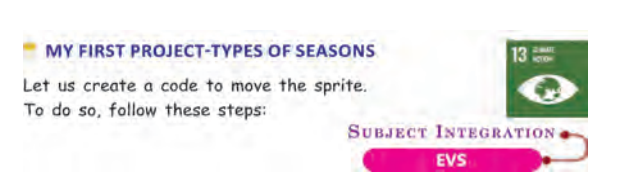
Discuss and Analysis

An engaging questions for the learners



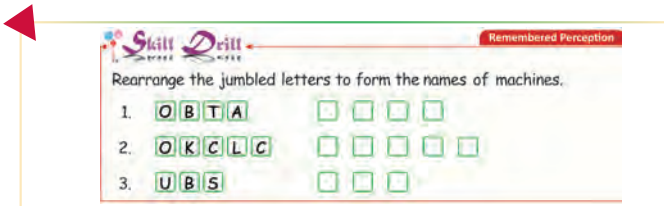
Quick Fact

An interesting piece of knowledge



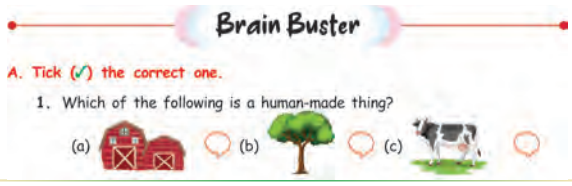
SDGs

Goals decided by various countries to be achieved by 2030



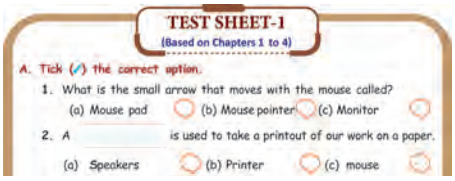
Skill Drill

An activity that reinforce learning among the learners



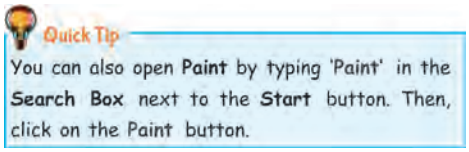
Brain Buster

A set of questions for assessing the learner's knowledge



Test Sheet

Evaluates the learner's knowledge in a subject

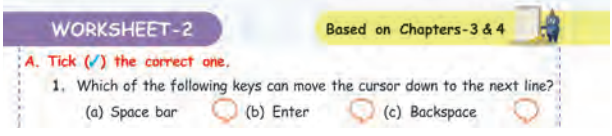


Quick Tips

An interesting bit of knowledge that will help the learners

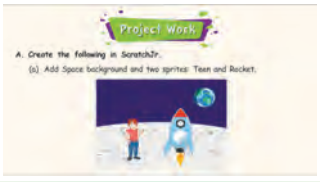
Computational Thinking

A question that needs the learners to think and solve analytically



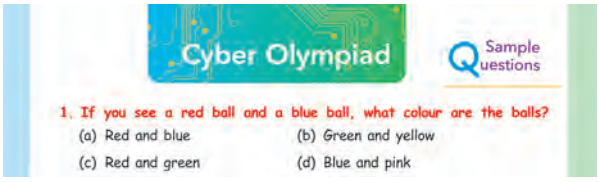
Worksheets

Reinforcing and assessing students understanding



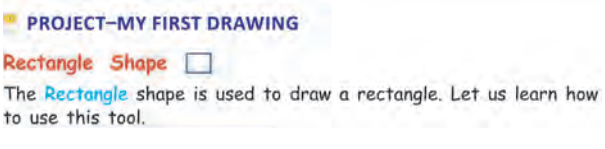
Project Work

In-depth exploration and application of learned concepts



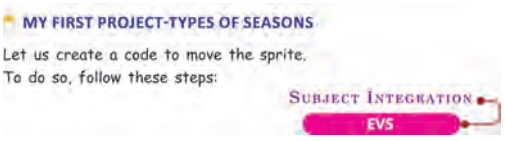
Cyber Olympiad

A competitive exam conducted by SOF for each class in schools to assess learners



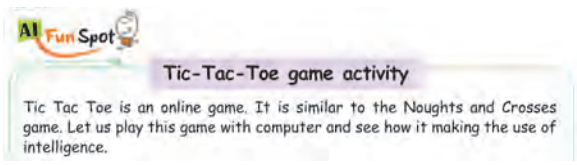
Project-Based Learning

Focuses on enhancing practical knowledge



Subject Integration

Project and activities are crafted to link different subjects for better learning



AI Fun Spot

An AI fun lab activity to spark curiosity

• Contents •

1. Computer – A Smart Device 7

• Natural things • Human-made things • What is a machine? • What is a device? • Computer - A smart device • Characteristics of computer • Types of computer

Uses of a Computer 16

2. Parts of a Computer 19

• Main parts of a computer • Other parts of a computer

Worksheet - 1 26

3. Knowing a Keyboard 27

• Alphabet keys • Number keys • Special keys

4. Using a Mouse 32

• Proper way of using a mouse • Holding the mouse • Mouse pointer • Mouse actions

Worksheet - 2 39

Test Sheet - 1 40

5. Data and Storage Devices 41

• What is data? • What is memory? • Data storage device

Fun with Tux Paint 48

6. Introduction to Paint 51

• Starting Paint • Components of Paint window • Tools in Paint • Project—My First Drawing

Worksheet - 3 61

7. Let's Code: ScratchJr 62

• Starting ScratchJr • Components of ScratchJr • My First Project—Types of Seasons • Adding blocks for scene-2

8. My AI Pal 79

• AI Fun Spot—Tic-Tac-Toe Game

Worksheet - 4 83

Test Sheet - 2 84

Project Work 85

Computational Thinking 86

Game Time 87

Cyber Olympiad 88

1 Computer– A Smart Device

ICODE-kHSZ

Learning Objectives

After studying this chapter, students will be able to:

- know about natural and human-made things.
- understand the concept of machines.
- understand a computer as a smart device.

Get Ready

In this picture, there are various objects. Some of them are natural things, while others are human-made things.

What do you mean by natural and human-made things?

Let us read the chapter to learn more about it.

NATURAL THINGS

Things that are given to us by nature are called natural things. For example, in the picture, tree and cow are available in nature, so these are called natural things.

Tree

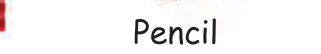
Cow

HUMAN-MADE THINGS

Things that are made by humans are called human-made things. For example, a house, pencil, and clothes are human-made things.

House

Clothes


Pencil

WHAT IS A MACHINE?

Machines are human-made things that make our work easier. They help us do different types of work. They save our time and work very fast. Let us learn about some common machines.

Refrigerator

Calculator

BRAIN BOOST

Do you think a nail clipper is a machine? Write Yes or No.

Type of Machines

There are different types of machines. Each perform a different function. Let us learn about them.

Runs on Electricity

Microwave

Juicer

Runs on Fuel

Bus

Motorbike

Skill Drill

Remembered Perception

Look at the pictures and tick (✓) the ones that are runs on fuel.

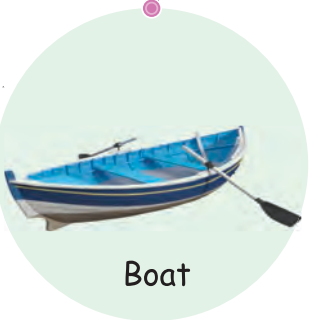
Runs on Battery

Clock

Camera

Runs on Human Power

Cycle


Boat

Skill Drill

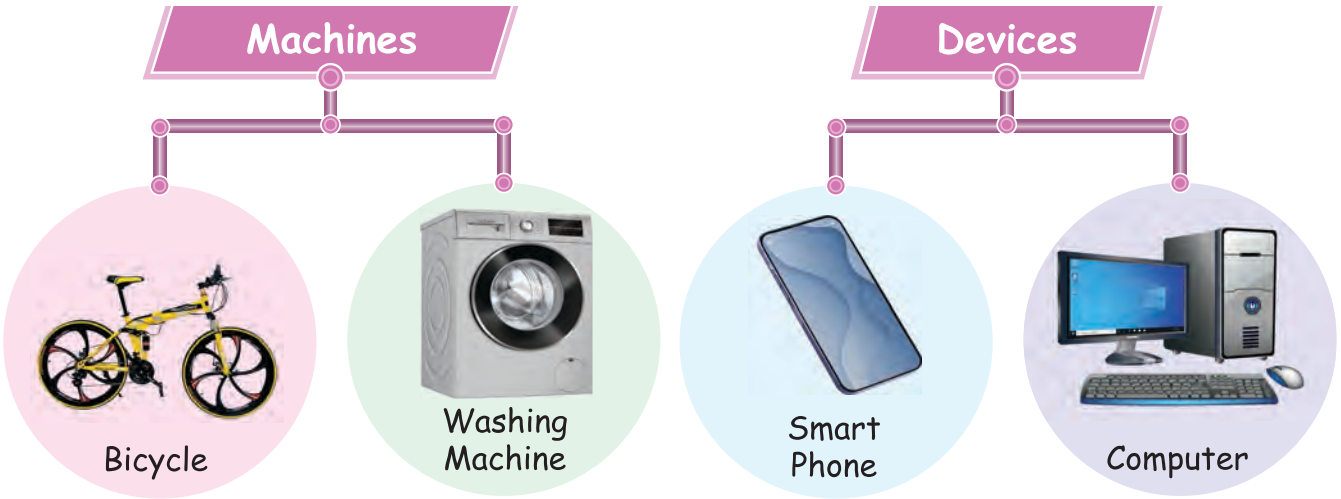
Remembered Perception

Rearrange the jumbled letters to form the names of machines.

1. O B T A ☐ ☐ ☐ ☐
2. O K C L C ☐ ☐ ☐ ☐ ☐
3. U B S ☐ ☐ ☐

WHAT IS A DEVICE?

A device is a special kind of a machine that helps to do a particular job. For example, a microphone is a recording device.



COMPUTER—A SMART DEVICE

A computer is a human-made device. It runs on electricity and needs our instructions to work. It can do many things, like helping us learn new things, play fun games and stay us connected with others.

CHARACTERISTICS OF A COMPUTER

Interdisciplinary Learning

Complete the picture by joining the dots and colour it. Also, write its name.

I am a _____ _____ _____ _____ _____ _____ _____ _____ .

TYPES OF COMPUTERS

Children! Let us meet different types of computers.

Hi!
I am a desktop computer. You keep me on a desk. I run on electricity. You cannot carry me from one place to another.

Hi!
I am a laptop. I am a small and light-weighted computer. You can put me on your lap. You can carry me with yourself.

Hi!
I am a tablet. I am smaller than a laptop but larger than a smartphone.

Hi!
I am a Smartphone. I am a small computer. I have a touchscreen and can fit in your hand and pocket.

Brain Buster

A. Tick (✓) the correct one.

1. Which of the following is a human-made thing?

(a) ◯ (b) ◯ (c) ◯

2. Which of the following devices has a touchscreen and can fit in your hand?

(a) ◯ (b) ◯ (c) ◯

3. Which of the following does not run on battery?

(a) (b) (c)

B. Write 'T' for true and 'F' for false statements.

1. A clock runs on human power. ☐
2. A computer needs our instructions to work. ☐
3. A computer can store a large amount of information. ☐

C. Identify the machines and write their names in the blank spaces and match with the uses.

_____ It helps to calculate the sums.

_____ It keeps our food fresh.

_____ It is used to transport people.

D. Answer in One Word.

1. It never gets tired. _____
2. It works on fuel. _____

E. Competency/Application-based question.

Critical Thinking

You want to watch a movie while travelling in a car. Which computer is the best to use?

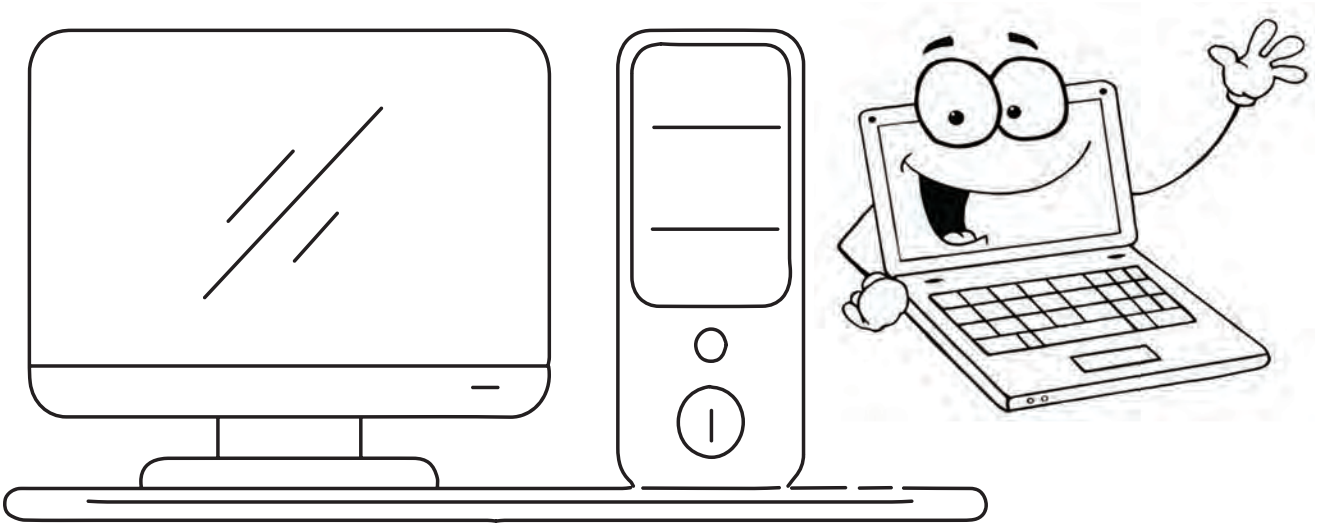
_____

Interactive Space

Art Integration

Colour the pictures according to the given colour codes.

- Computer that can be carried anywhere
- Computer that cannot be carried anywhere



LAB WORK

Experiential Learning

Go to the computer lab to observe the appearance of a computer. Sketch it out in your notebook.

Teacher's Notes

- Show the pictures of various machines and ask them what each machine works on.

Uses of a Computer

We can use a computer to do different types of work. Let us learn different uses of a computer.

Playing fun and educational games

Type letters, poems, and stories

Learn about new things

Draw and colour pictures

Send and receive messages

Solve sums quickly

Places where computers are used

Let us learn about the different places where computers are used.

In Schools

- To teach students
- To make test papers, marksheets and report cards

At Homes

- To listen to music
- To play games

In Banks

- To record the information of all the customers and their bank accounts
- To take out money from ATMs (Automated Teller Machine)

At Railway Stations

- To inform arrival and departure times of trains
- To keep a record of all the passengers
- To book and print tickets

In Hospitals

- To diagnose diseases
- To keep record of all patients

At Airports

- To inform arrival and departure times of flights
- To keep a record of all the passengers
- To book and print tickets

Interactive Space

Remembered Perception

Identify the figure and write where the computer is being used.

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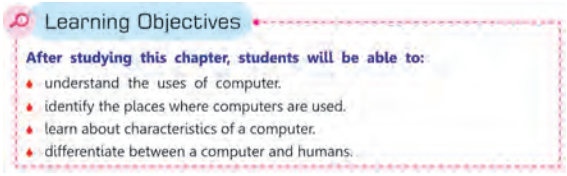

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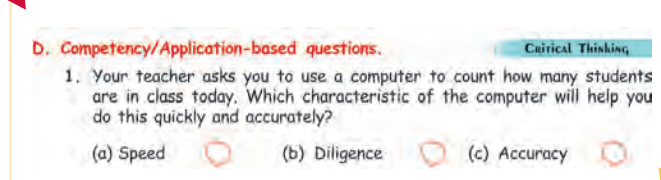

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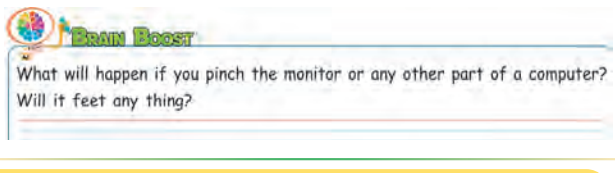

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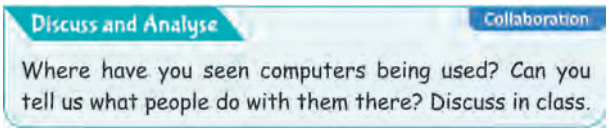

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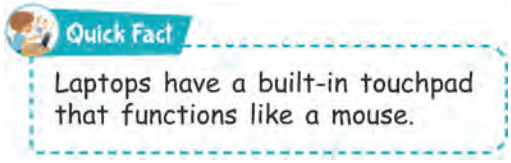
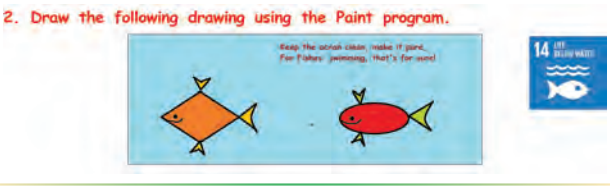


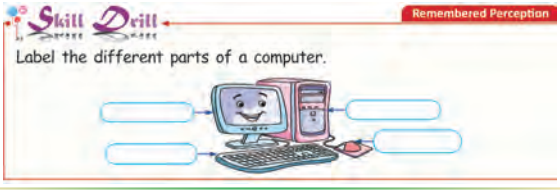
Quick Fact

An interesting piece of knowledge



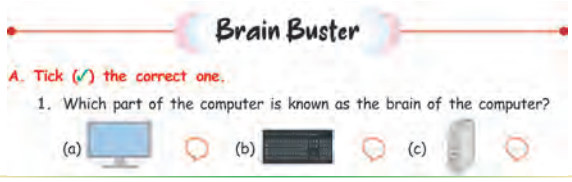
SDGs

Goals decided by various countries to be achieved by 2030



Skill Drill

An activity that reinforce learning among the learners



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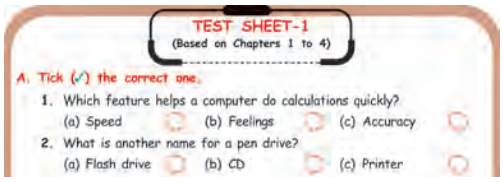
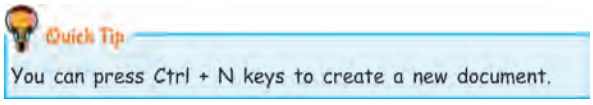
A set of questions for assessing the learner's knowledge



Test Sheet

Evaluates the learner's knowledge in a subject



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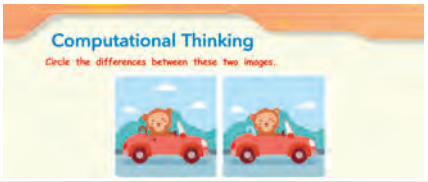
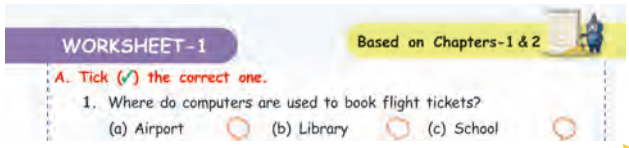


Computational Thinking

A question that needs the learners to think and solve analytically



Worksheets

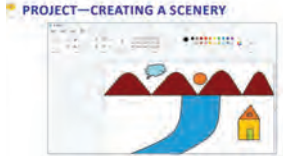
Reinforcing and assessing students understanding

Project Work

In-depth exploration and application of learned concepts

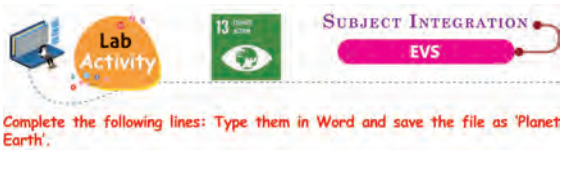
Cyber Olympiad

A competitive exam conducted by SOF for each class in schools to assess learners



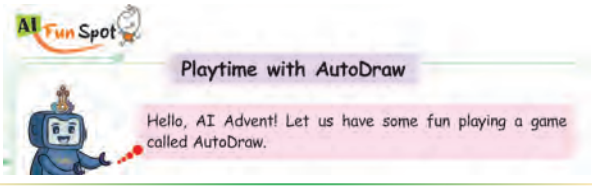
Project-Based Learning

Focuses on enhancing practical knowledge



Subject Integration

Project and activities are crafted to link different subjects for better learning



AI Fun Spot

An AI fun lab activity to spark curiosity

• Contents •

1. Computer-An Electronic Device 7

• Uses of a Computer • Places where Computers are Used • Characteristics of a Computer • Computer and Humans

2. Parts of a Computer 16

• Main Parts of a Computer • Other Parts of a Computer

IPO Cycle 22

Worksheet - 1 24

3. Understanding Keyboard 25

• Alphabet Keys • Number Keys • Special Keys • Function Keys • Cursor Control Keys

4. Handling a Computer Mouse 33

• Computer Mouse • Mouse Actions • Touchpad • Types of Scroll Mouse

Worksheet - 2 39

Test Sheet - 1 40

5. Let's Start Word 2021 41

• Word Processing Software • Introduction to Microsoft Word • Starting Word 2021 • Components of Word 2021 Window • Creating a New Document • Inserting Text in Document • Selecting Text • Changing the Style, Size, and Colour of Font • Saving a Document • Closing a Document • Opening an Existing Document

Fun With Tux Paint 55

6. Drawing and Colouring in Paint 58

• How to Launch Paint? • Components of Paint Window • Project-Creating a Scenery • Drawing Mountains and River • Drawing Hut • Drawing Clouds and Sun • Using Fill Tool • Color Picker Tool • Resize a Picture • Copying an Object • Adding Text • Saving a Drawing • Opening a Saved Drawing • Exiting Paint

Worksheet - 3 72

7. Animation in ScratchJr 73

• Getting Started with ScratchJr • Different Blocks in ScratchJr • Project — Penguin and Polar Bear (Story Time)

8. Fun with AI 86

Worksheet - 4 91

Test Sheet - 2 92

Project Work 93

Computational Thinking 94

Game Time 95

Cyber Olympiad 96

1 Computer–An Electronic Device

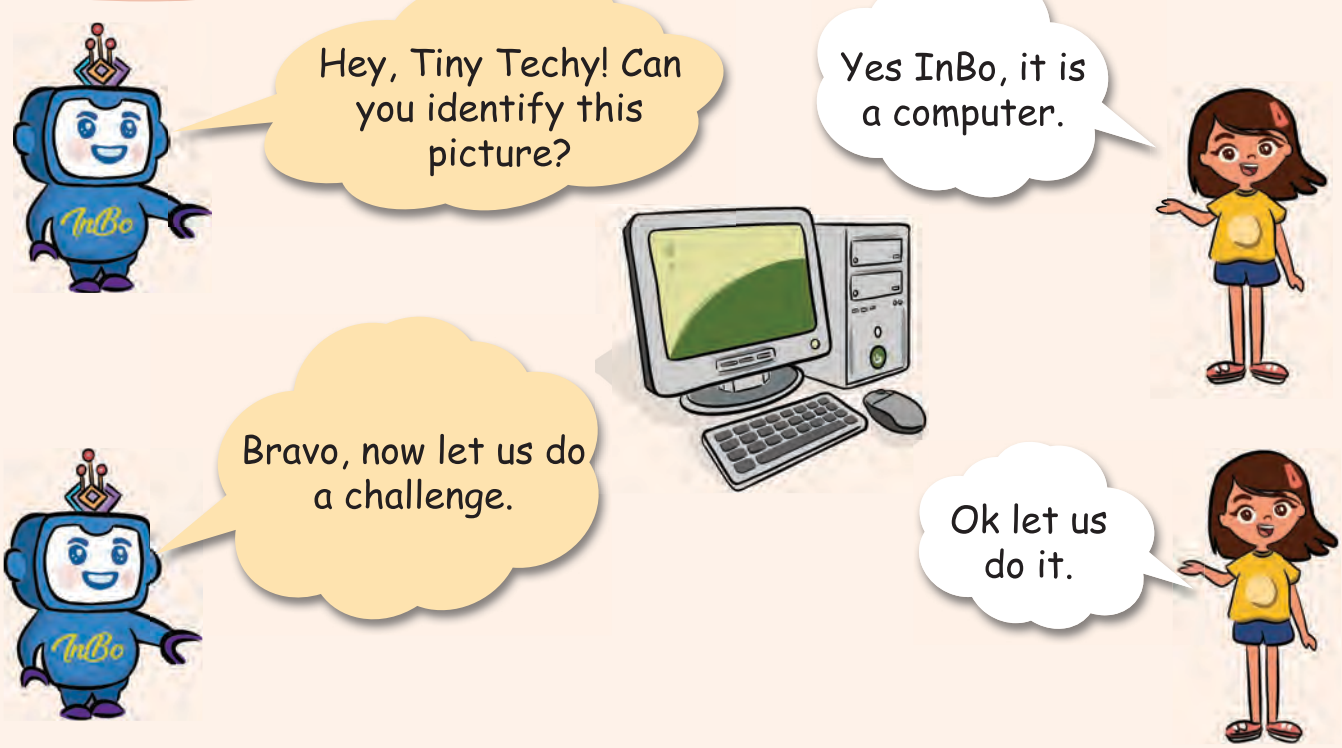
ICODE-iL93

Learning Objectives

After studying this chapter, students will be able to:

- understand the uses of computer.
- identify the places where computers are used.
- learn about characteristics of a computer.
- differentiate between a computer and humans.

Get Ready



Identify the machines in this picture and name them.

They are the things you often see at homes.

USES OF A COMPUTER

A computer is an electronic machine. It needs instructions to work. We can use a computer to do different types of work. A computer is a smart machine because it can be used for many tasks like:

Playing games

Solving sums

Drawing and colouring pictures

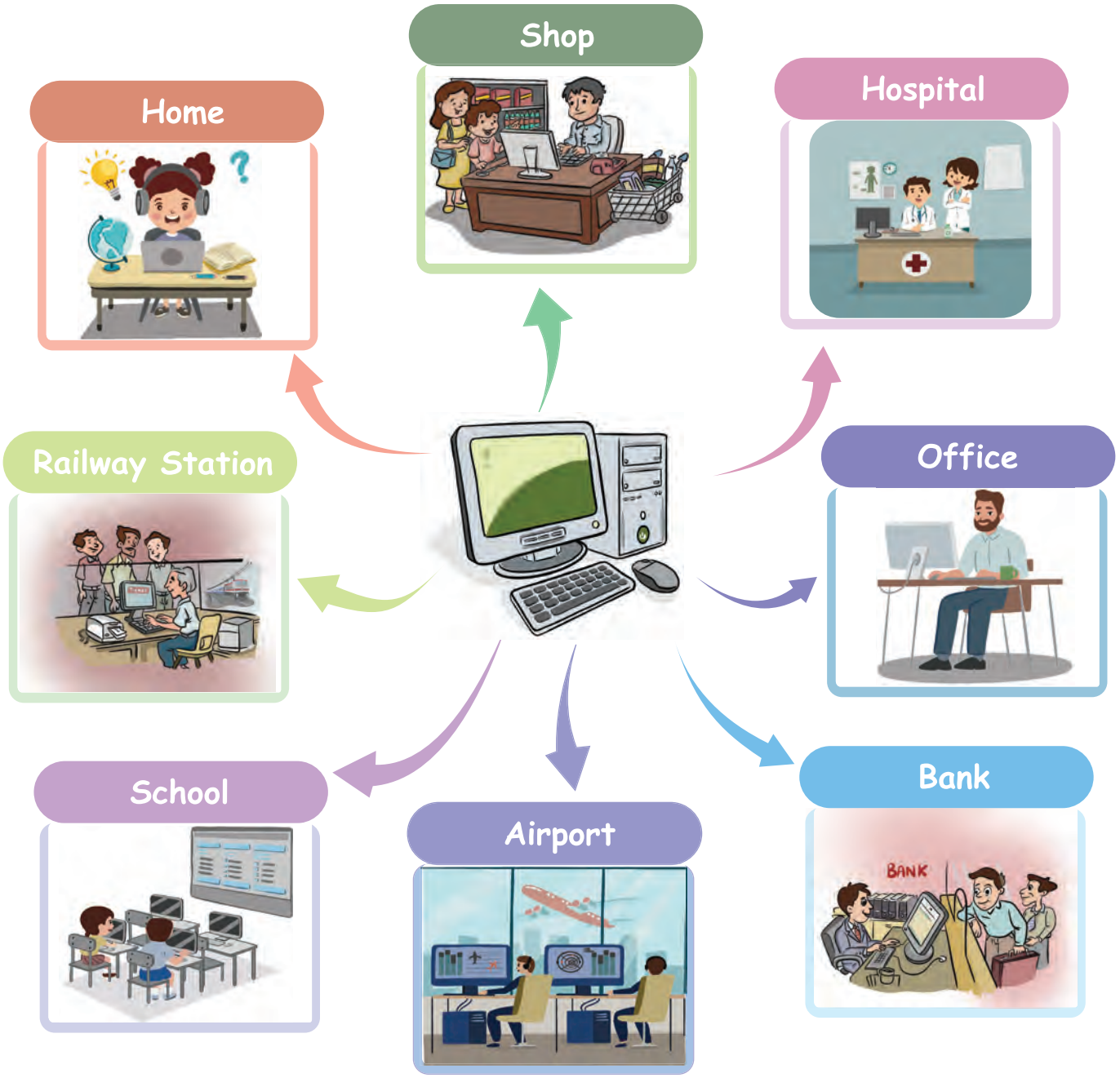
Listening to music

Watching movies or cartoons

Typing letters, poems, and stories

PLACES WHERE COMPUTERS ARE USED

Nowadays, computers are used everywhere. It has become an important part of our lives. We can see computers around us at various places like:



Discuss and Analyse — Collaboration

Where have you seen computers being used? Can you tell us what people do with them there? Discuss in class.

CHARACTERISTICS OF A COMPUTER

A computer has certain characteristics that make it different from other machines. Let us know some characteristics of a computer.

Speed

A computer works very fast.

Reliable

A computer works without error.

Accurate

A computer always gives correct results.

Diligent

A computer does not get tired.

Storage

A computer stores a lot of information.

Skill Drill

Critical Thinking

Rearrange the jumbled letters to form the names of places.

1. B N K A ☐☐☐☐
2. P O H S ☐☐☐☐
3. S H O L O C ☐☐☐☐☐☐

COMPUTER AND HUMANS

Children! We know that computer is a smart machine. It is one of the greatest wonders created by a human. It can do many things. Let us see how a computer is different from a human.

A computer has a good memory.

VS

Humans can forget the information.

A computer does not make mistakes.

VS

Humans can make mistakes.

A computer does not get tired and bored.

VS

Humans gets tired and may sometimes get bored.

A computer does not have feelings.

VS

Humans have feelings as they feel sad, happy or angry.

A computer needs our instruction to work.

VS

Humans can work on their own.

A computer works very fast.

VS

Humans cannot work as fast as a computer.

BRAIN BOOST

What will happen if you pinch the monitor or any other part of a computer? Will it feel any thing?

Brain Buster

A. Tick (✓) the correct one.

1. What does a computer need to work?

   (a) Water ◯ (b) Electricity ◯ (c) Food ◯

2. In which places are computers used for booking tickets?

   (a) Airport ◯ (b) Office ◯ (c) Bank ◯

3. A computer stores a lot of _____.

   (a) ◯ (b) ◯ (c) ◯

B. Write 'T' for true and 'F' for false statements.

1. A computer can store a large amount of information. ☐
2. A computer is used in banks. ☐
3. Humans do not have feelings. ☐

C. Answer the following questions:

1. What is a computer?

2. Name a place where computers are used.

3. Write any one characteristic of a computer.

D. Competency/Application-based questions.

Critical Thinking

1. Your teacher asks you to use a computer to count how many students are in class today. Which characteristic of the computer will help you do this quickly and accurately?

   (a) Speed (b) Diligence (c) Accuracy

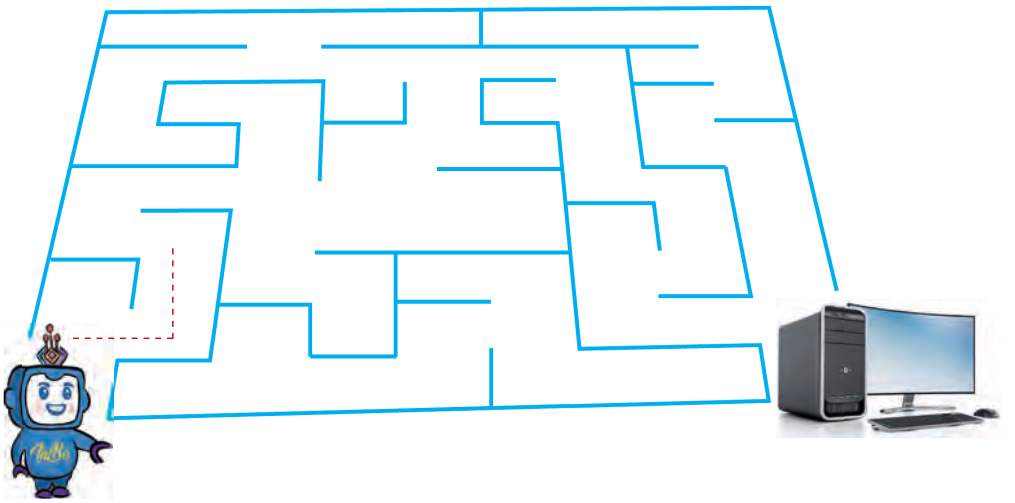
2. You are using a computer to save your drawings and stories. Which characteristic of the computer helps you keep all your work safe and stored?

   (a) Speed (b) Storage (c) Reliability

INTERACTIVE SPACE

Problem Solving

Help InBo reach the computer.



LAB WORK

Experiential Learning

Visit your computer lab and perform the following tasks.

Visit different departments in your school like Admin, Library, Labs. Write for what purposes computers are being used there.

Teacher's Notes

- Encourage students to speak out on what they feel are the differences between computers and humans beyond those discussed in the chapter.

As per
NEP 2020 and NCF 2023

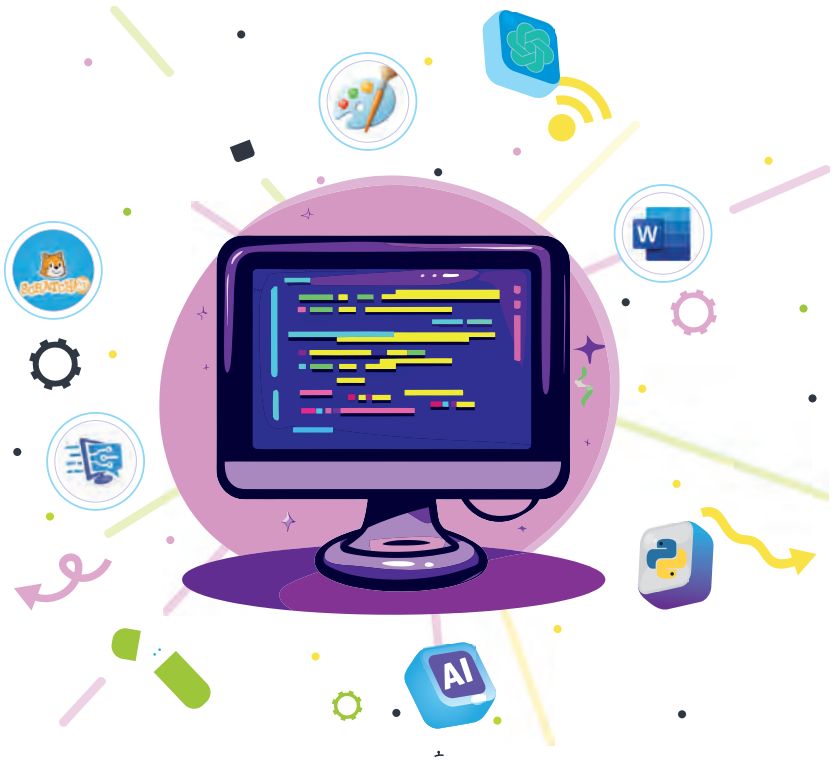
Tech Ninja

WINDOWS 11 & OFFICE 2021

A Textbook of Computer Science
for Joyful and Experiential Learning

3

By
Editorial Team
Inventant Education



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Introduction

Tech Ninja is a comprehensive computer series for learners in classes 1-8, focusing on computer knowledge, the internet, and advancements in **Machine Learning** and **Deep Learning Systems.**

Inventant Education aims to equip students with computer skills, creativity, and diligence while aligning with Sustainable Development Goals to foster global understanding and problem-solving. Additionally, the projects and activities are aligned with Sustainable Development Goals (SDGs), fostering a deep understanding of global challenges.

The **National Education Policy (NEP) 2020** is integrated into practical activities, highlighting **21st-century** skills like **Healthy Living**, **Artificial Intelligence**, **Cyber Ethics**, **Art Integration**, **Cross-Curricular Activities**, and **more**. The **National Curriculum Framework 2023** fostering cognitive abilities in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

Our Teacher's Resource Book and Online Support offer lesson plans, answer keys, e-books, and animated videos for educators, enhancing learning and shaping the future of education.

—Inventant Education

Aligned with NEP 2020 and NCF 2023

FEATURES OF NEP 2020

21st Century Skills

Learning Skills (4Cs)
- ✓ Critical Thinking
- ✓ Creativity
- ✓ Communication
- ✓ Collaboration

Literacy Skills (IMT)
- ✓ Information Literacy
- ✓ Media Literacy
- ✓ Technology Literacy

Life Skills (FLIPS)
- ✓ Flexibility
- ✓ Leadership & Responsibility
- ✓ Initiative
- ✓ Productivity & Accountability
- ✓ Social Interaction

BASED ON NCF 2023

In NCF 2023, **curriculum** means not only what is given in the books, but also how the learners learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

The Six Pramanas

Inference | Perception | Comparison | Verbal Testimony | Non- Apprehension | Postulation

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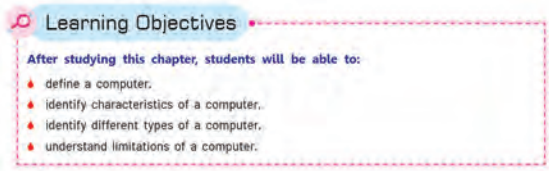
- ✓ Enter your name, email, mobile number and password.
- ✓ Click 'Register', and Enter the OTP to verify your mobile/email.
- ✓ Once registered, login on to the website and go to **Scan and Learn** section. Enter the Codes printed below the QR Codes to view the required content.

For Mobile Users

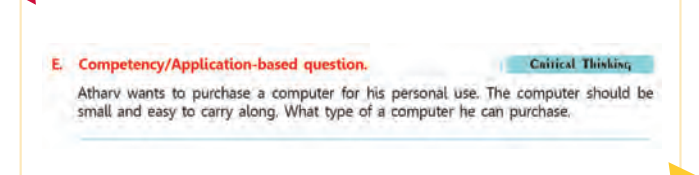
- ✓ Go to Google Play Store or Apple App Store.
- ✓ Type 'Edu Invent' in the search bar.
- ✓ Tap 'Install'. The app will take a few moments to download and install.
- ✓ Once installed, tap 'Open' to launch the app.
- ✓ Register yourself and login on the app.
- ✓ On the dashboard, click Scan QR Code button.
- ✓ Scan a QR Code printed in the book to explore the learning content associated with the QR Code.

About the Series



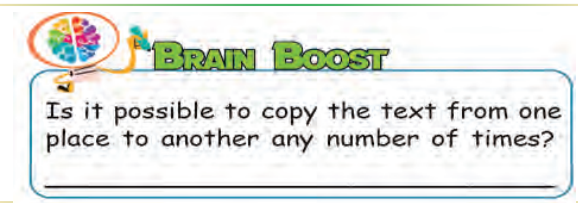
Learning Objectives

Sets out goals required to be achieved by the end of the chapter



Competency/Application-based questions

Assesses the learners analytical and critical thinking abilities

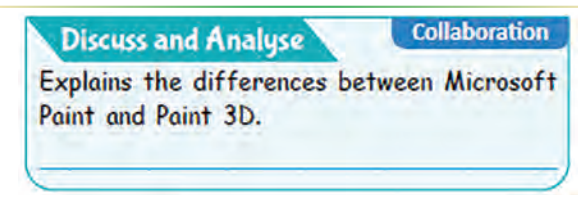


Brain Boost

An interesting question to think out

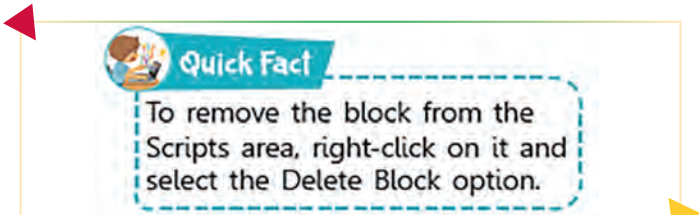
Get Ready

Warm up activites that sparks curiosity and engagement



Discuss and Analysis

An engaging questions for the learners



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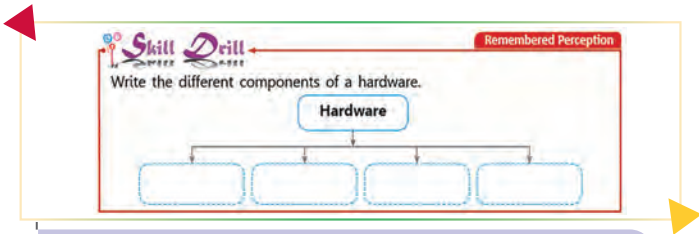

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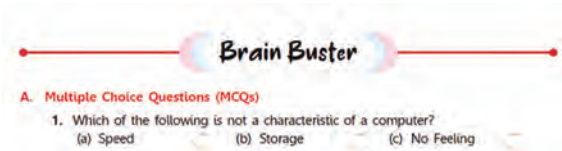

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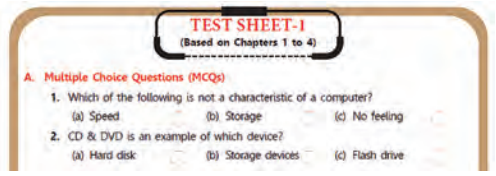

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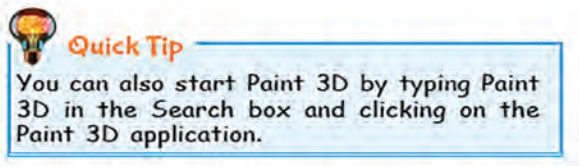

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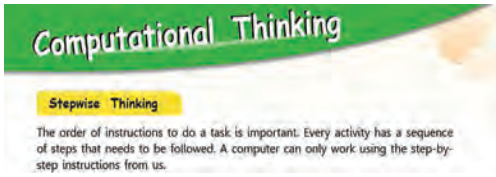

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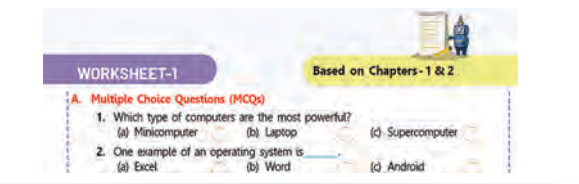
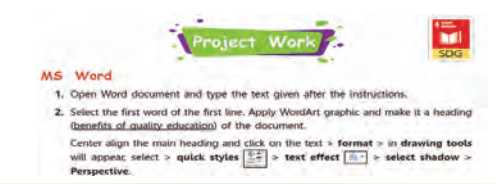


Worksheets

Reinforcing and assessing students understanding



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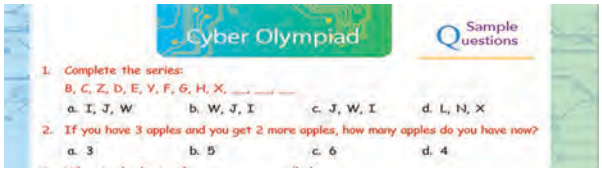

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• Contents •

1. Know about Computer 7

• What is a Computer? • Characteristics of A Computer • Limitations of a Computer • Types of computers • Microcomputers • Minicomputers • Mainframe Computers • Supercomputer

2. Hardware and Software 13

• What Is Hardware? • Input devices • Scanner • Microphone • Joystick • Voice Input Device • Digital Pen • Web Camera • Output devices • Monitor • Printer • Speakers • Headphones • Processing Devices • Storage Devices • What Is Software? • System Software • Application Software

Worksheet-1 22

3. Getting Started With Windows 11 23

• What is an operating system? • Microsoft windows (MS Windows) • Windows 11 • Features of windows 11 • Windows 11 desktop • Pinning and unpinning applications • Customizing the taskbar • Desktop background

4. Advanced Features of Word 2021 32

• Introduction • Project—Animals in our surroundings • Moving & Copying text • Spelling And Grammar Check • Thesaurus • Finding and Replacing Text • Formatting Text • Changing Case • Paragraph Formatting • Changing Font of the Text • Changing the Size of the Text • Aligning Text • Changing the Colour of Text • Applying Border and Shading • Creating a Bulleted or Numbered list • Page formatting • Page margins • Page Orientation • Inserting Graphics • Inserting Image from Computer • Wrapping Text Around an Image • Moving an Image • Inserting Online Pictures • Inserting 3D models • Adding Wordart • Saving A Document

AI in Action 50

Worksheet-2 51

Test Sheet-1 52

5. Working with Paint 3D 53

• Starting Paint 3D • Components of Paint 3D Window • Tools of Paint 3D • Project—Healthy food poster • Working with 2D Shapes Tool • Using Text Tool • Working with 3D shapes tool • Fill colour using the Brush Tool • Stickers • Saving a Drawing • Opening a Project

6. Introduction to Internet 66

• Introduction • Uses of Internet • Searching Information • Communication • Online Reservation • E-learning • Electronic Commerce (E-commerce) • Advantages of the Internet • Disadvantages of the Internet

Computational Thinking 73

7. Let's Learn Scratch 3 74

• What is Scratch? • Starting Scratch 3 • Components of Scratch 3 window • Different Blocks of Scratch • Project—Drawing Colorful Shapes • Using Pen Block • Drawing a square • Moving a sprite • Making a Duplicate • Sprite • Saving A Project • Opening An Existing Project • Exiting Scratch

Worksheet-3 83

8. Simple Programming in Scratch 84

• Project— Quiz Game In Scratch • Adding A New Sprite From Library • Changing the Appearance of the Sprite • Adding A New Backdrop • Add Text In Background • Making A Sprite Say Something • Repeating Actions • Adding Events In Project • Adding Sounds • Final Script

9. Human Vs Artificial Intelligence 98

• Introduction • What is Intelligence? • Importance and Features of Intelligence • What is Artificial Intelligence? • Human Vs Artificial Intelligence

Worksheet - 4 105

Test Sheet-2 106

Project Work 107

Healthy and Safe Living 109

Game Time 110

Cyber Olympiad 111

1 Know about Computer

ICODE-AMk5

Learning Objectives

After studying this chapter, students will be able to:

- define a computer.
- identify characteristics of a computer.
- identify different types of a computer.
- understand limitations of a computer.

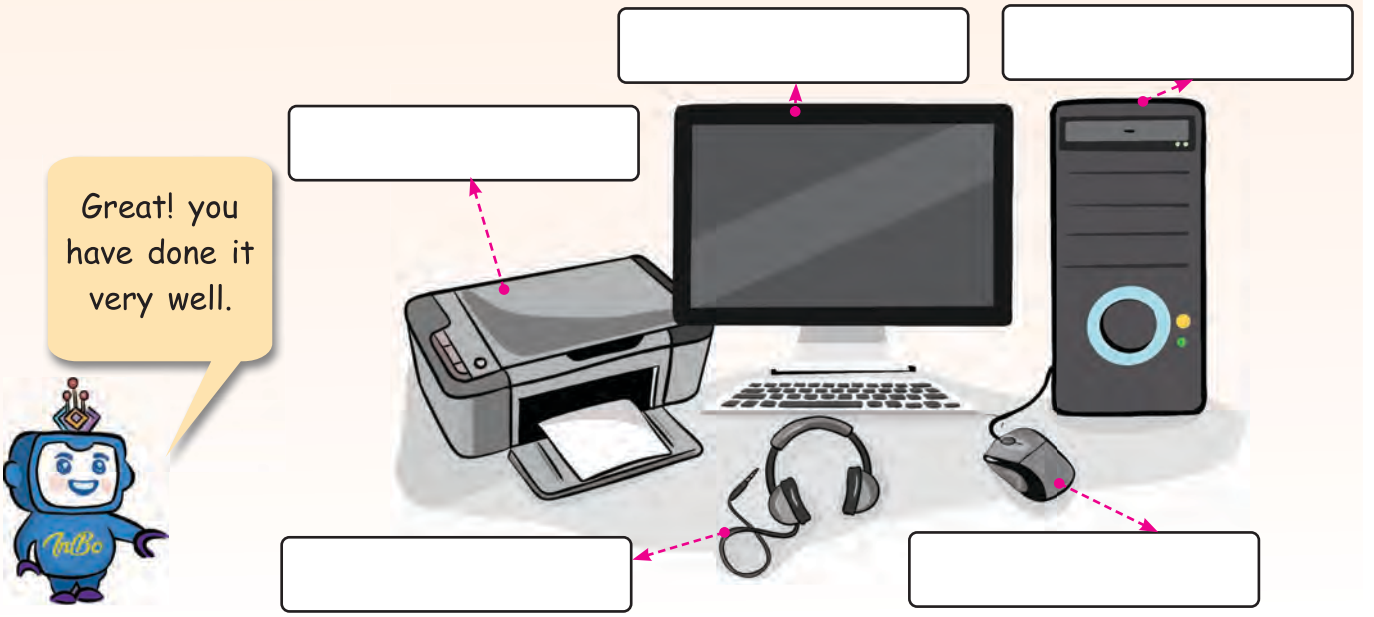
Get Ready

Welcome back, Tiny Techy! You have already learned about computers in your previous class. Now, in this chapter, you will be introduced to different types of computers.

Wow! I am Super excited. Let us start.

Sure, but first let us do a warm-up activity.

Write the names of the parts labelled here.



WHAT IS A COMPUTER?

A computer is an electronic device that needs electricity and our instructions to work. A computer allows us to do our work easily and quickly. It also has memory like us.

CHARACTERISTICS OF A COMPUTER

A computer has certain characteristics that make it different from other machines. Let us know some characteristics of a computer.

Speed	It works very fast and can perform a large number of calculations quickly.
Versatility	It can perform various types of jobs at the same time.
Accuracy	It always gives the correct results. However, a computer gives incorrect result when incorrect input is fed into it.
Diligence	It never gets tired. It can keep working for long hours and can do the same work again and again, with the same speed and accuracy.
Storage	It can store a large amount of information and never forgets it.

BRAIN BOOST

Can you use a computer to create your drawings? Write Yes or No.

_____

LIMITATIONS OF A COMPUTER

A computer has many limitations. These are:

- **No Thinking Capability:** It cannot think and works on the instructions provided to it.
- **No Decision-making Ability:** It cannot take its own decisions.
- **No Feelings:** A computer does not have any feelings. It never feels happy, bored or tired.
- **Zero IQ:** A computer lacks intelligence. It works according to the instructions given by the user.

Discuss and Analyse — Logical Thinking

What will happen if you pinch the monitor or any other part of a computer? Will it react?

TYPES OF COMPUTERS

We use different types of computers at various places for different purposes. Computers are classified into four types on the basis of their size and performance. These are:

Microcomputers

- Microcomputers are the most commonly used computers.
- They are small in size.
- They are also known as personal computers (PCs).
- They are used in places like schools, offices, and homes etc.
- Examples: **Laptop**, **Palmtop** and **desktop** computers

Desktop

Tablet

Minicomputers

- These computers are larger than microcomputers.
- They are faster and have more memory.
- They are more powerful than microcomputers.
- They are used in places like banks, universities, and many other big organisations.
- Examples: **PDP-8**, **HP 2100**, and **Honeywell 316**

Honeywell 316

Mainframe Computers

- Mainframe computers are large computers. They have many terminals connected with a network.
- They have faster speed.
- The storage capacity is larger than minicomputers.
- They are designed to work on a huge amount of data at any given time.
- They are used in big organisations for business and scientific research purposes.
- They are very expensive.
- Examples: **IBM Z series**, **System Z10**, and **PDP-10**

System Z10

Supercomputer

- Supercomputers are the most powerful computers.
- They are very expensive.
- They are used for weather forecasting and defence purposes, such as to control satellites and missiles.

PARAM

India has produced many supercomputers. PARAM is one of them.

Skill Drill

Direct Perception

Arrange the following computers according to their size from smallest to largest.

Minicomputers, Supercomputers, Microcomputer, Mainframe computer

1. _____ 2. _____

3. _____ 4. _____

Recall

- A computer needs electricity and instructions to work.
- A computer can perform various types of jobs at the same time with the same speed and accuracy.
- Microcomputers are the most commonly used computers. They are also known as personal computers (PCs).
- Minicomputers are larger than microcomputers. They are more powerful than microcomputers.
- Mainframe computers are large computers. They have many terminals connected with a network.
- Supercomputers are the most powerful computers. They are very expensive.

Brain Buster

A. Multiple Choice Questions (MCQs)

1. Which of the following is not a characteristic of a computer?
   (a) Speed (b) Storage (c) No Feeling

2. Which of the following computers are also known as Personal computers?
   (a) Microcomputers (b) Mainframe (c) Minicomputers

3. Which of the following is a limitation of a computer?
   (a) Accuracy (b) Zero IQ (c) Diligence

B. Fill in the blanks.

Hints Micro Super PARAM Versatility

1. _____ computers are used for weather forecasting.
2. A computer can perform various types of jobs at the same time. This characteristic of a computer is called _____.
3. _____ is an example of a supercomputer developed by India.
4. Desktop and laptop computers are also known as _____ computers.

C. Write 'T' for true and 'F' for false statements.

1. A computer works on human orders, so it cannot take its own decisions. ☐
2. A computer stores a large amount of information and never forgets it. ☐
3. Microcomputers are more powerful than minicomputers. ☐

D. Answer the following questions:

1. What is a computer?

   _____

   _____

2. Give any one characteristic of a computer.

   _____

3. Give examples of microcomputers.

   _____

   _____

E. Competency/Application-based question.

Critical Thinking

Atharv wants to purchase a computer for his personal use. The computer should be small and easy to carry along. What type of a computer he can purchase.

_____

INTERACTIVE SPACE

Problem Solving

Give one example for each of the following:

Microcomputer	
Minicomputer	

LAB WORK

Experiential Learning

Visit your computer lab. Open Word 2021, and write about different types of computers, including two characteristics and limitations for each, and finally, save the file with an appropriate name.

IDEA EXCHANGE

Life Skills and Values

Imagine you are sitting with your mother while she is working on the computer. You notice that she has complete a her work very quickly. What characteristic of the computer helps her finish the work fast? How does this make her job easier?

HANDS-ON PROJECT

Exploratory Learning

List the types of computers used in various places.

Place	Type of computer
Home	
Office	

Teacher's Notes

- Familiarise the students with the different types of computers. Also, show the differences between them to students.
- Ask the students about different places where they have seen the use of the computer. The teacher can take the students to the places where computers are used to show them different uses of the computer in different places.

As per
NEP 2020 and NCF 2023

Tech Ninja

WINDOWS 11 & OFFICE 2021

A Textbook of Computer Science
for Joyful and Experiential Learning

4

By
Editorial Team
Inventant Education

Inventant Education
Present Meets Future
(A Unit of EDULABZ International)

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Introduction

Tech Ninja is a comprehensive computer series for learners in classes 1-8, focusing on computer knowledge, the internet, and advancements in **Machine Learning** and **Deep Learning Systems.**

Inventant Education aims to equip students with computer skills, creativity, and diligence while aligning with Sustainable Development Goals to foster global understanding and problem-solving. Additionally, the projects and activities are aligned with Sustainable Development Goals (SDGs), fostering a deep understanding of global challenges.

The **National Education Policy (NEP) 2020** is integrated into practical activities, highlighting **21st-century** skills like **Healthy Living**, **Artificial Intelligence**, **Cyber Ethics**, **Art Integration**, **Cross-Curricular Activities**, and **more**. The **National Curriculum Framework 2023** fostering cognitive abilities in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

Our Teacher's Resource Book and Online Support offer lesson plans, answer keys, e-books, and animated videos for educators, enhancing learning and shaping the future of education.

—Inventant Education

Aligned with NEP 2020 and NCF 2023

FEATURES OF NEP 2020

21st Century Skills

Learning Skills (4Cs)
- ✓ Critical Thinking
- ✓ Creativity
- ✓ Communication
- ✓ Collaboration

Literacy Skills (IMT)
- ✓ Information Literacy
- ✓ Media Literacy
- ✓ Technology Literacy

Life Skills (FLIPS)
- ✓ Flexibility
- ✓ Leadership & Responsibility
- ✓ Initiative
- ✓ Productivity & Accountability
- ✓ Social Interaction

BASED ON NCF 2023

In NCF 2023, **curriculum** means not only what is given in the books, but also how the learners learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

The Six Pramanas

Inference | Perception | Comparison | Verbal Testimony | Non- Apprehension | Postulation

How to Access Digital Content through QR Code

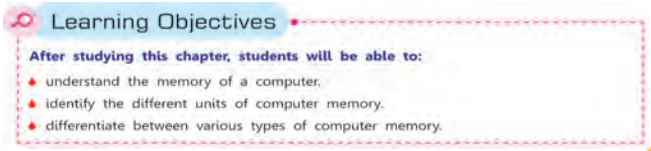
For Website Users

- ✓ "Visit "digital.inventanteducation.com"
- ✓ Click "Register" button available on the top-right.
- ✓ Select 'Teacher/Student' in 'User' Type.
- ✓ Enter your name, email, mobile number and password.
- ✓ Click 'Register', and Enter the OTP to verify your mobile/email.
- ✓ Once registered, login on to the website and go to **Scan and Learn** section. Enter the Codes printed below the QR Codes to view the required content.

For Mobile Users

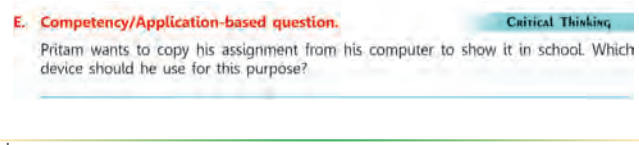
- ✓ Go to Google Play Store or Apple App Store.
- ✓ Type 'Edu Invent' in the search bar.
- ✓ Tap 'Install'. The app will take a few moments to download and install.
- ✓ Once installed, tap 'Open' to launch the app.
- ✓ Register yourself and login on the app.
- ✓ On the dashboard, click Scan QR Code button.
- ✓ Scan a QR Code printed in the book to explore the learning content associated with the QR Code.

About the Series



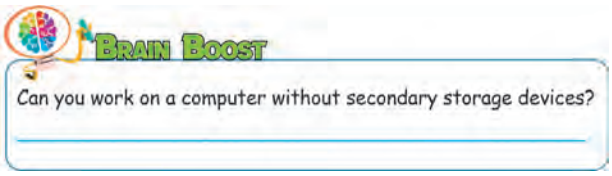
Learning Objectives

Sets out goals required to be achieved by the end of the chapter



Competency/Application-based questions

Assesses the learners analytical and critical thinking abilities

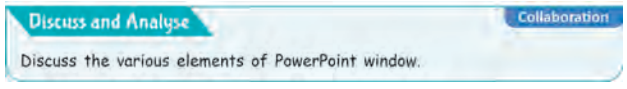


Brain Boost

An interesting question to think out

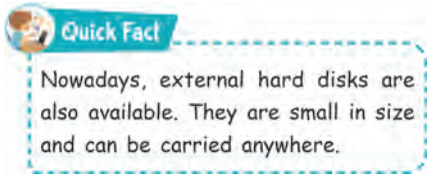
Get Ready

Warm up activities that sparks curiosity and engagement



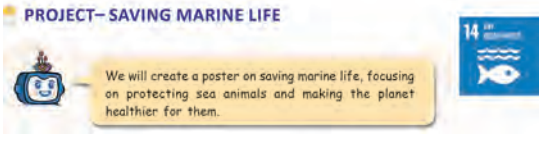
Discuss and Analysis

An engaging questions for the learners



Quick Fact

An interesting piece of knowledge

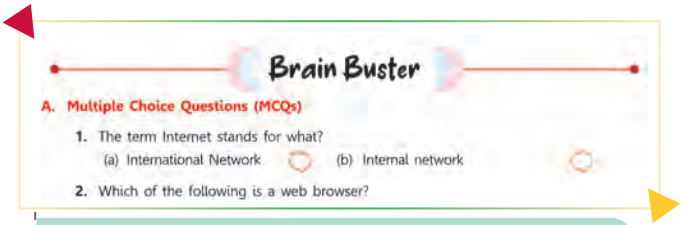


SDGs

Goals decided by various countries to be achieved by 2030

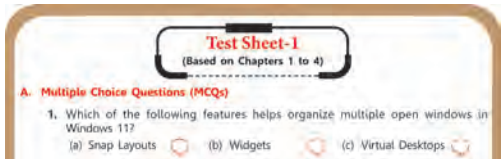
AI in Action

Improve productivity using AI-powered platform



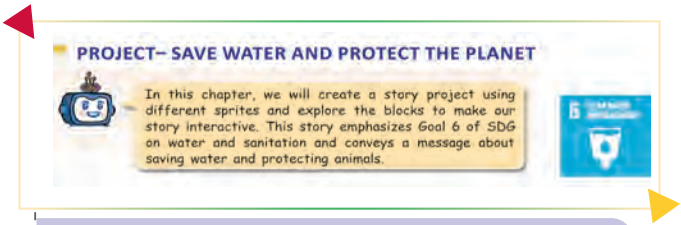
Brain Buster

A set of questions for assessing the learner's knowledge



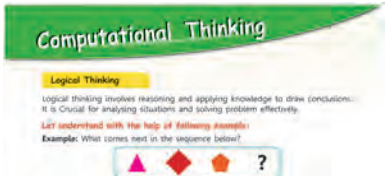
Test Sheet

Evaluates the learner's knowledge in a subject



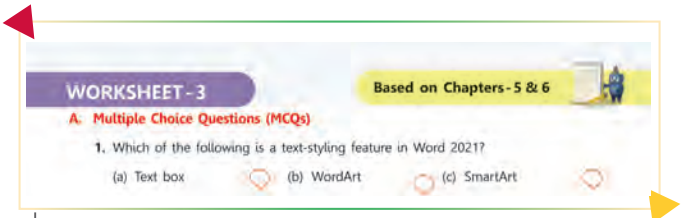
Project-Based Learning

Focuses on enhancing practical knowledge



Computational Thinking

A question that needs the learners to think and solve analytically

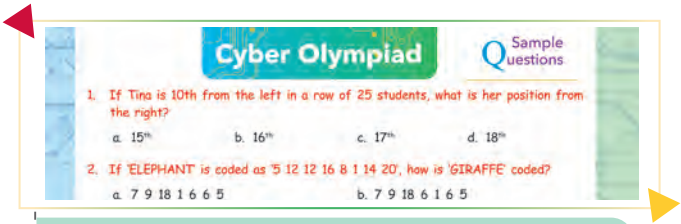


Worksheets

Reinforcing and assessing students understanding

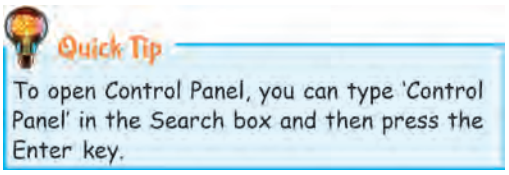
Project Work

In-depth exploration and application of learned concepts



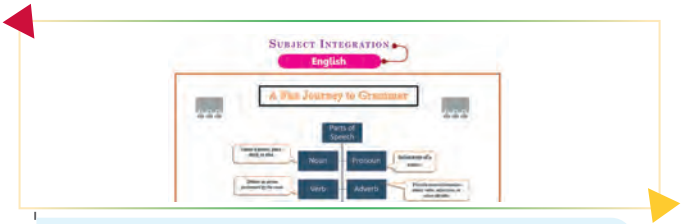
Cyber Olympiad

A competitive exam conducted by SOF for each class in schools to assess learners



Quick Tips

An interesting bit of knowledge that will help the learners



Subject Integration

Project and activities are crafted to link different subjects for better learning

Skill Drill

An activity that reinforce learning among the learners

• Contents •

1. Memory and Data Storage 07

- Computer Memory • Primary Memory
- Secondary Memory

2. More on Windows 11 15

- Windows 11 • Features of Windows 11
- Working with Control Panel

Worksheet - 1 24

3. Working with Paint 3D 25

- Working with Canvas Tool • Using Brush Tool
- Using 3D Library • Group/Ungroup Objects
- Inserting Stickers • Adding Effects
- Creating a Doodle

AI in Action 38

4. More on Internet 40

- Internet • Uses of the Internet
- History of the Internet • Internet Terms
- Browsing the Internet
- Parts of the Microsoft Edge Window
- Search Engines • Safety on the Internet

Worksheet - 2 48

Test Sheet - 1 49

5. More on Word 2021 50

- Project—Making a poster on Parts of Speech
- Adding a Text Box • Applying WordArt Styles
- Applying Effects • Inserting SmartArts graphics
- Formatting a SmartArt graphics
- Icons in Word 2021 • Working with Shapes

6. Introduction to PowerPoint 2021 65

- Starting PowerPoint 2021
- PowerPoint 2021 Interface
- Project—Handling Health Emergencies
- Creating a new presentation
- Inserting text in a placeholder
- Inserting a new slide • Slide Layout
- Remove background • Adding shapes
- Using Icon • Using Draw Feature
- PowerPoint Views • Closing a presentation
- Opening an Existing Presentation
- Running a presentation

Worksheet - 3 81

Computational Thinking 82

7. Let's Explore the Scratch 83

- Starting Scratch 3 • Scratch 3 Interface
- Different blocks of Scratch
- Project—Drawing multiple shapes
- Adding My Block • Adding Pen Block Extension
- Drawing Polygons in Scratch
- Operator Blocks category

8. Creating Story with Scratch 96

- Project—Save Water and Protect the Planet
- Adding sprites • Adding a Theme Backdrop
- Making a Sprite Say Something
- Changing the Sprite Position
- Animation in Scratch • Upload a new Sprite

9. AI Around Us 108

- Exploring the AI in daily life

Worksheet - 4 114

Test Sheet - 2 115

Project Work 116

Healthy And Safe Living 117

Game Time 118

Cyber Olympiad 119

1 Memory and Data Storage

ICODE-oTng

Learning Objectives

After studying this chapter, students will be able to:

- understand the memory of a computer.
- identify the different units of computer memory.
- differentiate between various types of computer memory.

Get Ready

Hey Tiny Techy, do you know the measuring units such as liters and meter?

Yes, InBo! We have learned these in math.

Great! Now, identify the given units and match them with the correct ones.

Kiloliter

Kilogram

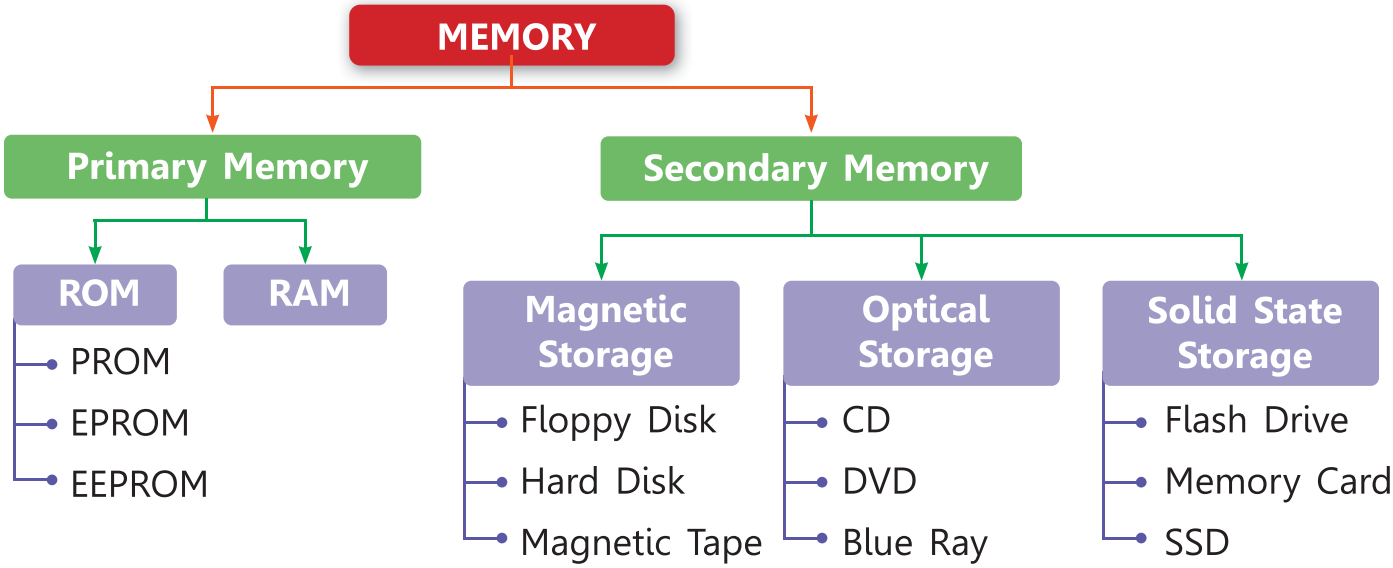
Rupees

Similarly, a computer also has memory to remember and store information. Let us learn about computer memory.

COMPUTER MEMORY

The CPU is known as the **brain** of a computer. It processes all the information it receives through input devices and stores it in the computer's memory. The storage capacity of a computer is called its **memory**. Computer memory is used for storing data and instructions.

Computers store data, information, and instructions in its memory so that they can be used in the future. Computer memory is divided into two types: **Primary Memory** and **Secondary Memory**.



Measuring the Computer's Memory

We all know that computer understands only 0s and 1s. These are called **bits**, short form of Binary Digits. A group of 4 bit is called a nibble and a group of 8 bits (for example, 10111001) is called a **byte**.

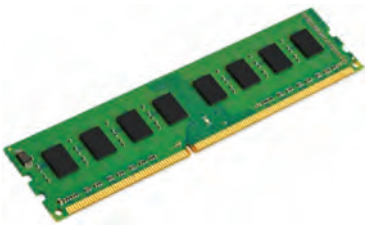
(a)	1 Kilobyte (KB) = 1024 bytes	**(b)**	1 Megabyte (MB) = 1024 KB
(c)	1 Gigabyte (GB) = 1024 MB	**(d)**	1 Terabyte (TB) = 1024 GB
(e)	1 Petabyte (PB) = 1024 TB	**(f)**	1 Exabyte (EB) = 1024 PB
(g)	1 Zettabyte (ZB) = 1024 EB	**(h)**	1 Yottabyte (YB) = 1024 ZB

PRIMARY MEMORY

The Primary Memory is also called the main memory of the computer. It can be directly accessed by the CPU. It is fixed inside the CPU cabinet. RAM and ROM are the two types of Primary Memory.

- **RAM: RAM** stands for **R**andom **A**ccess **M**emory. RAM refers to the read and write memory. Information can be written onto and read from RAM. RAM is **volatile** in nature. So, whenever power fails or the computer is switched off, all the information that has been stored in RAM is lost. It stores information temporarily.
- **ROM: ROM** stands for **R**ead **O**nly **M**emory. It keeps the data permanent. It is **non-volatile** in nature. It retains the data even when a computer is switched off. There are 3 types of ROM:
  - Programmable Read only Memory (PROM)
  - Erasable Programmable Read only Memory (EPROM)
  - Electrically Erasable Programmable Read only Memory (EEPROM)

ROM



RAM

SECONDARY MEMORY

We need secondary memory to store our data permanently. The CPU cannot access it directly. It is slower but more affordable than primary memory. Secondary memory is required because the internal memory of a computer has a limited storage capacity. Secondary memory, also called secondary storage, is divided into three categories: **Magnetic**, **Optical**, and **Solid-State** Storage.

Magnetic Storage

It is also called Magnetic Disk, and is covered with magnetic coating.

Hard disk: A hard disk, is also known as a **fixed disk**. It is the main secondary storage device found inside the cabinet CPU. It can store a large amount of data up to 8TB.

Hard Disk

Optical Storage

It is also called optical disk, it is an electronic data storage medium. It includes the following types:

1. **CD-R and CD-RW:**
   - **CD-R (Compact Disc-Recordable):** This type of disc allows data to be written once and cannot be changed or deleted afterwards.
   - **CD-RW (Compact Disc-Rewritable):** This disc allows data to be erased or rewritten multiple times.

DVD

CD

2. **DVD (Digital Versatile Disc or Digital Video Disc):** Similar to a CD, but with greater storage capacity. The storage capacity of a DVD ranges from 4.7 GB to 17 GB.
3. **Blu-ray disc:** It is similar to CDs or DVDs, use violet lasers to read data and can hold large amounts of information. They are primarily used for high-quality video files and games, which require significant storage space. A Blu-ray disc can hold up to 128 GB of data.

Blu-ray Disc

Solid State Storage

These are small portable data storage devices with no moving parts. They require less power and generate less heat than other storage media. Data is stored electronically in these devices.

1. **Pen drive:** A pen drive, also known as a **flash drive**, is a small, portable device that can store and transfer large amounts of data, such as 10 GB or 15 GB, from one computer to another.

Flash Drive

2. **Memory Card:** A memory card is used to store data in various electronic devices such as mobile phones, digital cameras, and many other portable devices. It can store up to 32 GB of data and allows for easy transfer to computers.

Memory Card

3. **Solid State Drive (SSD):** It is similar to a hard disk but uses flash memory to store data. It is much faster than a hard disk.

SSD

Quick Fact

Nowadays, external hard disks are also available. They are small in size and can be carried anywhere.

Brain Boost

Can you work on a computer without secondary storage devices?

_____

Skill Drill

Remembered Perception

Expand the following terms.

1. RAM
2. ROM
3. DVD
4. CD–RW
5. EEPROM

Recall

- The storage capacity of a computer is called its memory. Computer memory is used for storing data and instructions.
- A bit is the smallest unit of information which a computer can process and store.
- A group of 4 bits is called a nibble and a group of 8 bits is called a byte.
- Computer memory is of two types — primary memory and secondary memory.
- Primary memory is of two types — RAM and ROM.
- ROM is of three types — PROM, EPROM and EEPROM.
- Secondary memory devices are hard disk, CD-ROM, DVD, pen drive, Blu-ray disc and memory card.

Brain Buster

A. Multiple Choice Questions (MCQs)

1. How is computer memory measured?

(a) kiloliters (b) kilometers (c) bytes

2. What is the smallest unit of information a computer can process and store?

(a) Byte (b) Nibble (c) Bit

3. Which type of memory is known as the main memory or internal memory of a computer?

(a) Secondary (b) Primary (c) Auxiliary

4. What is the full form of SSD?

(a) Solid State Drive (b) Solid Store Drive (c) Solid State Disk

B. Fill in the blanks.

Hints Nibble hard disk Memory Flash drive

1. The storage capacity of a computer is called its _____.
2. A group of 4 bits is called a _____.
3. A _____ is the in-built storage device that is fixed inside the System Cabinet.
4. A pen drive is also known as a _____.

C. Write 'T' for true and 'F' for false statements.

1. 1 MB is equal to 210 KB. ☐
2. RAM stores information temporarily. ☐
3. ROM is volatile in nature. ☐
4. The CPU cannot access secondary memory directly. ☐

D. Answer the following questions:

1. Explain primary memory.

_____

_____

2. What is the difference between RAM and ROM?

_____

_____

3. What do you mean by secondary memory?

_____

_____

4. Define hard disk and pen drive.

_____

_____

E. Competency/Application-based question.

Critical Thinking

Pritam wants to copy his assignment from his computer to show it in school. Which device should he use for this purpose?

_____

Interactive Space

Problem Solving

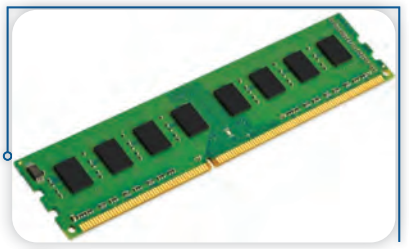
A. Identify the following storage devices and write their names.

1. _____

2. _____

3. _____

4. _____



5. _____

6. _____

B. Complete the following computer units.

(a)	1 Kilobyte (KB) = _____ B	**(b)**	1 Megabyte (MB) = _____ KB
(c)	1 Gigabyte (GB) = _____ MB	**(d)**	1 Terabyte (TB) = _____ GB
(e)	1 Petabyte (PB) = _____ TB	**(f)**	1 Exabyte (EB) = _____ PB

LAB WORK

Experiential Learning

Visit your computer lab and carry out the following tasks:

1. Gather more information on primary memory and its types using the internet with the help of your teacher or parents. Make a short project report in Word 2021.
2. Create a diagram showing the types of primary memory in Word 2021.

IDEA EXCHANGE

Life Skills and Values

Your friend is trying to open the system cabinet of a computer in the lab. What will you do? Will you stop him doing so, or will you let him proceed?

HANDS-ON PROJECT

Exploratory Learning

Draw and colour the types of secondary devices you see in the computer lab in your scrapbook. Write a brief description of each device on a seperate line.

Teacher's Notes

- Demonstrate how to use CDs, DVDs, and pen drives to the students.

As per
NEP 2020 and NCF 2023

Tech Ninja

WINDOWS 11 & OFFICE 2021

A Textbook of Computer Science
for Joyful and Experiential Learning

5

By
Editorial Team
Inventant Education

Inventant Education
Present Meets Future
(A Unit of EDULABZ International)

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Introduction

Tech Ninja is a comprehensive computer series for learners in classes 1-8, focusing on computer knowledge, the internet, and advancements in **Machine Learning** and **Deep Learning Systems.**

Inventant Education aims to equip students with computer skills, creativity, and diligence while aligning with Sustainable Development Goals to foster global understanding and problem-solving. Additionally, the projects and activities are aligned with Sustainable Development Goals (SDGs), fostering a deep understanding of global challenges.

The **National Education Policy (NEP) 2020** is integrated into practical activities, highlighting **21st-century** skills like **Healthy Living**, **Artificial Intelligence**, **Cyber Ethics**, **Art Integration**, **Cross-Curricular Activities**, and **more**. The **National Curriculum Framework 2023** fostering cognitive abilities in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

Our Teacher's Resource Book and Online Support offer lesson plans, answer keys, e-books, and animated videos for educators, enhancing learning and shaping the future of education.

—Inventant Education

Aligned with NEP 2020 and NCF 2023

FEATURES OF NEP 2020

21st Century Skills

Learning Skills (4Cs)
- ✓ Critical Thinking
- ✓ Creativity
- ✓ Communication
- ✓ Collaboration

Literacy Skills (IMT)
- ✓ Information Literacy
- ✓ Media Literacy
- ✓ Technology Literacy

Life Skills (FLIPS)
- ✓ Flexibility
- ✓ Leadership & Responsibility
- ✓ Initiative
- ✓ Productivity & Accountability
- ✓ Social Interaction

BASED ON NCF 2023

In NCF 2023, **curriculum** means not only what is given in the books, but also how the learners learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

The Six Pramanas

Inference | Perception | Comparison | Verbal Testimony | Non- Apprehension | Postulation

How to Access Digital Content through QR Code

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- ✓ "Visit "digital.inventanteducation.com"
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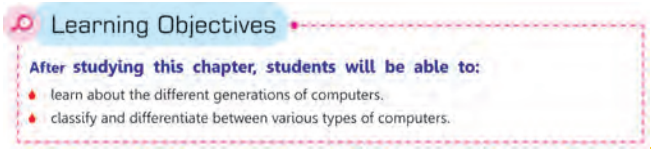
- ✓ Select 'Teacher/Student' in 'User' Type.
- ✓ Enter your name, email, mobile number and password.
- ✓ Click 'Register', and Enter the OTP to verify your mobile/email.
- ✓ Once registered, login on to the website and go to **Scan and Learn** section. Enter the Codes printed below the QR Codes to view the required content.

For Mobile Users

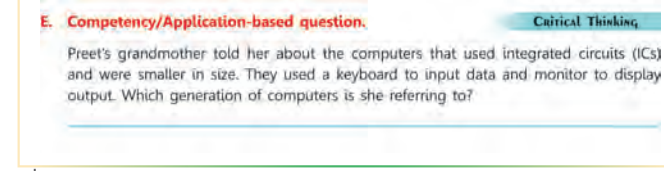
- ✓ Go to Google Play Store or Apple App Store.
- ✓ Type 'Edu Invent' in the search bar.
- ✓ Tap 'Install'. The app will take a few moments to download and install.
- ✓ Once installed, tap 'Open' to launch the app.
- ✓ Register yourself and login on the app.
- ✓ On the dashboard, click Scan QR Code button.
- ✓ Scan a QR Code printed in the book to explore the learning content associated with the QR Code.

About the Series



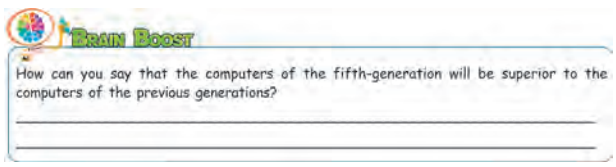
Learning Objectives

Sets out goals required to be achieved by the end of the chapter



Competency/Application-based questions

Assesses the learners analytical and critical thinking abilities



Brain Boost

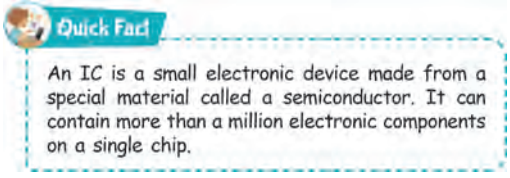
An interesting question to think out

Get Ready

Warm up activities that sparks curiosity and engagement

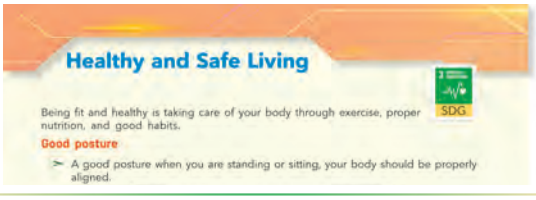
Discuss and Analysis

An engaging questions for the learners



Quick Fact

An interesting piece of knowledge

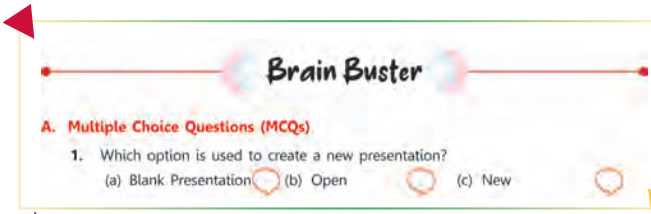


SDGs

Goals decided by various countries to be achieved by 2030

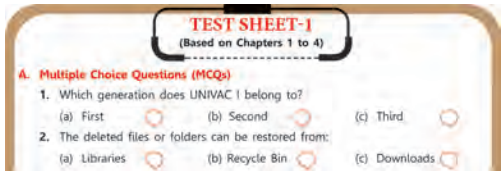
AI in Action

Improve productivity using AI-powered platform



Brain Buster

A set of questions for assessing the learner's knowledge

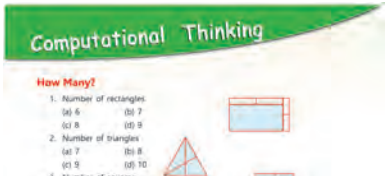


Test Sheet

Evaluates the learner's knowledge in a subject

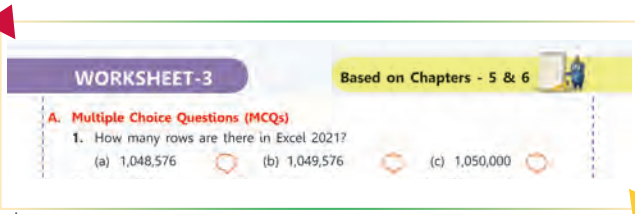
Project-Based Learning

Focuses on enhancing practical knowledge



Computational Thinking

A question that needs the learners to think and solve analytically

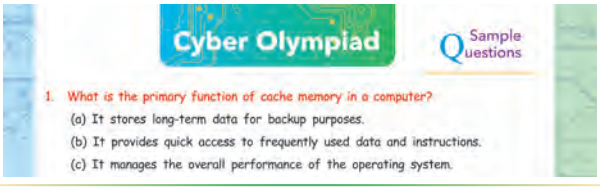


Worksheets

Reinforcing and assessing students understanding

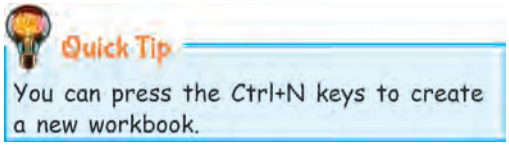
Project Work

In-depth exploration and application of learned concepts



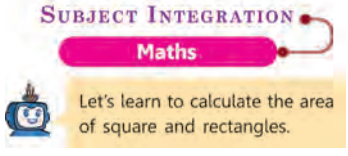
Cyber Olympiad

A competitive exam conducted by SOF for each class in schools to assess learners



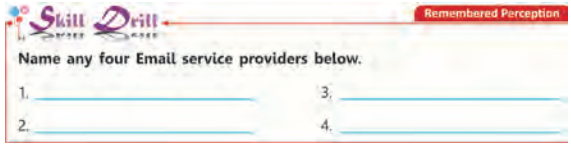
Quick Tips

An interesting bit of knowledge that will help the learners



Subject Integration

Project and activities are crafted to link different subjects for better learning



Skill Drill

An activity that reinforce learning among the learners

• Contents •

1. Generations of Computers 7
- Generations of computers • Types of computers

2. Managing Files and Folders 16
- Files and folders • File Explorer • Components of File Explorer • Viewing Files and Folder
- Creating a File • Creating a folder • Renaming a file/folder • Copying a file/folder • Moving a file/folder • Deleting a file/folder • Restoring a deleted file/folder

Worksheet - 1 26

3. Tables and Mail Merge 27
- Tables • Creating a table
- Project — Creating a table
- Entering Data in a table
- Modifying a table • Formatting tables
- Calculation in a table • Mail merge

4. Advanced Concept in PowerPoint 43
- Project— Layers of Atmosphere
- Inserting SmartArt Graphics
- Inserting a Table
- What are Animations Effects?
- Applying Animation Effects
- Applying Transitions Effects
- Adding Sounds • Inserting an Audio Clip
- Inserting a Video Clip • Inserting 3D Models
- Rehearse Timings

AI in Action 59

Worksheet - 2 61

Test Sheet - 1 62

5. Starting Excel 2021 63
- Starting Microsoft Excel
- Data types • Entering Data in a Worksheet
- Creating a new Workbook • Auto Fill
- Performing Calculations
- Working with Worksheets
- Saving a Workbook • Closing a workbook
- Opening an Existing Workbook

6. Working with Email 76
- What is an Email? • Advantages of Email
- Email Account • Email address
- Creating an Email Account
- Using an Email Account

Computational Thinking 88

Worksheet - 3 89

7. Programming with Scratch 90
- Different Types of Blocks
- Project — Calculating Area Square and Rectangle
- Adding My Block • Sensing Block
- Variable Category • Operators Category
- Looping Blocks • Conditional Blocks

8. Creating Games with Scratch 104
- Sensing Category
- Project: Ball Catching Game

9. Robots and AI 111
- Introduction to Robots • Types of Robots
- AI-powered Robots • AI Fun Spot

Worksheet - 4 121

Test Sheet - 2 122

Project Work 123

Healthy And Safe Living 125

Game Time 126

Cyber Olympiad 127

1 Generations of Computers

ICODE-isZi

Learning Objectives

After studying this chapter, students will be able to:

- learn about the different generations of computers.
- classify and differentiate between various types of computers.

Get Ready

Hey Tiny Techy! Did you know that early computers were as big as a room?

Really? How did they get so much smaller?

Great question! We will learn about that. Let's try this challenge activity first.

Write the names of the computers shown in the pictures below.

GENERATIONS OF COMPUTERS

The computers we see today are very different from what they were years ago. They have evolved through multiple generations of technological advancements to reach their current form. With each generation, significant developments in technology have made computers smaller, cheaper, and more powerful. These generations of computers are classified based on the technologies used to design them.

First-Generation Computers (1940-1958)

Between 1940 and 1958, people used first-generation computers. These computers relied on vacuum tubes for circuitry and magnetic drums for memory. Some key characteristics of first-generation computers are as follows:

- Enormous in size
- Expensive and slow to operate
- Extremely heavy and had limited internal memory
- Inputs to these computers were provided using punched cards and paper tapes

Vacuum tubes

Quick Fact

The presence or absence of holes punched into a rectangular piece of cardboard represents information on a punched card.

Some examples of first-generation computers are Mark I, ENIAC, EDSAC, EDVAC, UNIVAC.

Second-Generation Computers (1959–1964)

Between 1959 and 1964, people used second-generation computers. The defining characteristic of second-generation computers was their use of transistors instead of vacuum tubes.

Some other characteristics of the second-generation computers are:

- Smaller, faster, and more efficient than the first-generation computers
- Punched cards still used; magnetic tape and disks introduced
- High-level languages like COBOL and FORTRAN developed
- Examples: UNIVAC III, IBM 704, and IBM 1401

Transistors

Third-Generation Computers (1964–1970)

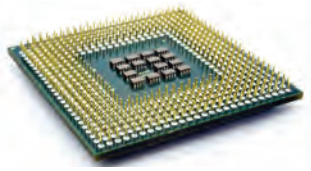
Between 1964 and 1970, third-generation computers were in use. These computers replaced transistors with integrated circuits (ICs), also known as **chips**. They featured operating systems that allowed multiple programs to run simultaneously.

Some characteristics of the third-generation computers include:

- Greater storage capacity, more faster, more efficient, and smaller in size as compared to second-generation computers
- Used keyboards for input and monitors for output

Examples of third-generation computers include the UNIVAC 900 series and IBM 360.

Fourth-Generation Computers (1971–present)



Microprocessor

People started using fourth-generation computers in 1971 and continue to do so today. The fourth-generation computers are the present-day computers. Microprocessors, a type of **VLSI** (Very Large Scale Integration) and **ULSI** (Ultra Large Scale Integration) which contain all the components of a CPU on a single chip, were used in these computers.

Some characteristics of the fourth-generation computers are:

- Smaller, more energy-efficient and reliable than the previous generations
- Advanced processing and memory capacities
- Enabled the development of personal computers (PCs)

- Support computer networks, leading to the creation of the internet
- Extremely powerful, processing millions of instructions in a fraction of a second

Some examples of fourth-generation computers are IBM PC and Apple Macintosh.

Quick Fact

An IC is a small electronic device made from a special material called a semiconductor. It can contain more than a million electronic components on a single chip.

Fifth-Generation Computers

Until the fourth generation, the primary focus of computer development was on reducing size and improving efficiency, resulting in smaller yet faster machines. However, the main limitation of these computers was their inability to think. The fifth-generation computers aim to address this limitation.

- Scientists are developing fifth-generation computers based on artificial intelligence (AI)
- These computers are able to process audio-visual commands
- Robots are prime examples of AI in action

Brain Boost

How can you say that the computers of the fifth-generation will be superior to the computers of the previous generations?

_____

_____

Skill Drill

Remembered Perception

Name the generation and technology used in the following computers.

		Generation	Technology
1.	ROBOTS	_____	_____
2.	EDVAC	_____	_____
3.	LAPTOPS	_____	_____

TYPES OF COMPUTERS

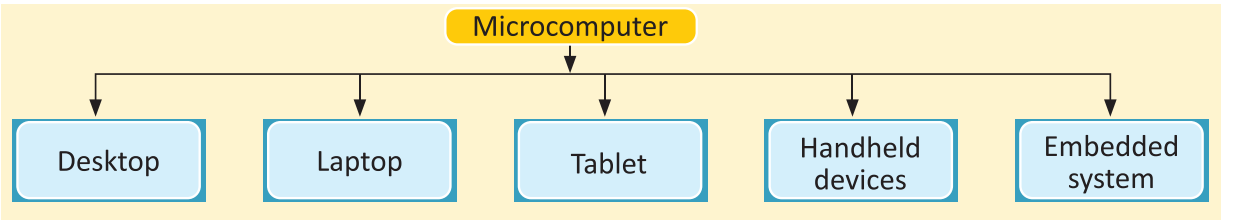
Different types of computers are used at various places for different purposes. Computers are divided into four categories based on their size. They are:

Microcomputers

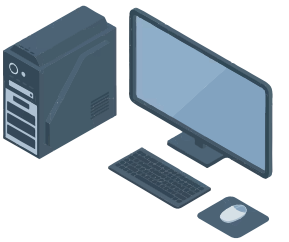
Microcomputers are small in size. They are designed for the use by one person. So they are called **Personal Computers (PCs)**. They are the most commonly used computers. Generally, schools, homes, offices, and shops use microcomputers single period.

Examples: Commodore 64, IBM PC

The names of the various microcomputers, which vary depending on their use are as follows:



Desktops: Desktop computers are designed to sit on desks, consisting of separate components like a monitor, system cabinet, keyboard, and mouse that work together as one unit.


Desktop computer

Laptop

Laptops: Laptops are portable computers that run on batteries and are easy to carry. They perform the same functions as desktops but are smaller in size. Screen sizes usually range from 13 to 15 inches.

Tablet Computers: Tablets are smaller and lighter than laptops but larger than smartphones, featuring touch-sensitive screens instead of a keyboard and mouse. Common sizes include 7, 8, and 10 inches. They are often used for reading, watching movies, browsing the internet, and more.

Handheld Devices: Handheld devices are small, portable, and can easily fit in a pocket. Examples include smartphones and tablets, also known as **Personal Digital Assistants (PDAs)**. They may have a touch screen or a simple display with a keyboard.

Tablet

Smartphones: Smartphones are handheld devices that combine the features of a personal computer with those of a mobile phone. They are used for calling, texting, emailing, web browsing, video capture, gaming, and more.

Game Consoles: Game consoles are devices designed for playing interactive video games, equipped with game controls and speakers. They can be connected to a TV or computer, with examples including Microsoft Xbox, Sony PlayStation, and Nintendo Wii.

Embedded Systems: Embedded systems are specialized computer systems integrated into larger devices, containing essential components like a CPU, RAM, and ROM but lacking a disk drive, keyboard, or a screen. They are designed for specific tasks in devices like TVs, vehicles, and appliances. These systems are also known as **microcontrollers**.

Minicomputers

Minicomputers are more capable than microcomputers. They are faster and have more memory. They are bigger than microcomputers. They are used in offices to connect many computers together. For example, PDP-8, HP 2100, and MicroVAX 3100.

Minicomputer

Mainframe computer

Mainframe Computers

Mainframe computers have faster speed and larger storage capacity than minicomputers. They are large computers and have many terminals connected to a network. They are used in big organizations and are mostly used for businesses and scientific research purposes. For example, IBM Z series, PDP-10 and System Z10.

Supercomputers

The most powerful computers in terms of performance are supercomputers. These computers are quite large and are very expensive. They are used for weather forecasting and defence purposes, such as controlling missiles and satellites. For example, CRAY-1, CRAY-2, PARAM, Tianhe-2, Sunway TaihuLight, and more.

Supercomputer

Discuss and Analyse

Collaboration

Can a computer with artificial intelligence ever match human intelligence? Discuss in class.

Recall

- Between 1940 and 1958, people used first-generation computers. These computers used a vacuum tube arrangement.
- First-Generation computers are the earliest computers used vacuum tubes for processing and were large and cumbersome.
- Second-Generation computers saw the replacement of vacuum tubes with transistors, making computers smaller, faster, and more reliable.
- Third-Generation computers used Integrated circuits (ICs), also known as chips, were introduced, further reducing the size and increasing the efficiency of computers.
- Fourth-Generation computers uses microprocessors, incorporating VLSI (Very Large Scale Integration) and ULSI (Ultra Large Scale Integration) technology, became the standard, allowing all CPU components to be housed on a single chip. These computers are still in use today.
- Fifth-Generation computers are the next generation of computers, enabling machines to think and behave more like humans.

Brain Buster

A. Multiple Choice Question (MCQs)

1. How many generations of computers are there?

(a) Four (b) Five (c) Six

2. What are Personal Computers (PCs) known as?

(a) Microcomputers (b) Minicomputers (c) Supercomputers

3. Which generation does UNIVAC belong to?

(a) First (b) Second (c) Third

4. Which type of computers are used in homes, schools, shops, offices, banks, etc.?

(a) Minicomputers (b) Microcomputers (c) Supercomputers

5. Which of the following is a second-generation computer?

(a) IBM 704 (b) EDSAC (c) UNIVAC II

B. Fill in the blanks.

Hints

1964 Microcomputer Transistor
Integrated circuit Artificial Intelligence 1959

1. Second generation computers were used between _____ and _____.
2. _____ were used instead of transistors in third-generation computers.
3. The _____ are also called Personal Digital Assistants (PDAs).
4. In the second-generation computers, _____ were used.
5. The fifth-generation computers are based on _____.

C. Write 'T' for true and 'F' for false statements.

1. Fifth generation computers can think and take decisions like humans. ☐
2. IBM 1401 is an example of the first-generation computers. ☐
3. The first-generation computers used ICs. ☐
4. Mainframe computers are faster than minicomputers. ☐

D. Answer the following questions:

1. Differentiate between first-generation and second-generation computers.

_____

_____

2. Write any two characteristics of the fifth-generation computers?

_____

_____

3. Define microcomputers.

_____

_____

4. What is a game console?

_____

_____

E. Competency/Application-based question.

Critical Thinking

Preet's grandmother told her about the computers that used integrated circuits (ICs) and were smaller in size. They used a keyboard to input data and monitor to display output. Which generation of computers is she referring to?

_____

INTERACTIVE SPACE

Problem Solving

Find and encircle 6 meaningful terms extracted from this chapter. See across and downwards.

ENIAC, DESKTOP, LAPTOP, PARAM, COBOL, UNIVAC.

S	M	O	T	Z	Y	X	W	P	C
M	Z	Y	U	N	I	V	A	C	Q
A	C	D	P	R	Q	D	E	O	P
R	F	I	E	O	U	E	K	B	A
B	R	A	N	S	I	S	T	O	R
P	O	T	I	U	W	K	V	L	A
H	M	N	A	X	Q	T	R	P	M
T	B	D	C	E	G	O	N	T	Z
N	L	A	P	T	O	P	Z	Y	W

LAB WORK

Experiential Learning

Create a PowerPoint presentation on the different generations of computers. The presentation should include an overview of each generation, key technological advancements, and examples of computers from each era.

IDEA EXCHANGE

Life Skills and Values

If you are given a chance to work with a computer from each of the five generations that you have studied, which one will you choose and why?

HANDS-ON PROJECT

Exploratory Learning

Find out when was the first supercomputer made in India. What was it called, and what was it used for? Prepare a report on your findings.

TEACHER'S NOTES

- Use charts or tables to compare and contrast the features, technology, and examples of each computer generation.

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- ✓ Leadership & Responsibility
- ✓ Initiative
- ✓ Productivity & Accountability
- ✓ Social Interaction

BASED ON NCF 2023

In NCF 2023, **curriculum** means not only what is given in the books, but also how the learners learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

The Six Pramanas

- Inference
- Perception
- Comparison
- Verbal Testimony
- Non- Apprehension
- Postulation

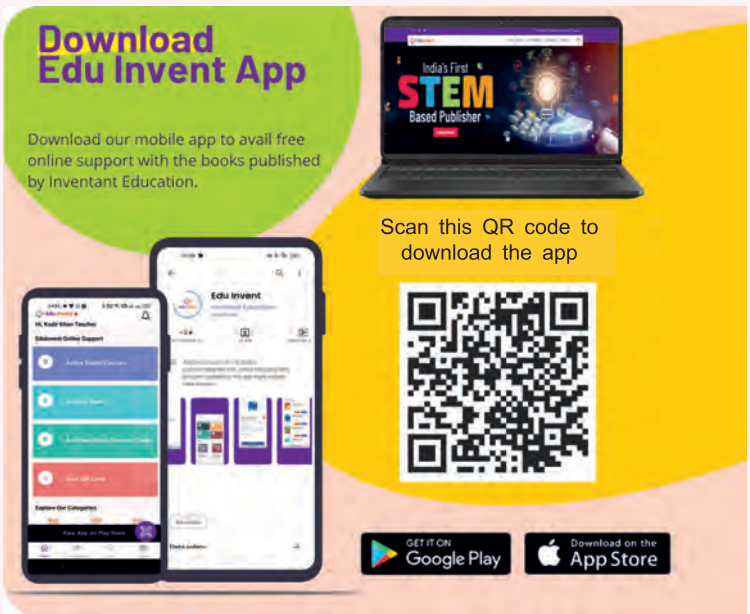
How to Access Digital Content through QR Code

For Website Users

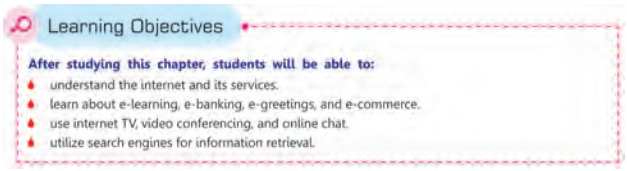
- ✓ "Visit "digital.inventanteducation.com"
- ✓ Click "Register" button available on the top-right.
- ✓ Select 'Teacher/Student' in 'User' Type.
- ✓ Enter your name, email, mobile number and password.
- ✓ Click 'Register', and Enter the OTP to verify your mobile/email.
- ✓ Once registered, login on to the website and go to **Scan and Learn** section. Enter the Codes printed below the QR Codes to view the required content.

For Mobile Users

- ✓ Go to Google Play Store or Apple App Store.
- ✓ Type 'Edu Invent' in the search bar.
- ✓ Tap 'Install'. The app will take a few moments to download and install.
- ✓ Once installed, tap 'Open' to launch the app.
- ✓ Register yourself and login on the app.
- ✓ On the dashboard, click Scan QR Code button.
- ✓ Scan a QR Code printed in the book to explore the learning content associated with the QR Code.

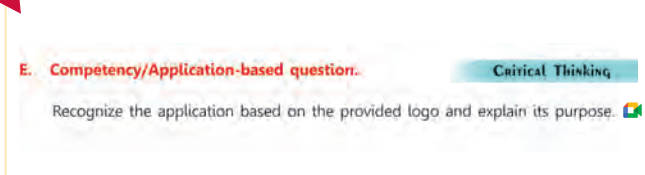


About the Series



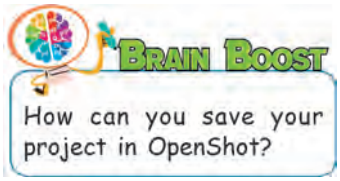
Learning Objectives

Sets out goals required to be achieved by the end of the chapter



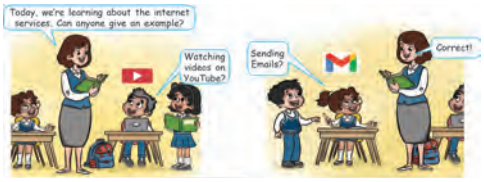
Competency/Application-based questions

Assesses the learners analytical and critical thinking abilities



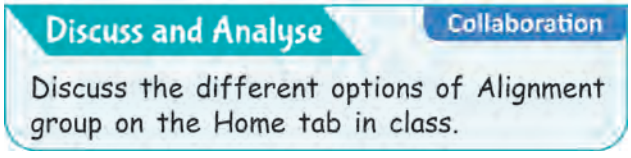
Brain Boost

An interesting question to think out



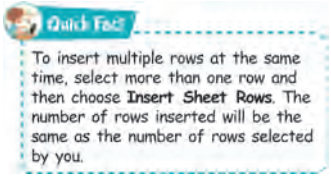
Comic Strip

Interesting stories to bring the concept to real life



Discuss and Analysis

An engaging questions for the learners

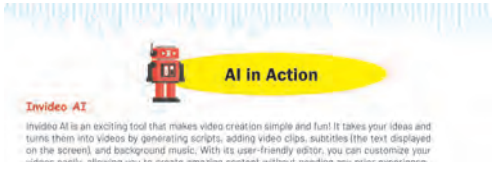


Quick Fact

An interesting piece of knowledge

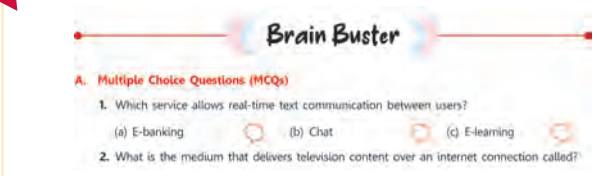
SDGs

Goals decided by various countries to be achieved by 2030



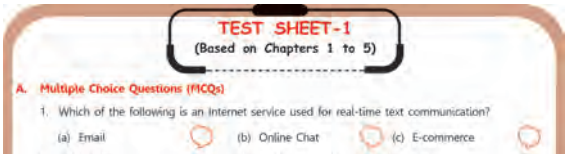
AI in Action

Improve productivity using AI-powered platform



Brain Buster

A set of questions for assessing the learner's knowledge

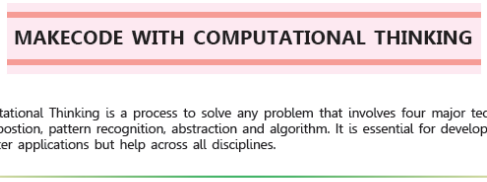


Test Sheet

Evaluations the learner's knowledge in a subject

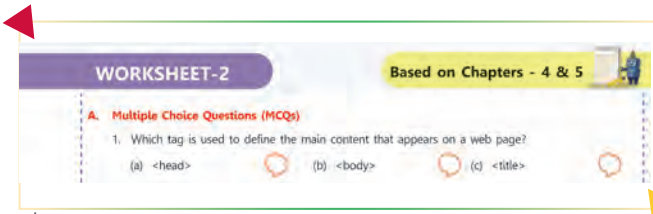
Digital Citizenship

Navigating the online world responsibly and respectfully



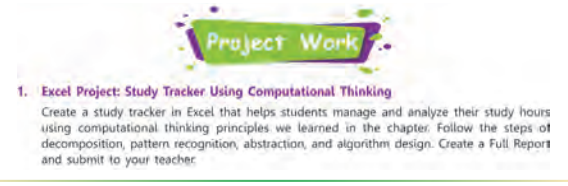
Computational Thinking

Applying problem-solving strategies to break down complex tasks and create efficient coding solutions



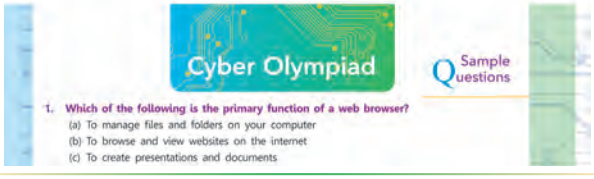
Worksheets

Reinforcing and assessing students understanding



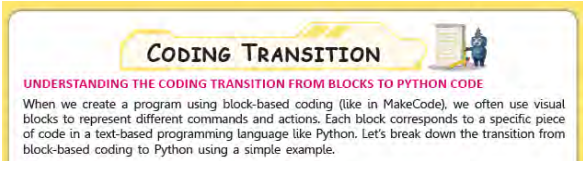
Project Work

In-depth exploration and application of learned concepts



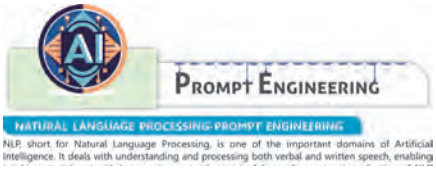
Cyber Olympiad

A competitive exam conducted by SOF for each class in schools to assess learners



Coding Transition

A smooth transition from block-based to text-based programming for advanced coding skills



Prompt Engineering

Designing effective prompts to help smart technology provide accurate and relevant answers.

Skill Drill

An activity that reinforce learning among the learners

• Contents •

1. Internet Services and Cloud Computing 7

• Information Retrieval • Search Engines • Email • Email vs. Postal Mail • Creating an Email Account • Chat • Google Meet • Dos and Don'ts of Chatting • Video Conferencing • E-Learning • E-Banking • E-Greetings • E-Commerce • Internet TV • Introduction to Cloud Computing • Characterstics of Cloud Computing • Storing and sharing Data Using Cloud Computing

Google Sites 18

2. Editing and Formatting a Worksheet 20

• Selecting Cells • Editing Cell Contents • Deleting Cell Contents • Copying and Moving Data • Inserting Rows, and Columns • Deleting Rows, and Columns • Font Group • Alignment Group

3. Functions and formulas in Excel 2021 32

• Functions in Excel • AutoSum Feature • Function Library • Formulas in Excel • Elements of a Formula in Excel • Performing Calculations in Excel • Types of Cell References

Worksheet - 1 45

4. Building Web Page Using Html5 and CSS3 46

• Web Page • HTML • HTML5 • Tools for HTML5 • Types of HTML Editors • Understanding HTML Tags • Types of HTML Tags • Elements • Attributes • Let's create your First Web Page • Introduction to basic HTML Tags • Other HTML Tags • HTML Structural and Spacing Tags • HTML Text Formatting Tags • CSS • Why use CSS • What is CSS3? • Key features of CSS3 • How to add CSS • CSS Priority Order • Background Properties

5. Introduction to OpenShot 59

• Components of OpenShot Window • Editing Videos with OpenShot

AI in Action 67

Worksheet - 2 69

Test Sheet - 1 70

6. Introducing Krita 71

• What is Krita? • Downloading and Installing Krita • Starting Krita • Creating a New File in Krita • Components of Krita • Tools in Krita • Drawing Tools • Inserting an Image • Selection Tools • Editing Tools

Computer Languages 84

7. Introduction to Makecode Arcade 86

• Introduction to Coding • Introduction to MakeCode • Downloading and Installing MakeCode Arcade • Starting online MakeCode Arcade • Components of MakeCode Arcade Window • Using Basic Blocks to Create a Simple Animation • Using Variables in MakeCode Arcade

Worksheet - 3 101

MakeCode with Computational Thinking 102

Coding Transition 109

8. Programming with Python 110

• Algorithm • Flowchart • Introduction to Programming • What is Python? • Use of Python • Installing Python • Python IDLE • Using the Print() Function • Variables in Python • Data Types • Using the Input() Function • Escape Sequences

Python with Computational Thinking 122

Prompt Engineering 127

9. Applications of AI 128

• About AI • AI –John McCarthy • Features of AI • Need for AI • Advantages and Disadvantages of AI • Applications of AI

Emerging Trends 135

Worksheet - 4 137

Test Sheet - 2 138

Project Work 139

Digital Citizenship 141

Fit and Healthy 142

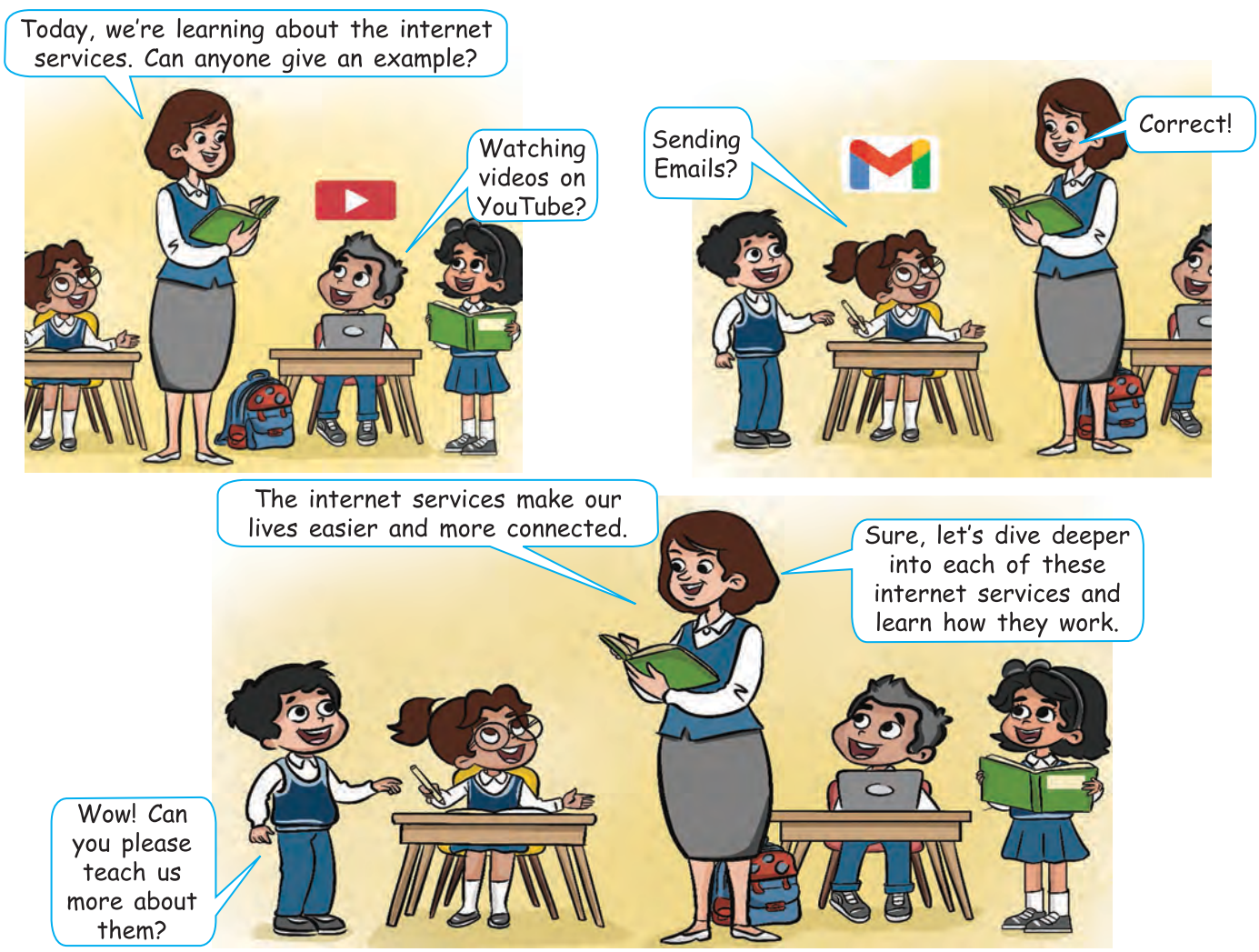
Cyber Olympiad 143

1 Internet Services and Cloud Computing

Learning Objectives

After studying this chapter, students will be able to:

- understand the internet and its services.
- learn about e-learning, e-banking, e-greetings, and e-commerce.
- use internet TV, video conferencing, and online chat.
- utilize search engines for information retrieval.



INTERNET SERVICES

The Internet is a global network consisting of millions of computers connected together. It offers a wide range of services that meet various needs. Some of the basic services available on the internet include search engines, emails, online chat, video conferencing, and more. In this chapter, we will learn about the various services that make the internet so popular.

Information Retrieval

The internet has made it easier to access and share information, which can be in the form of text, pictures, audio, or video. There is a vast amount of information available on the internet on a wide range of topics, such as news, books, products, and more. Search engines on the internet help you search for and find information on any topic.

Search Engines

Search engines are the **websites** that help users find information on the internet. By entering **keywords** or **phrases**, users can search for and access other websites that contain the relevant information they need.

Some of the popular search engines are **Google**, **Bing**, **Yahoo!**, **Search.com**, and **Lycos**.

Email

Email (electronic mail) is a process of sending and receiving messages over the internet. You must have an email address in order to access your email. Every email account is identified by its unique email address. An email address consists of a **username** and a **domain name** separated by the **"@"** symbol. For example:

preetirajput	@	gmail.com
↓	↓	↓
username	symbol	domain name

Quick Fact

An email address does not contain any space.

- **Username:** It is the name of a person's account. This can be the actual name of the user or any other name.
- **Domain name:** It is the location of the person's account on the internet. It typically ends in a domain suffix like .com, .org, .edu, and so on.

There are many sites on the internet that provide free email services. Some of them are:

- www.gmail.com
- www.yahoo.com
- www.rediffmail.com

Email vs Postal Mail

Email is different from postal mail. Postal mail can carry articles, gifts, letters, and documents, which an email cannot. Postal mail is sent to a **physical address**, while an email is sent to an **email address**.

Discuss and Analyse — Collaboration

How is an email better than a postal mail? Discuss in class.

Creating an Email Account

You can easily create an email account by filling out a registration form where you choose your email address and password. After creating an account, you can use the email address and password to access your email account.

Quick Fact

Jerry Yang and David Filo are the founders of www.yahoo.com. Yahoo is an American computer service company founded on 2nd March, 1995.

Chat

Chatting has become a popular way for people to communicate with others. Real-time text communication between two or more users through computers is called **chat**. Chat is also known as **Online chat** or **Internet chat**.

Chatting can be used to send instant messages and allows you to exchange text messages, as well as interact with others through **voice** and **video chat**.

Some popular instant messengers that allow you to chat with people in your friend's list are:

Windows Live Messenger

Yahoo Messenger

Skype IM

Using these messengers, you can chat with friends anywhere in the world and get instant replies, just like chatting in your classroom.

Google Meet

It is a free service provided by Google that allows you to talk to family and friends on your computer or a mobile device. You can even talk to each other live over **video chat** and to make **phone calls and texts**. It is available on its website, as an app on a smartphone or tablet, and as a plug-in for various web browsers.

Google Meet

Dos and Don'ts of Chatting

While chatting can be fun and informative, it is important to follow these dos and don'ts:

Dos	Dont's
• Use a chat nickname instead of your real name.	• Do not reveal any personal information in a chat room.
• Check the terms, conditions, and privacy statement of the chat site.	• Do not agree to meet someone you have only talked to in a chat room.
• Use decent language while chatting.	• Do not use abusive language.

Video Conferencing

Video Conferencing

Video conferencing allows two or more users to have a live interaction via audio and video transmission. It can be used for:

- Conducting meetings
- Educational training
- Interviewing job candidates
- Health care conferences

There are some sites such as **www.videoconference.com** that allow people to set up video chat rooms. **Skype**, **Yugma**, **Adobe Connect**, and **Ekiga**. are examples of some video conferencing applications.

E-Learning

E-learning

E-learning, or **Electronic learning**, refers to learning with the use of technology, enabling people to learn anytime and anywhere. The internet acts as a global library, overcoming the limitations of time, distance, and resources. E-learning is also less expensive than traditional learning. Some websites offering e-learning tutorials include:

- www.wesschools.com
- www.elearningforkids.org
- www.glearnfree.com
- www.abcya.com

E-Banking

E-Banking

E-banking means electronic banking. It is an online banking service that allows users to **monitor**, **transact**, and **manage** their bank accounts online. E-banking services can be used for:

- Downloading statements
- Applying for loans
- Transferring funds
- Paying utility bills
- Requesting cheque books and demand drafts
- Viewing bank account details and balances

E-Greetings

E-greetings

E-greetings are electronic greeting cards that can be sent over the internet to convey your wishes to a friend or relative. Some popular e-greeting sites are:

- www.123greetings.com
- www.americangreetings.com
- www.hallmarkecards.com

E-Commerce

E-commerce

E-commerce stands for electronic commerce, involves online commercial activities. The internet offers convenient ways to shop for almost everything from clothes to electronics. We can also buy and sell both new and used goods. This process of **buying** and **selling products** over the internet is called **Online shopping**. Some e-shopping websites are:

www.amazon.com

www.myntra.com

E-shopping website

www.flipkart.com

Quick Fact

Jerry Yang and David Filo are the founders of www.yahoo.com. Yahoo is an American computer service company founded on 2nd March, 1995.

Internet TV

Internet TV is a medium of delivering television content over an internet connection. It is also known as **web television**. It is almost the same as getting television through an antenna or a series of cable wires, but the difference is that the information is sent over the internet as **data**.

Some of the popular independent service providers of Internet TV are:

- Disney + Hotstar
- SonyLIV
- Netflix

Skill Drill — **Problem-Solving**

Write any four internet services.

1. _____ **2.** _____

3. _____ **4.** _____

INTRODUCTION TO CLOUD COMPUTING

In its most basic form, **cloud computing** refers to storing and accessing data and programs on remote servers located on the internet rather than the computer's hard drive or local server. Cloud computing involves the delivery of various computing services, including servers, storage, databases, networking, and software over the Internet. These services are provided by **cloud providers**, who maintain and operate large data centers and infrastructure, making them accessible to users and organisations on a **pay-as-you-go** or **subscription** basis.

Note

Cloud computing is another term for Internet-based computing.

Inter-Disciplinary (English)

- **Pay as you go** : *Paying for a service before it is used*
- **Metaphorical** : *Symbolic*

Understanding the Term 'Cloud'

In the context of cloud computing, the term cloud is a metaphorical representation of the Internet

or a network of remote servers and data centers that provide various computing services and resources over the Internet.

CHARACTERISTICS OF CLOUD COMPUTING

A good and robust cloud computing model has the following characteristics:

- **On-Demand resources**: Users can access computing resources as needed, without the need for investing heavily in hardware or infrastructure. This "on-demand" model allows for flexibility and cost savings.
- **Broad network access**: Since cloud computing is completely Internet based, it can be accessed from anywhere and at any time. You can use any kind of device to access your data on a cloud.
- **Resource pooling**: Cloud computing software enables an instance of the program which serves different consumers (also known as **tenants**) isolated from the each other. This property of software is referred to as **resource pooling** or **multi-tenancy.** A cloud allows multiple tenants to share a pool of resources. One can share single physical instance of hardware, database and basic infrastructure.
- **Scalability**: Cloud services can be scaled up or down based on changing requirements. This enables organisations to handle varying workloads, and increasing or decreasing demands.
- **Security:** Cloud providers invest in robust security measures to protect data and resources. Hardware failures do not result in data loss because of networked backups.

Advantages of Cloud Computing

Cloud computing offers a wide range of advantages for individuals, businesses, and organisations.

- **Cost effective:** Cloud computing often follows a pay-as-you-go or pay-for-what-you-use pricing model. Users are billed for the resources they consume, eliminating the need for capital expenditures on hardware. Cloud providers also handle infrastructure maintenance, reducing hardware and software maintenance costs for users.
- **Scalability and flexibility**: Users can scale up or down based on their demand, ensuring they have the right amount of computing resources at all times.
- **Global accessibility**: Cloud services can be accessed from anywhere with an Internet connection, facilitating remote work and collaboration.
- **Managed services**: Cloud providers offer managed services, such as databases, machine learning, security, and monitoring, reducing the operational burden on customers.
- **Regular updates**: Cloud providers handle routine updates and maintenance tasks, ensuring that systems are up to date and secure.
- **Energy efficiency**: Cloud providers often use energy-efficient data centers and share resources among multiple customers, which can reduce the overall carbon footprint.

Skill Drill

Critical Thinking

Search Internet and find information on 'How can cloud computing reduce carbon footprint?' Share the collected information in the class.

13 CLMATE ACTION

STORING AND SHARING DATA USING CLOUD COMPUTING

Storing and sharing data using cloud computing is a convenient and efficient way to manage data and collaborate with others. To store and share data using cloud computing, first you need to select a reputable cloud storage provider that suits your needs. Common options include Google Drive, Dropbox, Microsoft OneDrive, and iCloud. Let us learn to use Google Drive for cloud computing.

Google Drive is a cloud-based file storage and synchronisation service that allows users to store files, documents, photos, videos, and other digital content securely on Google's servers. Google Drive can be accessed from virtually any device with an Internet connection.

Google Drive logo

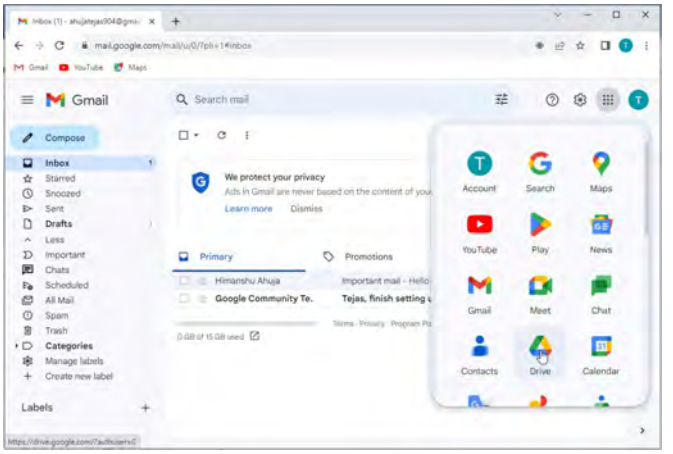
Opening Google Drive

To open Google Drive, follow these steps.

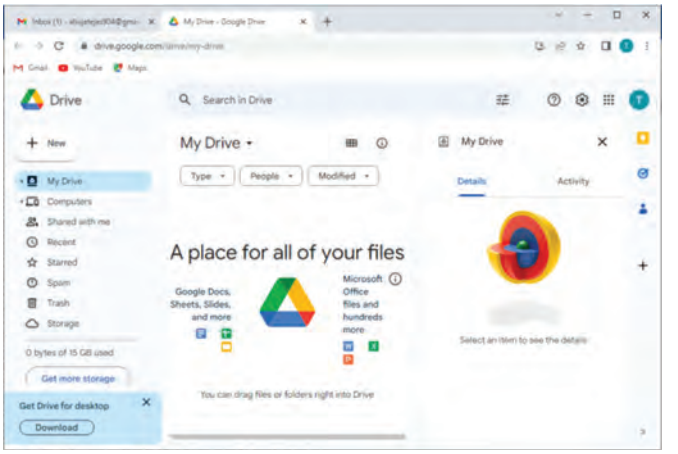
Step 1: Visit **www.gmail.com** and sign into your Google account.

Step 2: Click the **Google apps** (⋮⋮⋮) icon on the top-right corner of the email window.

Step 3: Select the **Drive** option from the list. The **Google Drive** window appears.



Opening Google Drive



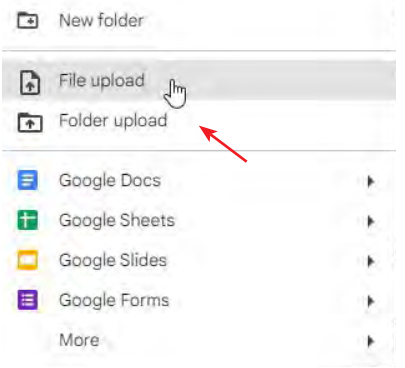
Google Drive window

Uploading Files on the Drive

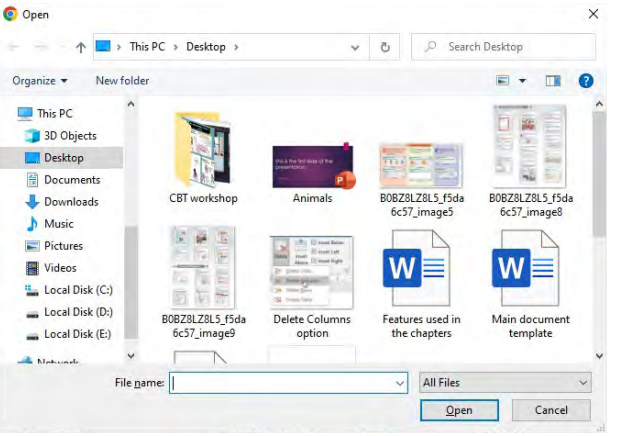
When you transfer data from your computer to the Google Drive over the Internet, it is called **uploading**. To upload a file on the Google Drive, follow these steps:

Step 1: Click on the **New** button (+ New) and click on the **File upload** option. The **Open** dialog box appears.

Step 2: Select the file you want to upload and click on the **Open** button.

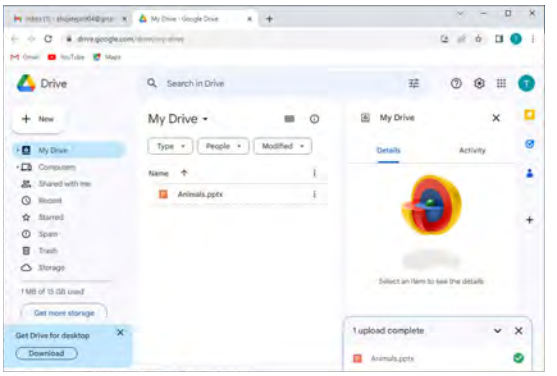


File upload option



Open dialog box

The file will be uploaded and a prompt is displayed on the bottom-right corner of the website.



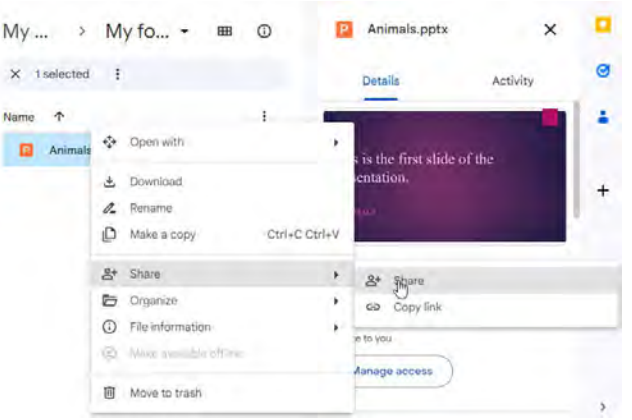
File uploaded in Google Drive

Sharing Files in Google Drive

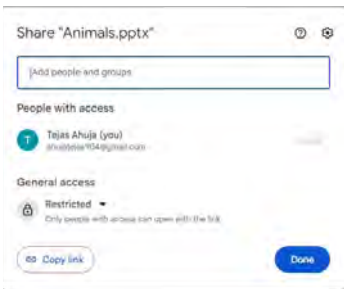
You can also share your files and folders with the help of Google Drive. To do this, follow these steps.

Step 1: Right-click on the file you want to share. A shortcut menu appears.

Step 2: Point to **Share** and then click the **Share** option. The Share dialog box appears.



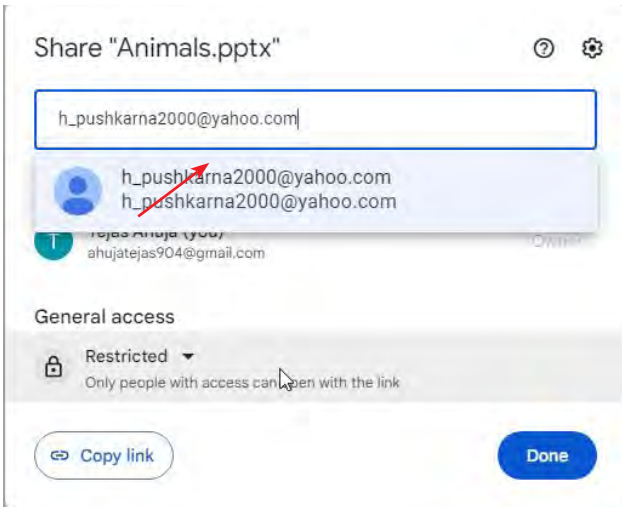
Clicking on the Share option



Share dialog box

Step 3: Choose the desired email to whom you want to share the file. Alternatively, enter the email ID of the person in the text box. A new prompt box appears.

Step 4: Type the message in the **Message** box, and click on the **Send** button. The file will be shared with the desired person.



Entering the email ID of the person

Message for the receiver

Logging out of the Google Drive Account

Signing out or logging out from the Google Drive account is the same as signing out from the Gmail account. Simply, click on the **username** icon (T) on the top-right corner of the email window and then click on **Sign out** (Sign out).

Recall

- A search engine on the internet helps you to search and find information on any subject.
- Email (electronic mail) is a process of sending and receiving messages over the internet.
- Chat has become a popular way for people to communicate with others. Real-time textual communication between two users through computers is called chat.
- Video conferencing allows two or more users to have a live interaction with one another via audio and video transmission.
- E-learning means electronic learning. It refers to learning with the use of technology that enables people to learn anytime and anywhere.
- E-banking means electronic banking. It is a net banking service that allows the users to monitor, transact and manage the bank accounts online.
- Cloud computing offers a wide range of advantages for individuals, businesses, and organisations.
- Google Drive is a cloud-based file storage and synchronisation service that allows users to store files.

Brain Buster

A. Multiple Choice Questions (MCQs)

1. Which service allows real-time text communication between users?

   (a) E-banking (b) Chat (c) E-learning

2. What is the medium that delivers television content over an internet connection called?

   (a) Video conferencing (b) Internet TV (c) E-banking

3. Which of the following is an example of an online chat application?

   (a) Gmail (b) Skype IM (c) Amazon

4. What service allows you to send electronic greeting cards over the internet?

   (a) E-commerce (b) E-banking (c) E-greetings

5. Which of the following is an online service that enables the buying and selling of goods?

   (a) E-commerce (b) E-learning (c) E-banking

B. Fill in the blanks.

Hints Electronic Internet Technology Online shopping E-Banking

1. Email stands for _____ mail.
2. The process of buying and selling products over the internet is called _____.
3. TV Cloud services can be accessed from anywhere with an _____ connection.
4. E-learning enables people to learn anytime and anywhere using _____.
5. _____ is an online banking service that allows users to monitor their bank accounts online.

C. Write 'T' for true and 'F' for false statements.

1. E-banking allows users to watch television content over the internet. ☐
2. E-greetings are electronic greeting cards that can be sent over the internet. ☐
3. Search engines help users find information by entering keywords or phrases. ☐
4. Internet TV requires a physical antenna to receive content. ☐
5. Video conferencing allows live interaction via audio and video transmission. ☐

D. Answer the following questions:

1. What are some services provided by E-banking?
2. What is the main difference between email and postal mail?
3. Explain how e-learning is beneficial compared to traditional learning.
4. Describe the process of creating an email account.
5. What is cloud computing?

E. Competency/Application-based question.

Critical Thinking

Recognize the application based on the provided logo and explain its purpose.

INTERACTIVE SPACE

Problem Solving

Skill Based Learning

Identify the following icons and write their names.

1. _____ 2. _____ 3. _____ 4. _____

IDEA EXCHANGE

Life Skills and Values

What will you do if you find any inappropriate content while surfing the internet?

HANDS-ON PROJECT

Exploratory Learning

Create a PowerPoint on "Online Chat" and discuss the dos and don'ts with your classmates.

Teacher's Notes

- Discuss the advantages of e-greetings, e-commerce, e-learning and other internet services to students.

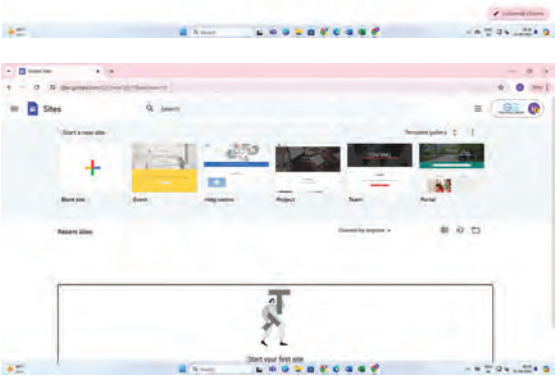
Google Sites

Google Sites is a fun and easy tool that lets you create your own website without needing to know any coding. You can add text, pictures, videos, and even your schoolwork from Google Drive. It's a simple way to build websites for things like projects or to share information with friends and teachers. Plus, you get to be creative and make your site look just the way you want!

Step 1: Open Google Sites

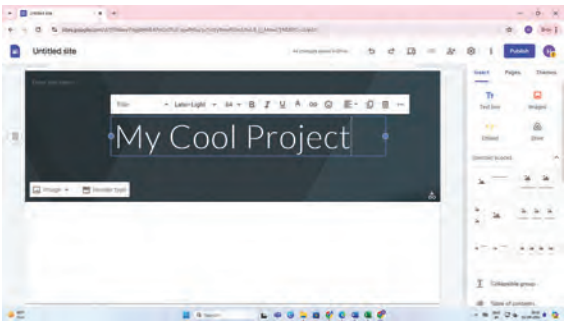
- First, open your web browser (like Chrome) and go to sites.google.com.
- If you're not already signed in, just use your Google account to log in.

Step 2: Start a New Site



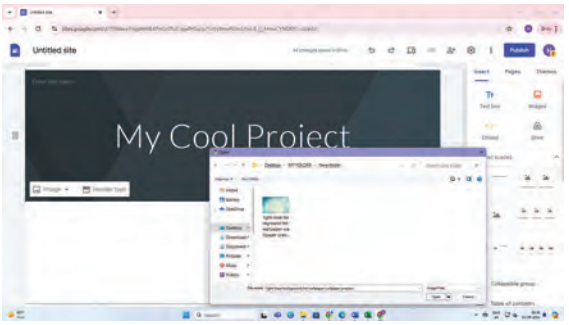
- Once you're in, look for a big plus button (+) at the bottom right and click on it.
- You'll have two choices: start from scratch with a blank template or pick one of the cool pre-made templates.

Step 3: Give Your Site a Name



- At the top of the page, you'll see a space that says **Your page title**.
- Click on that and type in the name of your website, like **My Cool Project** or **All About Me**.

Step 4: Make Your Header Look Awesome



- You'll see a big header section at the top—let's make it look cool!
- Click on **Change image** to choose a background. You can pick one from the gallery or upload your own.

Step 5: Start Adding Stuff to Your Page

- On the right side of your screen, you'll see a bunch of options under **Insert.** Here's where the fun begins!
  - **Text Box:** Click this if you want to add some words (like an introduction about yourself).
  - **Images:** Add photos by uploading them or dragging them right onto your page.

- **Embed:** Want to show a video or a map? Use this option to add links from other websites.
- **Drive:** You can even add files from your Google Drive, like your school presentations or documents.

Step 6: Move Things Around

- You can drag and drop everything on your page to arrange it however you like. Want your image above the text? Just drag it there!
- Don't forget to play around with the text styles too—make it bold, change the size, or centre it.

Step 7: Add More Pages (If You Want)

- Click on the **Pages** tab on the right side if you want to create more sections on your site (like **About Me** or **My Hobbies**).
- Hit the "+" button to add a new page. Name it, and Google Sites will automatically add it to your site's menu at the top.

Step 8: See What It Looks Like

- Ready to see how your site looks so far? Click on the **Preview** button (it looks like an eye) at the top.
- You can even see what it will look like on a phone or tablet.

Step 9: Publish Your Website

- When your site looks great and you're happy with it, hit the "Publish" button in the top right.
- Choose a web address for your site, like mysite.google.com.
- Decide who can see your site—make it public for everyone or just share it with specific people like your teacher or classmates.
- Finally, click Publish, and voilà! Your site is live on the web!

Step 10: Share It!

- After publishing, you'll get a link to your website. Copy that link and share it with anyone you want—they can visit your site and see all your hard work!

As per
NEP 2020 and NCF 2023

Tech Ninja

WINDOWS 11 & OFFICE 2021

A Textbook of Computer Science
for Joyful and Experiential Learning

7

By
Editorial Team
Inventant Education

Inventant Education
Present Meets Future
(A Unit of EDULABZ International)

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Introduction

Tech Ninja is a comprehensive computer series for learners in classes 1-8, focusing on computer knowledge, the internet, and advancements in **Machine Learning** and **Deep Learning Systems.**

Inventant Education aims to equip students with computer skills, creativity, and diligence while aligning with Sustainable Development Goals to foster global understanding and problem-solving. Additionally, the projects and activities are aligned with Sustainable Development Goals (SDGs), fostering a deep understanding of global challenges.

The **National Education Policy (NEP) 2020** is integrated into practical activities, highlighting **21st-century** skills like **Healthy Living**, **Artificial Intelligence**, **Cyber Ethics**, **Art Integration**, **Cross-Curricular Activities**, and **more**. The **National Curriculum Framework 2023** fostering cognitive abilities in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

Our Teacher's Resource Book and Online Support offer lesson plans, answer keys, e-books, and animated videos for educators, enhancing learning and shaping the future of education.

—Inventant Education

Aligned with NEP 2020 and NCF 2023

FEATURES OF NEP 2020

21st Century Skills

Learning Skills (4Cs)
- ✓ Critical Thinking
- ✓ Creativity
- ✓ Communication
- ✓ Collaboration

Literacy Skills (IMT)
- ✓ Information Literacy
- ✓ Media Literacy
- ✓ Technology Literacy

Life Skills (FLIPS)
- ✓ Flexibility
- ✓ Leadership & Responsibility
- ✓ Initiative
- ✓ Productivity & Accountability
- ✓ Social Interaction

BASED ON NCF 2023

In NCF 2023, **curriculum** means not only what is given in the books, but also how the learners learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

The Six Pramanas

Inference | Perception | Comparison | Verbal Testimony | Non- Apprehension | Postulation

How to Access Digital Content through QR Code

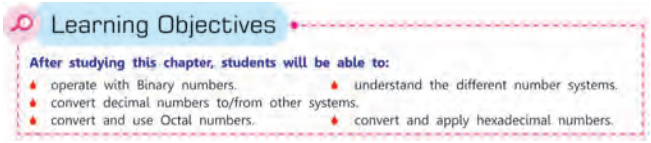
For Website Users

- ✓ "Visit "digital.inventanteducation.com"
- ✓ Click "Register" button available on the top-right.
- ✓ Select 'Teacher/Student' in 'User' Type.
- ✓ Enter your name, email, mobile number and password.
- ✓ Click 'Register', and Enter the OTP to verify your mobile/email.
- ✓ Once registered, login on to the website and go to **Scan and Learn** section. Enter the Codes printed below the QR Codes to view the required content.

For Mobile Users

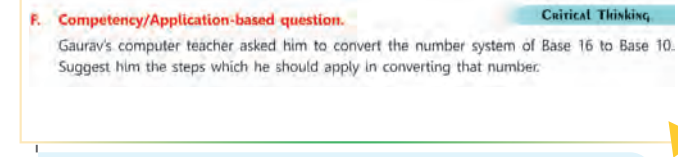
- ✓ Go to Google Play Store or Apple App Store.
- ✓ Type 'Edu Invent' in the search bar.
- ✓ Tap 'Install'. The app will take a few moments to download and install.
- ✓ Once installed, tap 'Open' to launch the app.
- ✓ Register yourself and login on the app.
- ✓ On the dashboard, click Scan QR Code button.
- ✓ Scan a QR Code printed in the book to explore the learning content associated with the QR Code.

About the Series



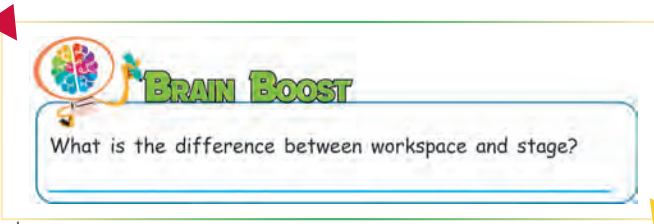
Learning Objectives

Sets out goals required to be achieved by the end of the chapter



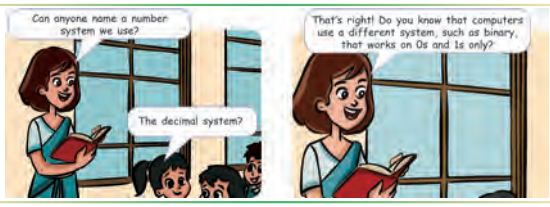
Competency/Application-based questions

Assesses the learners analytical and critical thinking abilities



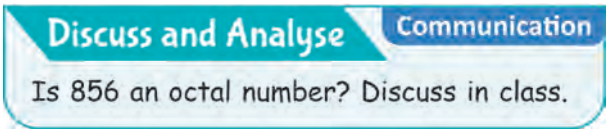
Brain Boost

An interesting question to think out



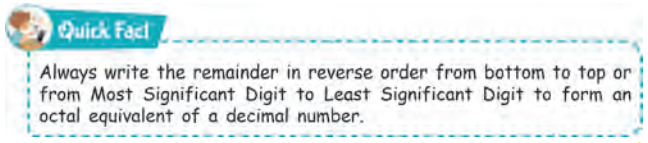
Comic Strip

Interesting stories to bring the concept to real life



Discuss and Analysis

An engaging questions for the learners



Quick Fact

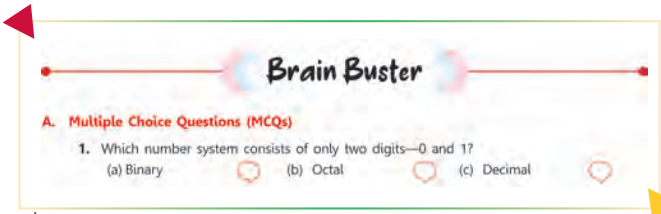
An interesting piece of knowledge

SDGs

Goals decided by various countries to be achieved by 2030

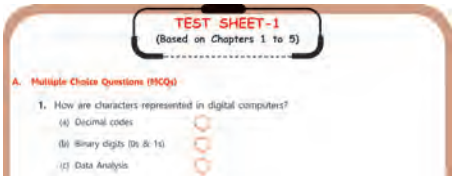
AI in Action

Improve productivity using AI-powered platform



Brain Buster

A set of questions for assessing the learner's knowledge

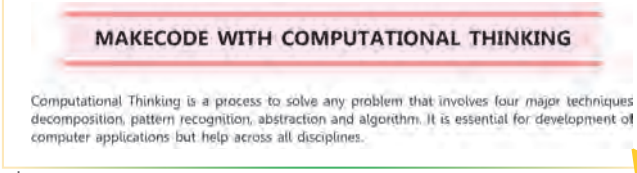


Test Sheet

Evaluations the learner's knowledge in a subject

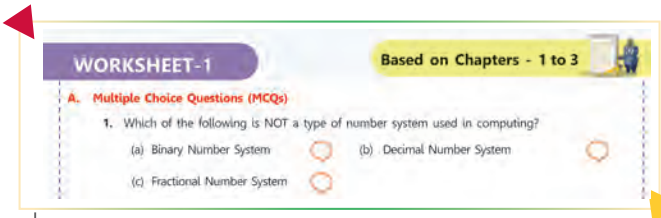
Digital Citizenship

Navigating the online world responsibly and respectfully



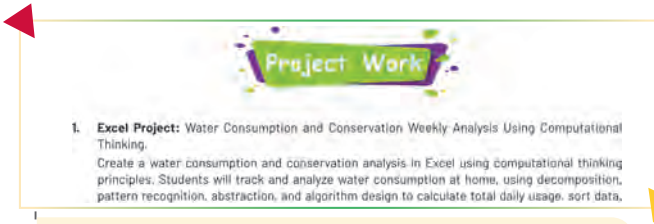
Computational Thinking

Applying problem-solving strategies to break down complex tasks and create efficient coding solutions



Worksheets

Reinforcing and assessing students understanding

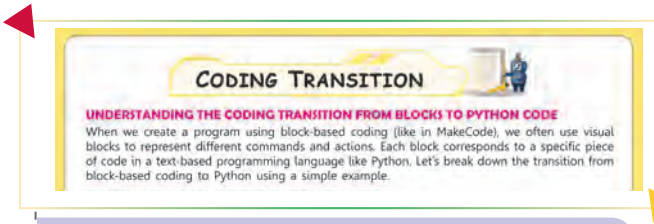


Project Work

In-depth exploration and application of learned concepts

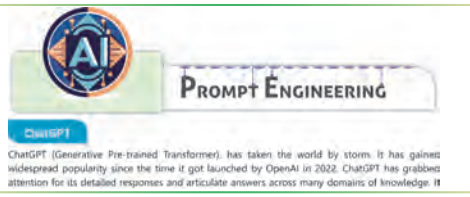
Cyber Olympiad

A competitive exam conducted by SOF for each class in schools to assess learners



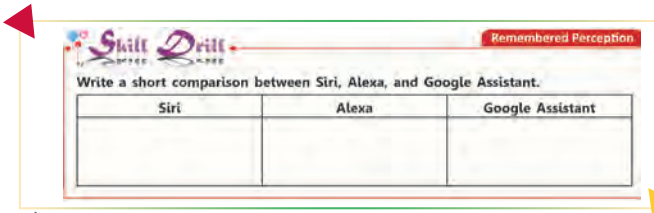
Coding Transition

A smooth transition from block-based to text-based programming for advanced coding skills



Prompt Engineering

Designing effective prompts to help smart technology provide accurate and relevant answers



Skill Drill

An activity that reinforce learning among the learners

• Contents •

1. Number System 7

• Binary digit • Number system • Binary number system • Decimal number system • Octal number system • Hexadecimal number system • Conversions

2. Working on Data in Excel 2021 15

• Freeze panes • Sorting data • Filtering data • Pivottable • Charts in excel • Components of a chart • Creating a chart

3. Layers and Animation in Krita 28

• Layers • Managing Layers • Working with Multiple Layers • Animation in Krita

Worksheet - 1 42

4. Cybercrime, Ethics and Security 43

• Computer ethics • Unethical computer practices/ cybercrimes • Cybercrimes against an individual • Cybercrimes against property • Different forms of cybercrimes against properties • Cybercrimes against organisation/society • Cyber security • Digital footprint • Implications of digital footprint

5. More on HTML5 and CSS3 57

• Html elements • Text properties • Font properties • Setting margins • Setting borders

Worksheet - 2 68

Test Sheet - 1 69

Computer Viruses 70

6. Introduction to Audacity 72

• What is Audacity? • Starting Audacity • Components of Audacity Window • Opening Audio Files • Playing an Audio File • Editing Audio File • Editing Audio Settings • Recording • Saving the Project

AI in Action 83

7. More on MakeCode Arcade 85

• Introduction to Operators • Arithmetic Operators • Comparison and Boolean Operators • Introduction to Conditional Statements

Makecode with Computational Thinking 100

Coding Transition 106

8. More on Python 107

• Comments in python • Operators • Precedence of operators • Statements flow control • Conditional statements

Worksheet - 3 120

Python with Computational Thinking 121

9. AI for Sustainable Development Goals 127

• What is Sustainable Development? • Concept of Sustainable Development • Artificial Intelligence for Achieving SDG(s)

10. Natural Language Processing 137

• What is Artificial Intelligence? • How NLP works?

Prompt Engineering 144

Worksheet - 4 145

Test Sheet - 2 146

Project Work 147

Digital Citizenship 149

Healthy and Safe Living 150

Cyber Olympiad 151

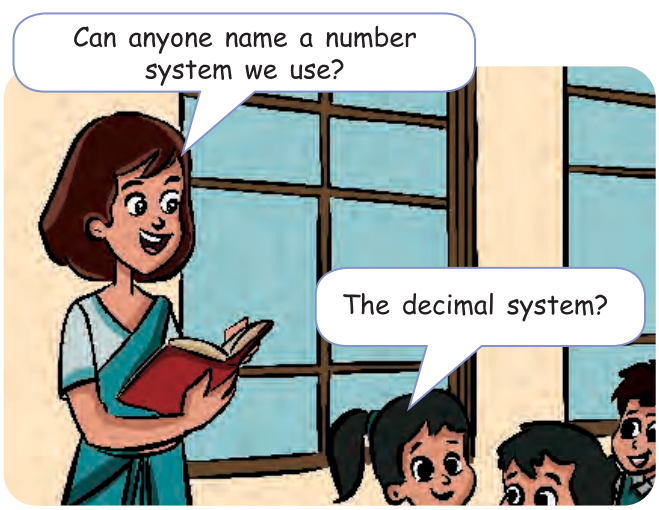
1 Number System

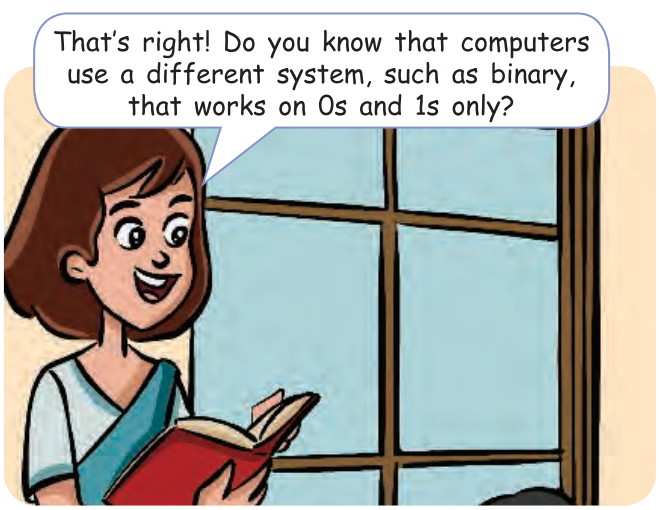
ICODE-nCiC

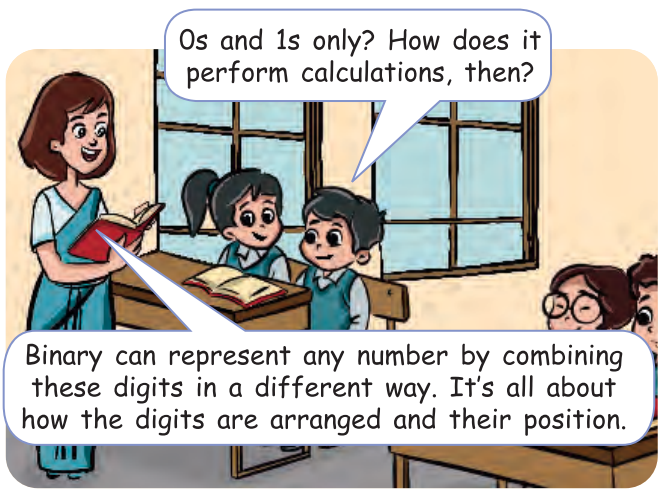
Learning Objectives

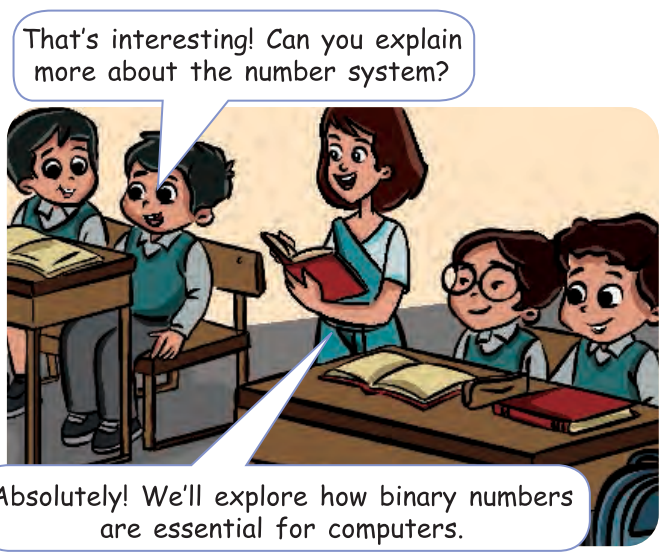
After studying this chapter, students will be able to:

- operate with binary numbers.
- convert decimal numbers to/from other systems.
- convert and use octal numbers.
- understand the different number systems.
- convert and apply hexadecimal numbers.









BINARY DIGIT

All digital computers store numbers, letters, and other characters in a coded form. The code used to represent characters is the Binary Code — i.e., a code made up of bits called **Binary Digits**. Every character is represented by a string of "0s" and "1s" — the only digits found in binary numbering system. When data is typed into a computer, the keyboard converts each key stroke into a binary character code. When the computer transmits the data to another device, each individual character is communicated in a binary code. It is then converted back to the specific character while displaying or printing the data.

NUMBER SYSTEM

A number system is a method of reprocessing numbers in various ways. It comprises a set of characters used to denote different numerical quantities. The computer uses sets of values to represent different quantities. Such sets of values include numbers (0–9), letters (A–Z, a–z) and some special characters. Therefore, a set of values used to represent different quantities is known as **Number System**.

There are various types of number systems. They are:

1. Binary Number System
2. Decimal Number System
3. Octal Number System
4. Hexadecimal Number System

Let us learn about different types of number systems.

BINARY NUMBER SYSTEM

The binary number system consists of only two digits — 0 and 1. The digits 0 and 1 are known as **binary digits** or **bits**. Since this system uses two digits, it has base 2. This number system is used by all the digital computers to convert the data input by a user into its binary equivalent.

Some of the examples of the binary number system are $(1001)_2$, $(100110)_2$, and more.

Quick Fact

The base or radix of the number system represents the number of digits used in it. The base of the number is written as its **subscript**.

DECIMAL NUMBER SYSTEM

The number system used in our day-to-day life is the decimal number system. The decimal number system consists of 10 digits, 0 to 9. Since this system uses ten digits, its base is 10.

Some of the examples of the decimal number system are $(759)_{10}$, $(893)_{10}$, and so on.

OCTAL NUMBER SYSTEM

The octal number system consists of 8 digits from 0 to 7. Since, this system uses eight digits, its base is 8.

Some of the examples of the octal number system are $(706)_8$, $(477)_8$, $(235)_8$, and more.

HEXADECIMAL NUMBER SYSTEM

The **hexadecimal number system** consists of 16 digits, i.e. (0–9) and (A–F). Since this system uses sixteen digits, its **base is 16**, where A stands for 10, B for 11, C for 12, D for 13, E for 14 and F for 15.

Some examples of hexadecimal number system are $(BEF)_{16}$, $(B56)_{16}$, $(192)_{16}$ and so on.

Discuss and Analyse Communication

Is 856 an octal number? Discuss in class.

CONVERSIONS

I. Decimal to Binary Number

To convert a decimal number into a binary number, follow these steps:

Step 1: Divide the number by 2.

Step 2: Write the remainder on the right side and divide the quotient again by 2.

Step 3: Repeat step 2 until the quotient is zero.

Step 4: Always write the remainder in reverse order from bottom to top or from the Most Significant Digit to the Least Significant Digit to form a binary equivalent of the decimal number.

For example:

(a) $(47)_{10} = (?)_2$

2	47	
2	23	1 → Least significant digit
2	11	1
2	5	1
2	2	1
2	1	0
	0	1 → Most significant digit

Therefore, $(47)_{10} = (101111)_2$

(b) $(893)_{10} = (?)_2$

2	893	
2	446	1
2	223	0
2	111	1
2	55	1
2	27	1
2	13	1
2	6	1
2	3	0
2	1	1
	0	1

Therefore, $(893)_{10} = (1101111101)_2$

II. Binary to Decimal Number

To convert a binary number into a decimal number, follow these steps:

Step 1: Multiply each binary digit by its positional value, which is in terms of powers of 2 (starting with 2^0), starting from the extreme right digit.

Step 2: Increase the power of 2 sequentially for each digit.

Step 3: Sum up the all products to get the decimal number.

For example:

(a) $(10101)_2 = (?)_{10}$

$(1\ 0\ 1\ 0\ 1)_2$

$1 \times 2^0 = 1$

$0 \times 2^1 = 0$

$1 \times 2^2 = 4$

$0 \times 2^3 = 0$

$1 \times 2^4 = 16$

$1 + 0 + 4 + 16 = 21$

Therefore, $(10101)_2 = (21)_{10}$

(b) $(11101)_2 = (?)_{10}$

$(1\ 1\ 1\ 0\ 1)_2$

$1 \times 2^0 = 1$

$0 \times 2^1 = 0$

$1 \times 2^2 = 4$

$1 \times 2^3 = 8$

$1 \times 2^4 = 16$

$1 + 0 + 4 + 8 + 16 = 29$

Therefore, $(11101)_2 = (29)_{10}$

III. Decimal to Octal Number

To convert a decimal number into an octal number, follow these steps:

Step 1: Divide the decimal number by 8.

Step 2: Write the remainder on the right side and divide the quotient again by 8.

Step 3: Repeat step 2 until the quotient is zero.

Quick Fact

Always write the remainder in reverse order from bottom to top or from Most Significant Digit to Least Significant Digit to form an octal equivalent of a decimal number.

For example:

(a) $(642)_{10} = (?)_8$

8	642	
8	80	2
8	10	0
8	1	2
	0	1

Therefore, $(642)_{10} = (1202)_8$

(b) $(9246)_{10} = (?)_8$

8	9246	
8	1155	6
8	144	3
8	18	0
8	2	2
	0	2

Therefore, $(9246)_{10} = (22036)_8$

IV. Octal to Decimal Number

To convert an octal number into a decimal number, follow these steps:

Step 1: Multiply each digit by its positional value, which is in terms of powers of 8, starting from the extreme right digit.

Step 2: Increase the power of 8 sequentially for each digit.

Step 3: Sum up all the products to get the decimal number.

For example:

(a) $(227)_8 = (?)_{10}$

$(2\ 2\ 7)_8$

$7 \times 8^0 = 7$

$2 \times 8^1 = 16$

$2 \times 8^2 = 128$

$7 + 16 + 128 = 151$

Therefore, $(227)_8 = (151)_{10}$

(b) $(2456)_8 = (?)_{10}$

$(2\ 4\ 5\ 6)_8$

$6 \times 8^0 = 6$

$5 \times 8^1 = 40$

$4 \times 8^2 = 256$

$2 \times 8^3 = 1024$

$6 + 40 + 256 + 1024 = 1326$

Therefore, $(2456)_8 = (1326)_{10}$

V. Decimal to Hexadecimal Number

To convert a decimal number into a hexadecimal number, follow these steps:

Step 1: Divide the decimal number by 16.

Step 2: Write the remainder on the right side and divide the quotient again by 16.

Write remainders in alphabetic form i.e., (10 – 15) as (A – F) where needed.

Step 3: Repeat step 2 until the quotient is Zero.

Quick Fact

Always write the remainder in reverse order from bottom to top or from the Most Significant Digit to the Least Significant Digit, to form a hexadecimal equivalent of the decimal number.

For example:

(a) $(910)_{10} = (?)_{16}$

16	910	
16	56	14 (E)
16	3	8
	0	3

Therefore, $(910)_{10} = (38E)_{16}$

(b) $(7890)_{10} = (?)_{16}$

16	7890	
16	493	2
16	30	13(D)
16	1	14(E)
	0	1

Therefore, $(7890)_{10} = (1ED2)_{16}$

VI. Hexadecimal to Decimal Number

To convert a hexadecimal number into a decimal number, follow these steps:

Step 1: Multiply each hexadecimal digit by its positional value, which is in terms of powers of 16, starting from the extreme right digit. Write the letters (A–F) as digits (10–15) where needed.

Step 2: Increase the power of 16 sequentially for each digit.

Step 3: Sum up the all products to get the decimal number.

For example:

(a) $(4D63)_{16} = (?)_{10}$

$(4\ D\ 6\ 3)_{16}$

$3 \times 16^0 = 3$

$6 \times 16^1 = 96$

$D \times 16^2 = 13 \times 16^2 = 3328$

$4 \times 16^3 = 16384$

$3 + 96 + 3328 + 16384 = 19811$

Therefore, $(4D63)_{16} = (19811)_{10}$

(b) $(BDE)_{16} = (?)_{10}$

$(B\ D\ E)_{16}$

$E \times 16^0 = 14 \times 16^0 = 14 \times 1 = 14$

$D \times 16^1 = 13 \times 16^1 = 13 \times 16 = 208$

$B \times 16^2 = 11 \times 16^2 = 11 \times 256 = 2816$

$14 + 208 + 2816 = 3038$

Therefore, $(BDE)_{16} = (3038)_{10}$

Skill Drill

Problem Solving

Write the base of the number systems given below:

1. Binary ☐ 2. Decimal ☐ 3. Octal ☐

Recall

- A computer uses sets of values to represent different quantities. Such sets of values include numbers (0–9), letters (A–Z, a–z) and some special characters. These sets of values are known as number system.
- The number systems is divided into four categories. These are Binary Number System, Decimal Number System, Octal Number System and Hexadecimal Number System.
- The binary number system consists of two digits— 0 and 1 called binary digits or bits. The base of binary number system is 2.
- The decimal number system consists of 10 digits, i.e. 0 to 9. The base of decimal number system is 10.
- The octal number system consists of 8 digits, i.e. 0 to 7. The base of octal number system is 8.
- The hexadecimal number system consists of 16 digits, i.e. 0 to 9 and A–F. The base of hexadecimal number system is 16.

Brain Buster

A. Multiple Choice Questions (MCQs).

1. Which number system consists of only two digits—0 and 1?

(a) Binary (b) Octal (c) Decimal

2. What number system has '10' as its base?
   (a) Octal ◯ (b) Decimal ◯ (c) Binary ◯

3. Which number system is based on the number 16?
   (a) Hexadecimal ◯ (b) Decimal ◯ (c) Binary ◯

4. Which number system uses 8 distinct digits?
   (a) Binary ◯ (b) Octal ◯ (c) Hexadecimal ◯

5. What number system includes 10 digits, ranging from 0 to 9?
   (a) Decimal ◯ (b) Octal ◯ (c) Hexadecimal ◯

B. Fill in the blanks.

Hints 10 2 12 Octal A

1. The base of the binary number system is _____.
2. The base of _____ number system is 8.
3. The base of the decimal number system is _____.
4. In hexadecimal number system, C stands for _____.
5. In hexadecimal number system, _____ stands for 10.

C. Write 'T' for true statements and 'F' for the false ones.

1. The numbers used in hexadecimal number system is 0 to 15. ☐
2. The octal number system consists of 8 digits, i.e. 0 to 7. ☐
3. The digits 0 and 1 are known as binary digits or bits. ☐
4. To convert a decimal number into an octal number, divide the number by 10. ☐
5. To convert a decimal number into a binary number, divide the number by 2. ☐

D. Solve the following.

1. Convert the following decimal numbers into binary numbers.
   (a) $(778)_{10}$ (b) $(12548)_{10}$
2. Convert the following decimal numbers into octal numbers.
   (a) $(452)_{10}$ (b) $(1258)_{10}$
3. Convert the following decimal numbers into hexadecimal numbers.
   (a) $(8585)_{10}$ (b) $(5842)_{10}$

E. Answer the following questions:

1. Explain number system. Name the different types of number system.
2. Briefly explain the binary number system.

3. Briefly explain the hexadecimal number system.
4. Write the rules to convert a decimal number to binary number.

F. Competency/Application-based question.

Critical Thinking

Gaurav's computer teacher asked him to convert the number system of Base 16 to Base 10. Suggest him the steps which he should apply in converting that number.

INTERACTIVE SPACE

Problem Solving

Skill Based Learning

Convert the following decimal numbers into binary number.

1. $(83)_{10}$ = (_____)$_2$
2. $(2024)_{10}$ = (_____)$_2$

IDEA EXCHANGE

Life Skills and Values

Find out if there are applications for converting numbers into various bases.

HANDS-ON PROJECT

Exploratory Learning

Prepare a PowerPoint presentation on 'Number System' and explain each number system with the help of an example.

Teacher's Notes

- Students should be given sufficient number of questions to practise.

As per
NEP 2020 and NCF 2023

Tech Ninja

WINDOWS 11 & OFFICE 2021

A Textbook of Computer Science
for Joyful and Experiential Learning

8

By
Editorial Team
Inventant Education

Inventant Education
Present Meets Future
(A Unit of EDULABZ International)

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Introduction

Tech Ninja is a comprehensive computer series for learners in classes 1-8, focusing on computer knowledge, the internet, and advancements in **Machine Learning** and **Deep Learning Systems.**

Inventant Education aims to equip students with computer skills, creativity, and diligence while aligning with Sustainable Development Goals to foster global understanding and problem-solving. Additionally, the projects and activities are aligned with Sustainable Development Goals (SDGs), fostering a deep understanding of global challenges.

The **National Education Policy (NEP) 2020** is integrated into practical activities, highlighting **21st-century** skills like **Healthy Living**, **Artificial Intelligence**, **Cyber Ethics**, **Art Integration**, **Cross-Curricular Activities**, and **more**. The **National Curriculum Framework 2023** fostering cognitive abilities in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

Our Teacher's Resource Book and Online Support offer lesson plans, answer keys, e-books, and animated videos for educators, enhancing learning and shaping the future of education.

—Inventant Education

Aligned with NEP 2020 and NCF 2023

FEATURES OF NEP 2020

21st Century Skills

Learning Skills (4Cs)
- ✓ Critical Thinking
- ✓ Creativity
- ✓ Communication
- ✓ Collaboration

Literacy Skills (IMT)
- ✓ Information Literacy
- ✓ Media Literacy
- ✓ Technology Literacy

Life Skills (FLIPS)
- ✓ Flexibility
- ✓ Leadership & Responsibility
- ✓ Initiative
- ✓ Productivity & Accountability
- ✓ Social Interaction

BASED ON NCF 2023

In NCF 2023, **curriculum** means not only what is given in the books, but also how the learners learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

The Six Pramanas

Inference | Perception | Comparison | Verbal Testimony | Non- Apprehension | Postulation

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- ✓ Type 'Edu Invent' in the search bar.
- ✓ Tap 'Install'. The app will take a few moments to download and install.
- ✓ Once installed, tap 'Open' to launch the app.
- ✓ Register yourself and login on the app.
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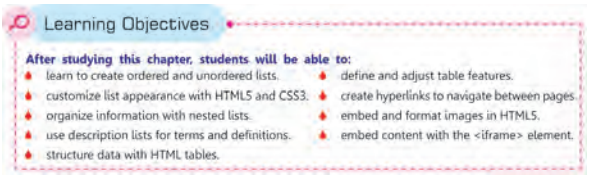
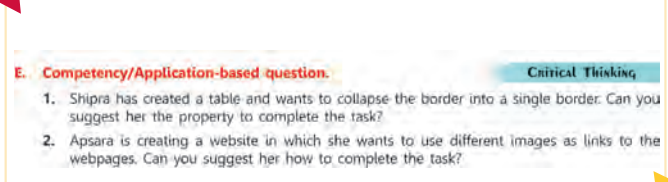
- ✓ Scan a QR Code printed in the book to explore the learning content associated with the QR Code.

About the Series



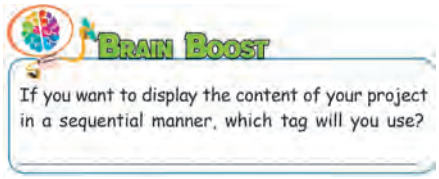
Learning Objectives

Sets out goals required to be achieved by the end of the chapter



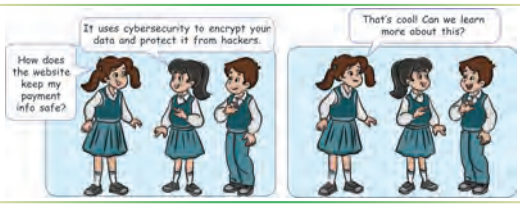
Competency/Application-based questions

Assesses the learners analytical and critical thinking abilities



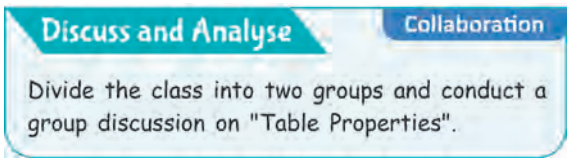
Brain Boost

An interesting question to think out



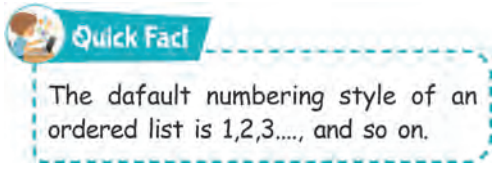
Comic Strip

Interesting stories to bring the concept to real life



Discuss and Analysis

An engaging questions for the learners

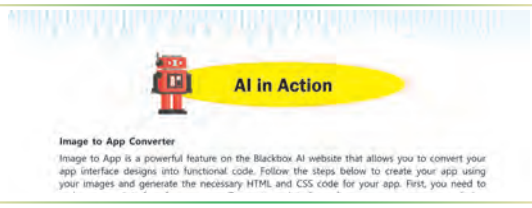


Quick Fact

An interesting piece of knowledge

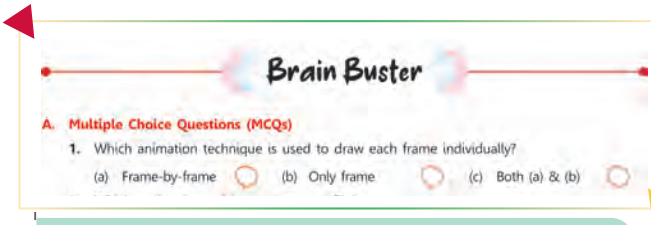
SDGs

Goals decided by various countries to be achieved by 2030



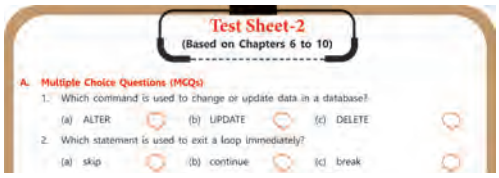
AI in Action

Improve productivity using AI-powered platform



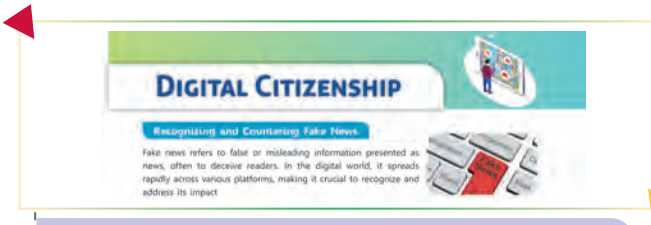
Brain Buster

A set of questions for assessing the learner's knowledge



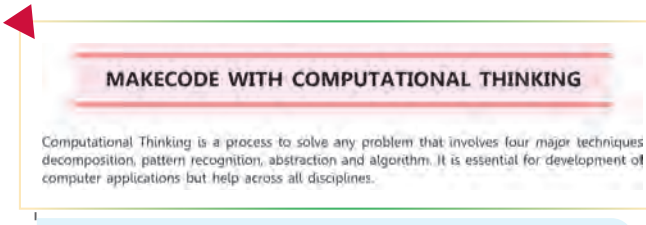
Test Sheet

Evaluates the learner's knowledge in a subject



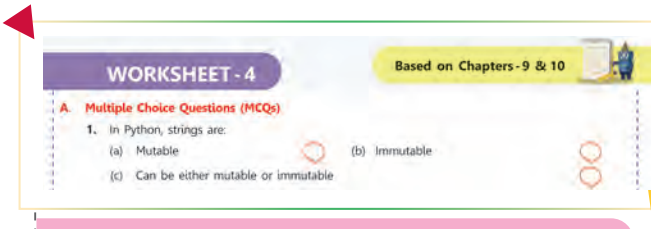
Digital Citizenship

Navigating the online world responsibly and respectfully



Computational Thinking

Applying problem-solving strategies to break down complex tasks and create efficient coding solutions



Worksheets

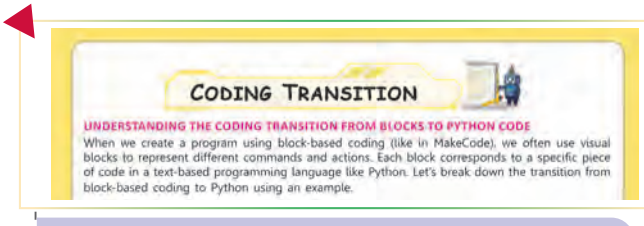
Reinforcing and assessing students understanding

Project Work

In-depth exploration and application of learned concepts

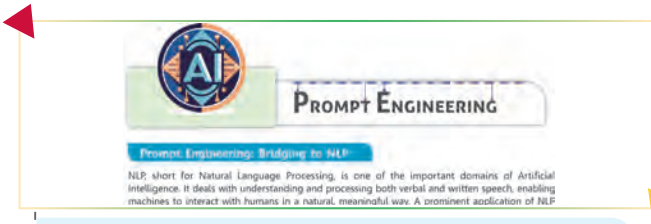
Cyber Olympiad

A competitive exam conducted by SOF for each class in schools to assess learners



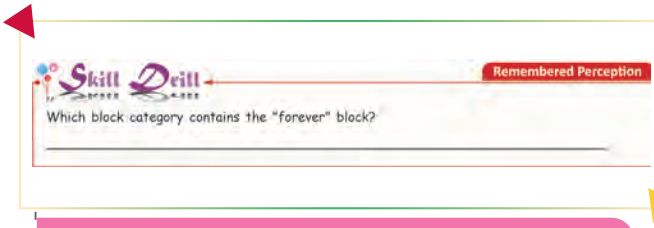
Coding Transition

A smooth transition from block-based to text-based programming for advanced coding skills



Prompt Engineering

Designing effective prompts to help smart technology provide accurate and relevant answers.



Skill Drill

An activity that reinforce learning among the learners

• Contents •

1. Networking and Cyber Security 7

• What is a computer network? • Advantages of networking • Types of networks • Network components • Network architecture • Transmission media • Network topology • Network security • Cybersecurity

2. More on HTML5 21

• Creating lists in HTML5 • Ordered list (<OL>) • List properties • Nested Lists • Description list • Creating tables in HTML5 • Table properties • Linking in HTML5 • Inserting images • Frames in HTML5

Robotics 45

3. Introduction to App Development 47

• Introduction to Apps • Some commonly known apps and their usage • Types of Apps • Downloading and Installing applications from Google play store • Developing an App • Thunkable Platform

Canva 62

Worksheet - 1 64

4. More on Krita 65

• Project-Candle Animation in Krita

AI in Action 72

5. MakeCode Arcade - Looping Statements 74

• Introduction to looping statements • For loop • While loop • Repeat • Forever • Break statement • Continue statement

Makecode with Computational Thinking 80

Coding Transition 86

Worksheet - 2 87

Test Sheet - 1 88

6. Iterative Statements in Python 89

• For statement • While statement • Infinite loop • Jump statements

7. List and Tuples in Python 101

• Lists • Tuples

Python with Computational Thinking 110

8. Computer vision 117

• Introduction to computer vision • How computer vision • Applications of computer vision

Worksheet - 3 124

9. Machine Learning 125

• Artificial intelligence models • Machine learning • Deep learning • Interconnection between AI, ML, and DL • Difference between ML and DL • Types of machine learning

Prompt Engineering 133

10. MYSQL– An Introduction 135

• What is a database? • Data • Concept of database management system • Relational database management system • MYSQL • SQL commands • MYSQL commands related to database • MYSQL commands related to table • Altering table • MYSQL queries • MYSQL queries using select statement

Worksheet - 4 153

Test Sheet - 2 154

Project Work 155

Digital Citizenship 157

Fit and Healthy 158

Cyber Olympiad 159

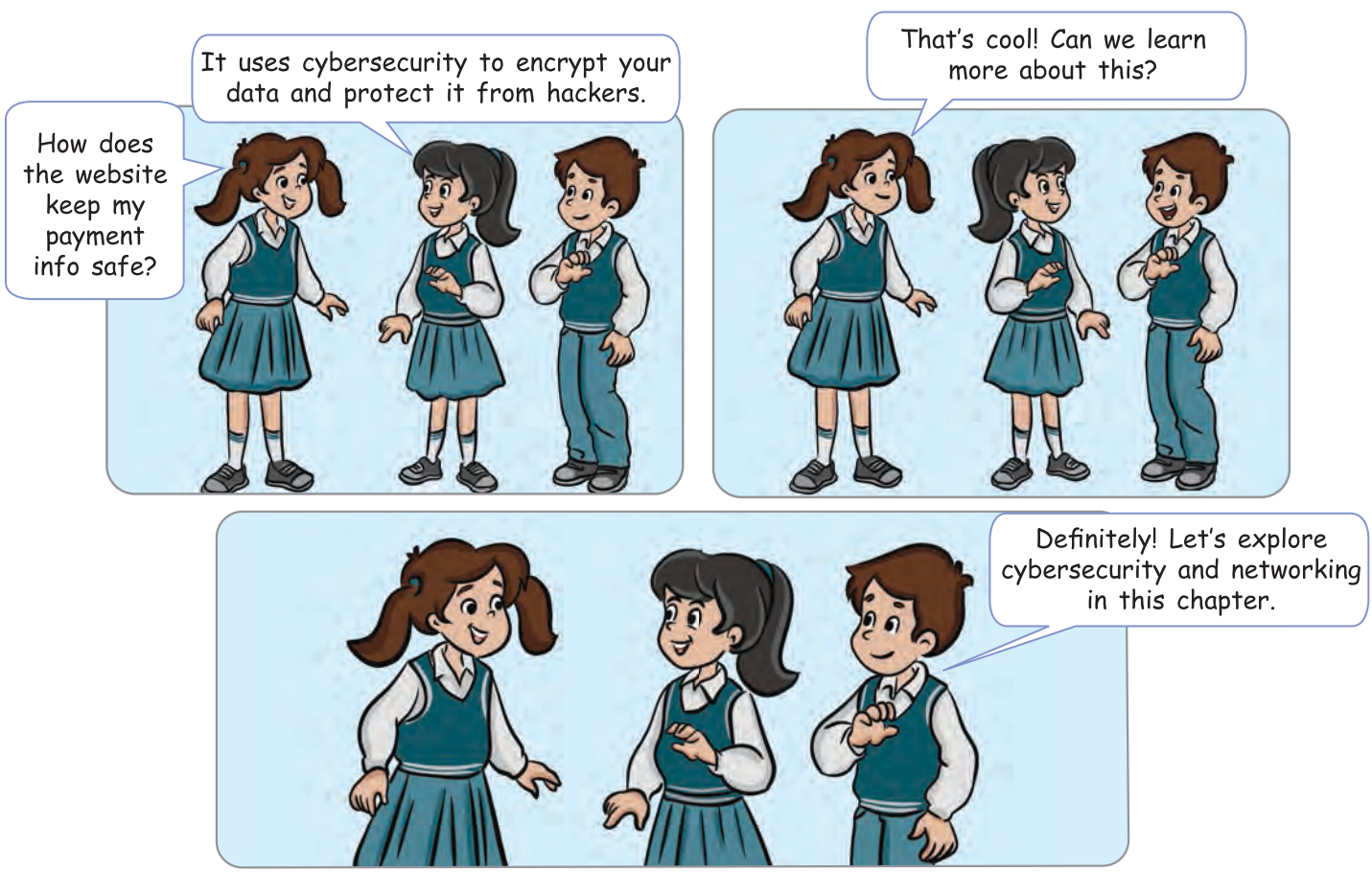
1 Networking and Cyber Security

ICODE-Eutv

Learning Objectives

After studying this chapter, students will be able to:

- define what a computer network is.
- identify the advantages of networking.
- describe the different types of networks.
- recognize and explain the components of a network.
- understand network architecture and its significance.
- explain various transmission media used in networking.
- define network topology and describe different types of network topologies.
- understand the importance of network security and identify methods to ensure it.



WHAT IS A COMPUTER NETWORK?

When a number of computers are connected in order to communicate or share information, they form a network, and this is defined as a computer network.

The internet is an example of a computer network. The purpose of computer networking is to build communication between computers. This communication includes exchange of data and information with the help of software installed on computer systems.

A computer network can be formed between two or more computers linked together in a room or a building, a town, a city, or across the globe. A computer network can also include peripheral devices, such as a printer, scanner, and so on.

The computers or devices within a network that originate, route, and terminate the data are called nodes. The computers in a network can work independently and communicate with each other too. Hosts, such as personal computers, mobile phones, servers, and networking hardware are different types of nodes. The computers are interconnected through different media, such as cables, telephone lines, radio waves, or infrared light beams. Every network has a control centre, which allows the different nodes to communicate.

A network can be of two types:

- **Intranet:** A network that is private to an organisation.
- **Internet:** A network that is open to all, allowing anyone connect to it.

ADVANTAGES OF NETWORKING

There are many advantages to computer networking. Some of them are given below.

- **Cost-effective:** Hardware devices, such as a printer, scanner, and modems, can be shared by all the computers on a network. Thus, it saves a good amount of money by eliminating the need to buy additional hardware and software for each computer.
- **Backup:** If a computer in a network faces some technical issues or hardware failure, the work can be allocated to another computer on the same network. Networking helps to look for lost data at one place.
- **Communication Tool:** It is a convenient mode of communication for any organisation with branches at different locations.
- **Easy Access to a Remote Database:** One can instantly book railway or airline tickets from anywhere. Hence, it saves time and effort.
- **Accelerates Efficiency:** It allows for the upgrade of software and data from a single point, thus enhancing the efficiency of a working system.
- **Reduces the Need for Hard Copies:** Can be shared among network members, reducing the need for physical copies.
- **Real–Time Delivery:** Data and information can be shared instantly across the globe.

TYPES OF NETWORKS

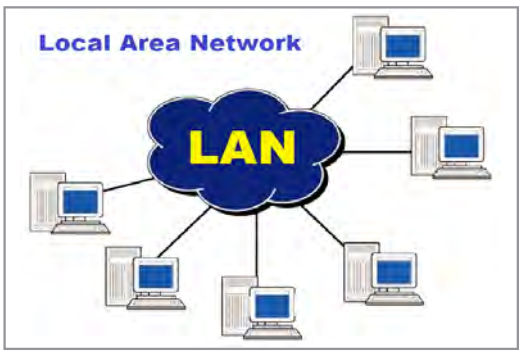
The computer network can be classified into various categories based on the coverage of geographical areas. The various categories are discussed below.

Personal Area Network (PAN)

A PAN allows communication among devices, such as personal computers, mobile phone, digital camera, Personal Digital Assistant (PDA), tablet, and more.

This type of network covers a small area of nearly ten meters. It is widely used to transfer files, such as emails, images, audio, and video files between devices. A PAN can be easily set up between two devices. It is built using either a USB cable (wired media) or Bluetooth (wireless media).

Personal Area Network (PAN)



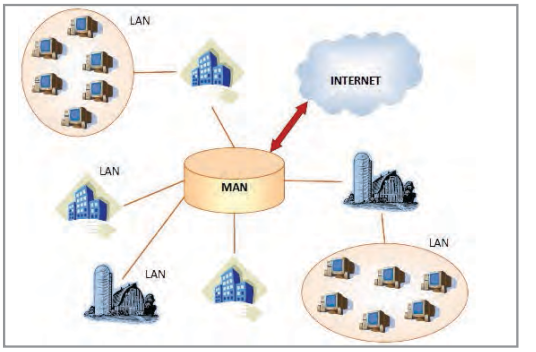
Local Area Network (LAN)

Local Area Network (LAN)

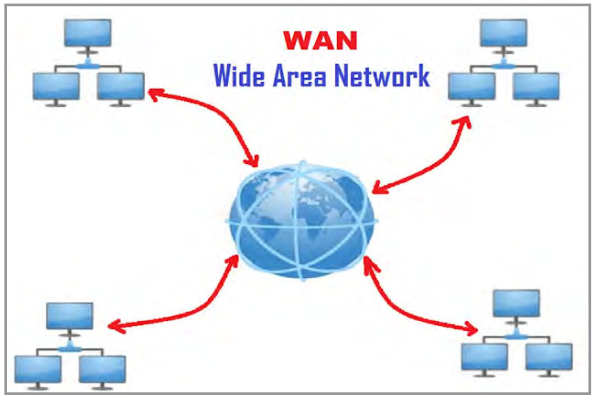
In a LAN, two or more computers and peripheral devices are connected within a limited area, such as a room, building, or a small campus. A LAN covers an area of a few kilometres and usually links the devices using wired (e.g. Ethernet Cables) or wireless connections. LANs are owned and controlled by a single person or an organisation. An office building or an educational institution usually has a single LAN.

Metropolitan Area Network (MAN)

A MAN is a larger network than LAN, and connects computing devices located in geographically separate areas within the same city. A MAN covers an area of a few hundred kilometres within a city. It allows a high-speed network sharing of resources among institutions, organisations, and bank branches within the same city.



Metropolitan Area Network (MAN)



Wide Area Network (WAN)

Wide Area Network (WAN)

A WAN connects two or more computers located at distant locations even across different cities, countries or continents. They are interconnected through telecommunications or satellite signals. WANs are essential to large establishments, government agencies, and multinational corporations that needs to transfer data globally. For example, ATMs and customer services at rely heavily on the WAN for data exchange.

NETWORK COMPONENTS

To set up wired networking in a group of computers for data sharing, some additional components, such as interface cards, and other equipment are required. The hardware components that are required for establishing wired networking is given below.

Network Interface Card (NIC)

This card provides an interconnection between the network and the computers (or nodes). Most computer motherboards usually have an inbuilt Network Interface Card. It is used to connect a computer to a network, enabling participation in network communication.

Network Interface Card (NIC)

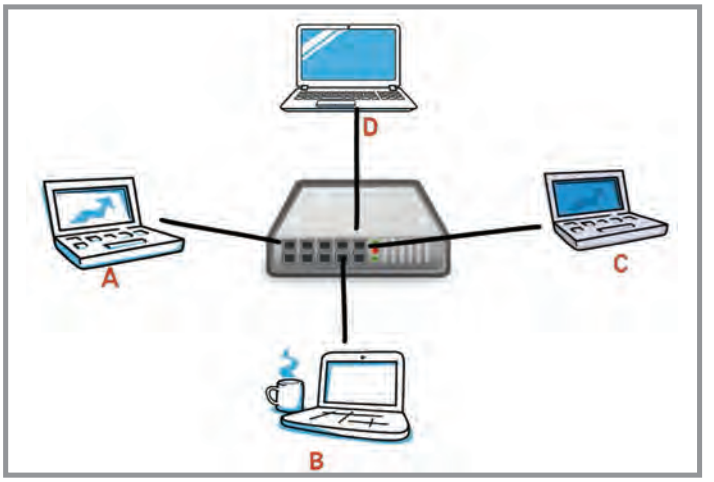
Network Cable

Network Cable

Registered Jack 45 (RJ45) is an eight-wire network cable. It is a connector commonly used to link the Network Interface Card (NIC) with a hub and to transfer data and information between computers and a switch.

Hub

It is a network device that connects computers and computing devices to exchange data between them. Each hub has some ports which determine the number of devices that can be connected to it. For example, 6, 8, 12, 24, and so on. A hub can also be linked to the NIC through an RJ45 cable. It primarily broadcasts the message, which increases data traffic over the network. The intended computer(s) receive the information, while other computers on the network ignore it.



Hub

Switch

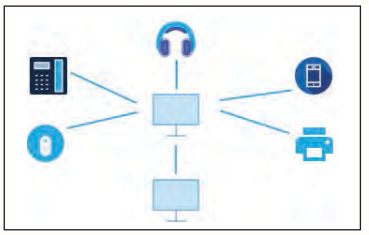
Switch

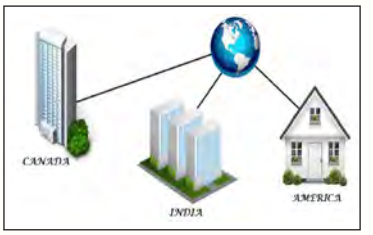
A switch performs a similar function to that of a hub with greater capability. Unlike a hub, which broadcasts data to all the connected devices, a switch analyzes data packets as they arrive and identifies their source and destination before forwarding them. This targeted forwarding enhances network efficiency, and hence switches are preferred over hubs because they prevent data collisions and reduce network congestion, resulting in improved overall network performance.

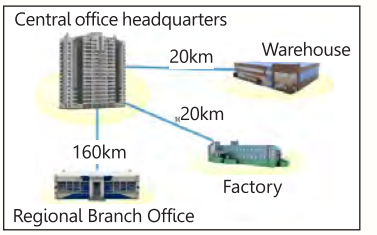
Skill Drill

Remembered Perception

Identify the following types of networks and write their names.







1. _____ 2. _____ 3. _____

NETWORK ARCHITECTURE

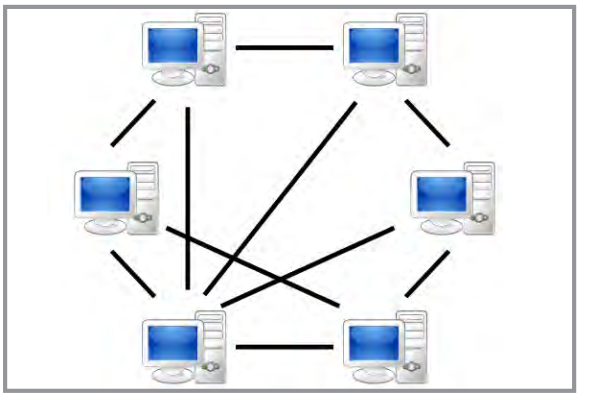
Network architecture refers to the overall design of an organization's computer network. To facilitate effective network communication, it is crucial to have a comprehensive understanding of all the accessible resources within the network. Network architecture encompasses the following elements:

- Hardware components used for communication
- Topology
- Wired or wireless connections
- Protocols

There are two main types of network architecture:

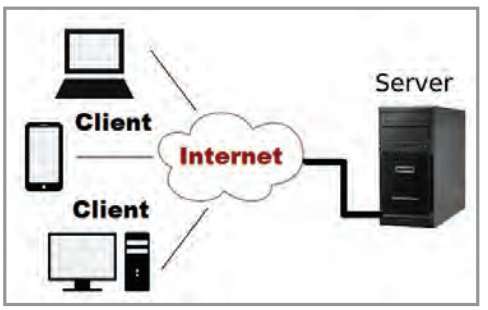
Peer-to-Peer

This architecture is ideal for small environments, typically involving up to ten computers. In a Peer-to-Peer network, each computer connected to the network has equal capabilities. These computers must be granted specific rights to use or share available resources.



Peer-To-Peer Network Architecture

In a Peer-to-Peer network, there is no dedicated network administrator or central server. Each computer can function as both a server and a client. This type of network is relatively easy to set up and is cost-effective.



Client-Server

Client-Server

In this architecture, multiple computers known as clients, connect to a central computer called the server. A server manages and controls all connected computers, shared devices, and other resources. Clients are computers that request services, such as data retrieval and storage, from the server. If the server is turned off, its resources on the network become unavailable.

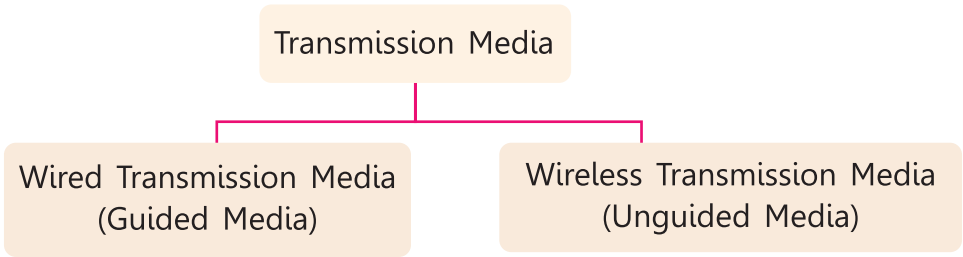
Brain Boost

Which type of network architecture is most suitable when a few computers having similar power and capacity need to be connected?

_____

TRANSMISSION MEDIA

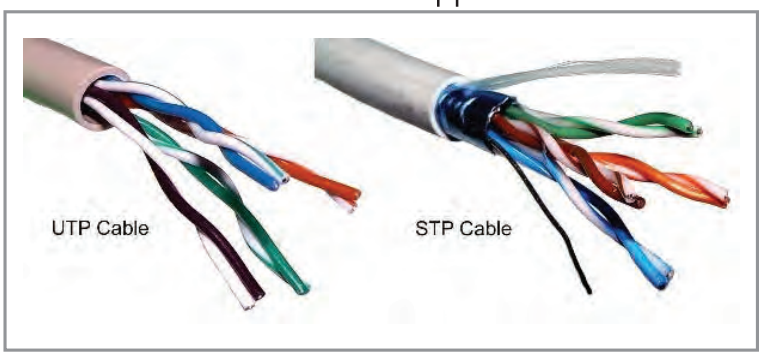
Transmission media means the physical material that is used to transmit data between computers. Transmission media can be classified into the following categories:



Wired Transmission Media / Guided Media

This type of transmission uses cables or wires to transfer information from the source to the destination. The wires can be made of copper, other metals, or glass fiber. These cables use electrical or light signals to transmit data and are susceptible to noise, which can degrade the signal, a phenomenon known as attenuation.

Twisted Pair Cable: Twisted pair cables were invented by Alexander Graham Bell in 1881. They are the most widely used medium for telecommunication and consist of copper wires twisted into pairs. Ordinary telephone wires are made up of two insulated copper wires twisted together, while computer networking cables typically consist of four pairs of copper wires that can be used for both voice and data transmission.



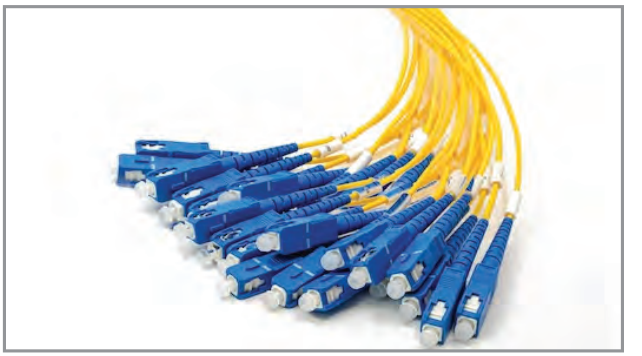
UTP cable and STP cable

Twisted pair cables come in two types: Shielded Twisted Pair (STP) and Unshielded Twisted Pair (UTP). UTP cables are the most commonly used in computer networking.

Coaxial Cable

Coaxial Cable: The cable consists of a central conductor made of copper or aluminum, surrounded by a dielectric insulating layer. This layer is encased by a conductive shield, which is typically made of braided metal or foil, and the entire assembly is covered with a thin outer insulating layer.

Fibre Optic Cable/Optical Fibre Cable: Fiber optic cable, also known as optical fiber cable, consists of a central glass core surrounded by several layers of protective materials. Fiber optic cables can transmit signals over much longer distances compared to coaxial and twisted pair cables. They also have the capability to carry information at very high speeds, which expands communication possibilities to include services such as video conferencing and more.



Bluetooth Wireless Technology

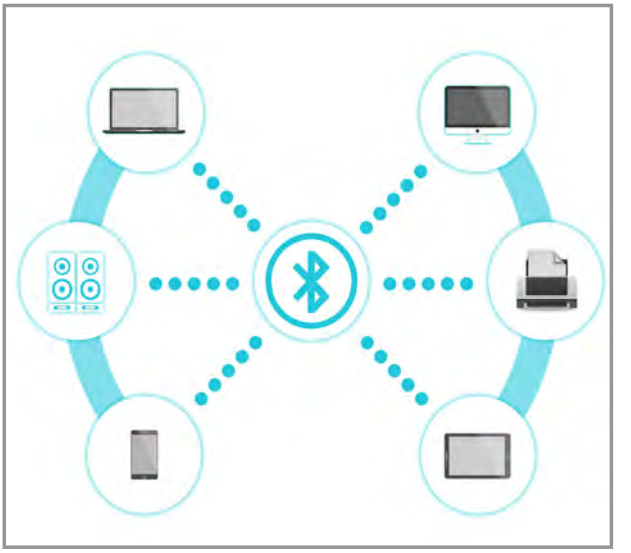
Wireless Transmission Media/Unguided Media

The transmission in such a media is wireless. It is used to provide network communication over short distances using radio or infrared signals, instead of network cabling. Some example of wireless transmission media are as follows:

Radio Wave Transmission

Radio waves transmit music, conversations, pictures, and data invisibly through the air, often over varying distances. They travel in all directions from the source, so the transmitter and receiver do not need to be precisely aligned. Radio waves are relatively easy to generate and can penetrate through buildings, though the effectiveness of penetration depends on the frequency and materials involved. Two common technologies that use radio frequency waves for networking are Bluetooth, which is used for short-range communication; and Wi-Fi, which provides wireless networking over moderate distances.

(a) **Bluetooth Wireless Technology:** Bluetooth is a wireless technology that allows you to communicate and share information such as voice, music, and videos. Invented in 1994 by engineers at Ericsson, a Swedish company, Bluetooth is now built into a variety of electronic gadgets.



Personal Area Network (PAN) and Bluetooth

Unlike FM radios and televisions, which use different types of radio waves to transmit information over long distances, Bluetooth technology operates over shorter ranges. The key difference between Bluetooth and devices like FM radios and TVs is distance. While radios and TVs are designed to broadcast information over miles or kilometers, Bluetooth is intended for short-range communication within a Personal Area Network (PAN). The maximum range for most Bluetooth devices is about 10 meters (33 feet), although newer versions like Bluetooth 5.0 can extend this range up to 100 meters (328 feet) in optimal conditions.

A 'Bluetooth-enabled' product includes both the hardware and software necessary to connect wirelessly with other Bluetooth-enabled devices.

Quick Fact

The name 'Bluetooth' is derived from Harald Blåtand, an ancient king of Denmark. 'Blåtand' translates to 'Bluetooth' in English. . Bluetooth's founding members include Ericsson, IBM, Intel, Nokia, and Toshiba.

Wi-fi

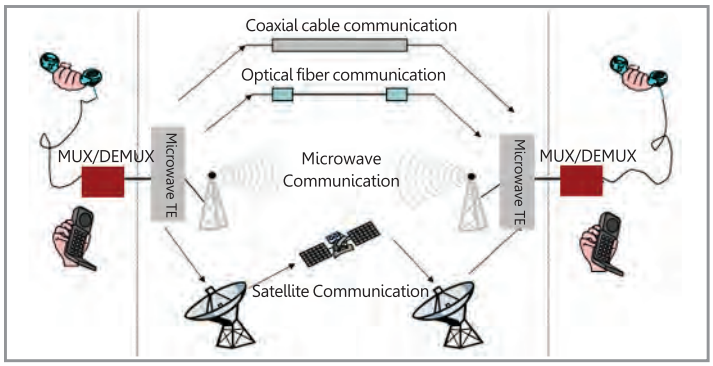
(b) Wi-Fi: Wi-Fi stands for Wireless Fidelity. It is a widely used wireless networking technology that utilizes radio waves to provide high-speed internet and network connections.

Wi-Fi networks use radio technologies to provide secure, reliable, and fast wireless connectivity.

Infrared Technology

Infrared technology is used to send documents from portable computers to printers, connect home entertainment systems, and exchange information between computers, cellular phones, and fax machines. The communication range of devices using infrared waves is very limited, as these waves cannot penetrate walls or other obstructions. Therefore, there must be no physical barriers between the communicating devices. For example, a television and its remote control use infrared waves to communicate.

Infrared



Microwave

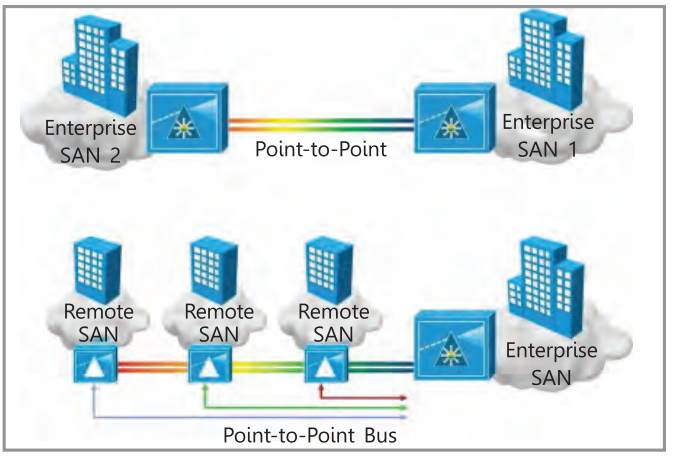
Microwave Transmission: For long-distance communication, microwave radio transmission is commonly used as an alternative to coaxial cable. One of the main advantages of microwave transmission is that constructing a tower is generally less expensive than laying cable. Microwaves can pass through the Earth's atmosphere with ease and are used to transmit information between satellites and ground-based stations.

NETWORK TOPOLOGY

For computers to be connected, they must be on the same network and share resources. To understand how a network is set up, it's important to first grasp the concept of network topology. Network topology describes the arrangement of network components such as nodes, links, and peripherals. It defines how data moves through the network, independent of its physical layout. Here are some of the most commonly used network topologies.

Point-to-Point (PTP) Topology

Point-to-Point (PTP) topology is a type of network connection where two devices are directly linked to each other. This setup allows them to communicate quickly and efficiently, which is great for tasks that need fast data transfer, like sharing files between two computers. Because there are only two devices involved, it's easy to manage and understand. However, if you want to connect more devices, PTP isn't the best choice since it only works for two. It's often used in simple situations, like connecting a printer to a computer or a server directly to another server. Overall, PTP topology is a straightforward way to connect devices when you only need a direct link.



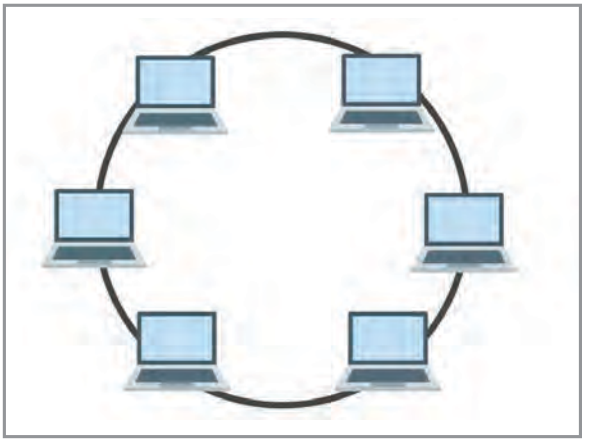
Point-to-Point (PTP) Topology

Bus Topology

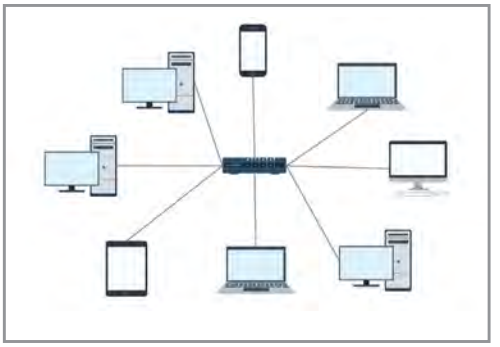
In this type of topology, all devices are connected to a single linear cable known as a bus or trunk, which acts as the backbone of the network. This topology is the simplest way to connect multiple devices and uses cables for connections. It is easy and inexpensive to implement for small networks. In this setup, one of the computers serves as a server, providing data to all the client devices. The advantage of this network is that if one computer fails, it does not affect the other systems. However, if the main cable fails, the entire network becomes unusable.

Ring Topology

In this topology, all nodes in the network are connected in a circular fashion, with each node linked to two others, forming a continuous pathway for signals. Data travels around the ring in a circular manner. Ring networks offer high bandwidth and can cover large distances. However, their popularity is waning because they only support unidirectional data flow. Similar to Bus topology, adding or removing devices in a Ring topology can cause network disruptions. Additionally, a single break in the connection can disrupt the entire network.



Ring Topology



Star Topology

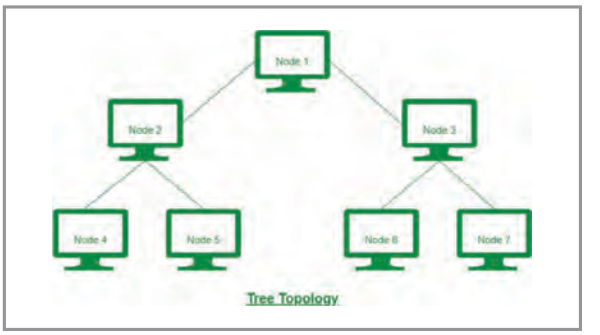
Star Topology

In Star topology, all devices are connected to a central device, which acts as a hub or switch. Each device is linked to the central hub through its own connection, requiring more connections overall. The advantage of this setup is that if a single connection fails, only the affected device is impacted, not the entire network. Unlike Bus and Ring topologies, adding or removing devices does not disrupt the network.

Data is sent to the central hub or switch before reaching its destination, meaning that the hub or switch controls network communication. However, since all data passes through the central device, a failure of the hub or switch can bring down the entire network.

Tree Topology

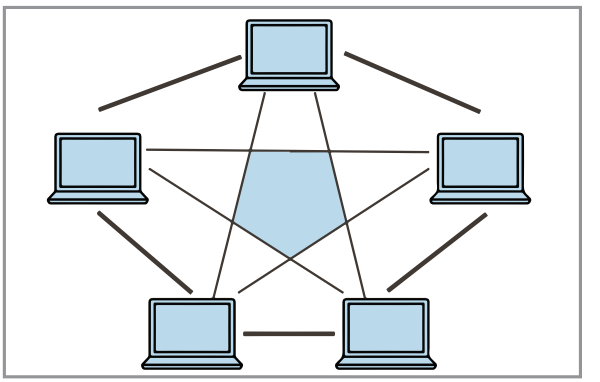
Tree topology connects multiple Star networks to a central bus, forming a hierarchical structure. It is also known as Star-Bus topology. If the main cable connecting two Star networks fails, those networks cannot communicate with each other, though devices within each individual Star network can still communicate internally. Tree topology allows for easy network expansion, but maintenance can become challenging due to its complexity.



Tree Topology

Mesh Topology

In Mesh topology, each node is connected to every other node with point-to-point links. No single computer acts as a server. Instead, every node both sends its own signals and relays data from other nodes. This network configuration is also known as Meshnet. It offers high data security and privacy because data is transmitted through dedicated channels and can handle high data traffic.


Mesh Topology

The wire count in a mesh network can be calculated using the formula wire count = $(n \times (n-1))/2$ where 'n' is the number of device for example, in a network with 5 device wire count = $(5 \times (5-1))/2 = (5 \times 4)/2 = 20/2 = 10$

NETWORK SECURITY

Securing data and resources from unauthorized access and misuse is crucial. Therefore, it is advisable to protect your data and secure the network. The purpose of network security is to safeguard the information of individuals or organizations and to protect computers on a network from potential attacks.

Several methods can be used to keep your network secure, including:

Access Control: Used to block unauthorized users from accessing the network.

Application Security: Protects applications stored on a computer system from threats.

Data Loss Prevention (DLP): Prevents the unauthorized sending or uploading of sensitive information outside the network.

Firewall: A security system that protects a computer from unauthorized access over a network. A firewall can be implemented using hardware, software, or a combination of both, and follows a set of rules to determine which data can enter or leave the network.

CYBERSECURITY

Cybersecurity is all about protecting computers, phones, and networks from people who try to hack into them or spread harmful software. It's like putting up strong defences to keep your data safe.

Types of Cybersecurity

- **Network Security:** Protects a computer network from hackers or viruses.
- **Application Security:** Keeps software safe from threats by securing it during the design stage.
- **Information Security:** Ensures your data stays private and secure while it's stored or being sent.
- **Operational Security:** Involves decisions on how to handle and protect data.
- **Disaster Recovery and Business Continuity:** Helps a company recover and keep running after a cyberattack or disaster.
- **End-User Education:** Teaches people how to avoid risks like clicking on suspicious links.

Staying Safe Online

To protect yourself:

- **Keep Software Updated:** Ensure you have the latest security patches.
- **Use Strong Passwords:** Make sure your passwords are hard to guess.
- **Avoid Suspicious Emails:** Don't open attachments or click on links from unknown senders.
- **Use Anti-virus Software:** This can detect and remove threats from your device.
- **Be Careful on Public WiFi:** Avoid using insecure WiFi networks, as they can expose your data to hackers.

By learning about cybersecurity, you can better protect yourself and your devices from online threats.

Recall

- When a number of computers are connected in order to communicate or share information, they form a network and this is defined as a computer network.
- Intranet refers to a network that is private to an organisation.
- Internet network is open to all. Anyone can connect to it.
- A PAN allows communication among devices, such as personal computer, tablet, and so on.
- In LAN, two or more computers and peripheral devices are connected within a room, building, or a small campus.
- A MAN is a larger network than LAN, and connects computing devices, which are located at geographically separate areas within the same city.
- A WAN connects two or more computers located at distant locations. They are interconnected through telecommunication or satellite signals.

Brain Buster

A. Multiple Choice Questions (MCQs)

1. Which of the following is not an advantage of networking?

(a) Cost-effective (b) Very expensive (c) High speed

2. Which type of network is built using USB cables?

(a) PAN (b) WAN (c) LAN

3. Which network topology is connected to a central device that acts as a hub?

(a) Star topology (b) Ring topology (c) Bus topology

4. Which topology is formed with a group of star networks?

(a) Mesh topology (b) Tree topology (c) Hybrid topology

5. Which of the following is a network security system?

(a) Switch (b) Firewall (c) Router

B. Fill in the blanks.

Hints LAN Bus Intranet Server MAN

1. All devices are connected to a linear cable called a _____ Topology.

2. A _____ network is connected to a room, building or a small campus.

3. _____ spans from several blocks of buildings to the entire city.

4. In the client-server network model, there is a central computer called a _____.

5. _____ refers to a network that is private to an organisation.

C. Write T for true statements and F for the false ones.

1. Bluetooth is used to form a wireless Personal Area Network. ☐
2. Each hub has ports which determine the number of devices that can be connected to it. ☐
3. Mesh topology is quite poor at managing high data traffic. ☐
4. A computer system directly connected to a printer is an example of Point-to-Point topology. ☐
5. The function of a switch is similar to that of a hub, but it is more intelligent as compared to hub. ☐

D. Expand the following terms.

1. PAN _____
2. WAN _____
3. MAN _____
4. LAN _____

E. Answer the following questions:

1. What is a computer network?
2. Briefly explain the client-server architecture.
3. Define the term topology. Briefly explain any two types of network topologies.
4. Explain the utility of network security. Name any two methods to keep your network secure.
5. Differentiate between Wireless Transmission Media and wired Transmission Media.

F. Competency/Application-based questions.

Critical Thinking

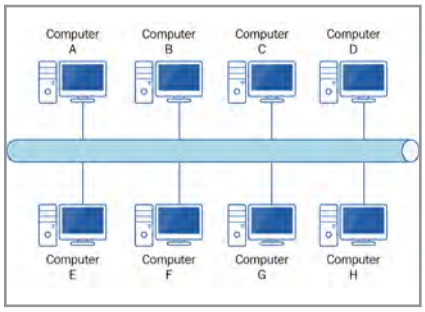
1. Assume that you are opening a cyber cafe where people come to surf the internet. You are buying ten computers. Now think and write the answer to the following questions.
   (a) What type of networking will you do in your cyber cafe– LAN, WAN, MAN or PAN?
   (b) What type of topology will you prefer?
   (c) What architecture will you prefer– peer-to-peer or client server? Why?
2. Smriti wants to share music and videos in her smartphone with her friend. Suggest her the technology by which she can easily perform her task.

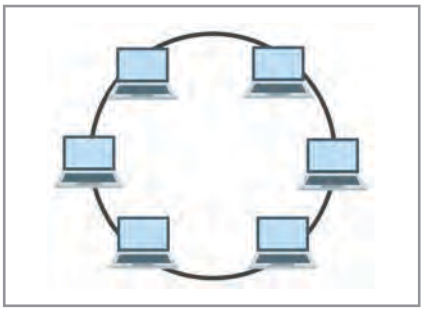
Interactive Space

Problem Solving

Skill Based Learning

Identify the following network topologies and write their names.





1. _____ 2. _____ 3. _____

LAB WORK

Experiential Learning

Go to you computer lab and perform the following:

1. With the help of the internet, discover the various types of networks and how they work.
2. After collecting information, make a presentation in PowerPoint.

IDEA EXCHANGE

Life Skills and Values

How can we use Personal Area Network at our home?

HANDS-ON PROJECT

Exploratory Learning

Prepare an informative presentation on 'Networking concepts'.

Teacher's Notes

- Discuss the concept of networking with the help of real-life examples.
- Tell the students why different types of networks are needed.