As per NEP 2020 and NCF 2023

Based on Windows 7 and MS Office 2010

i-Boot

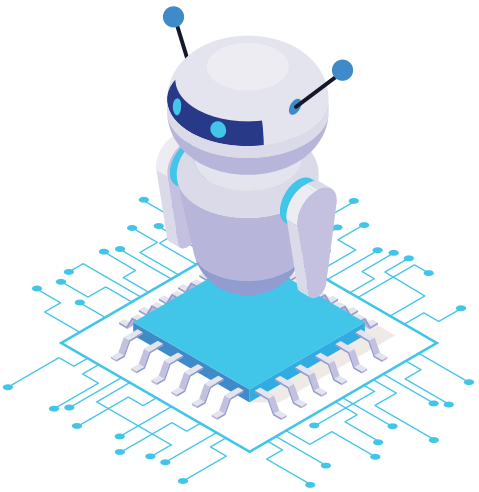
A Textbook of Computer Science

1

For ICSE Schools

By

Editorial Team
Inventant Education



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

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Introduction

Welcome to the world of **Inventant Education's** cutting-edge computer series, **i-Boot** designed to empower the learners from **classes 1 to 8** on their journey through the digital realm. The series is aligned as per the latest curriculum designed by the **Council for the Indian School Certificate Examination (CISCE) 2023**. It has been developed in accordance with the guidelines set forth by the **National Education Policy (NEP) 2020** and the **National Curriculum Framework (NCF) 2023**. In recent years, there has been a paradigm shift towards designing a learner-centric curriculum that is based on activity-based approach. So, in this series, we have incorporated key points from the NEP 2020 into practical activities, covering essential **21st Century Skills**, such as Fun time, Computational Thinking, Artificial Intelligence, Robotics, Cyber Olympiad, etc. Our chapters are also aligned with the six phases of logical understanding outlined in the NCF 2023, fostering skills in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

In today's digitally driven world, computer proficiency is not just a skill; it's a necessity. Whether you are a student, a professional, or someone looking to enhance your computer literacy, this series is your roadmap to mastering the fundamentals of **Windows 7** and **Microsoft Office 2010**. The world of computer systems and technology is continuously evolving and has touched virtually each and every aspect of your life. At **Inventant Education**, we are committed to nurturing the potential of young minds. More than a series of books i-Boot is a gateway to a future where the learners harness their talents and work diligently to excel in the computer world.

Core features of i-Boot series (for classes 1 to 8) are:

- **Learning Outcomes:** Describes the goals required to achieve at the end of the chapter
- **Think and Tell:** Enhances analytical abilities, stimulates memories and broadens the imagination
- **Brain Power On:** Give extra and useful information on the topics being covered
- **Activity:** Helps the learners to recall and recapitulate the topic discussed
- **Update Yourself:** Find facts about the topic being covered
- **Recap:** Gives a brief summary of the topics being taught in the chapter
- **Brain Teaser:** Includes a variety of questions to evaluate the knowledge of the learners
- **Activity:** Encourages the learners to explore some real life use of the topics being covered
- **Lab Zone:** Gives instructions to the learners to perform various tasks in the lab
- **Tips for Teacher:** Gives suggestions to the teachers to make enhance teaching methods
- **Worksheets:** Comprehensive four test papers for thorough assessment
- **Project Work:** Challenging projects that apply learned concepts
- **Cyber Olympiad:** Sample paper for competitive advancement
- **Annexure:** A treasure trove of knowledge tidbits to inspire the learners

We believe that every learner should have the opportunity to become computer-savvy from a young age. This series is our contribution to making that goal a reality. We hope that learners will find it a valuable resource in their learning journey and it will inspire their curiosity and creativity. Any suggestions for improvement will be gratefully acknowledged.

With warm regards,

The Inventant Education Team

About the Series

1 Computer – A Machine

Learning Outcomes

The students will be able to:

- understand natural things and human-made things
- know about machine
- know about computers and its characteristics
- know about the different types of computers

Learning Outcomes

The goals to be reached by the end of the chapter

Think and Tell!

To exercise the powers of judgment, conception, or inference

Think and Tell!

Students! Which objects do you observe in the above picture? Write their names.

_____ _____ _____

Brain Power ON

All human-made things are made by using some natural things. Example, shirt is made from fibre that is natural.

Brain Power On

Some interesting pieces of knowledge related to the topic

Activity

Helps the learners to recall and recapitulate the topic discussed

Activity-3

Tick (✓) on the devices that are a type of a computer.

☐ ☐ ☐ ☐ ☐

Recap

- Things that are given to us by nature are called natural things.
- Things that are made by humans are called human-made things.
- Machines are human-made.
- Machines work fast. They save time, need power, and make our work easier.
- A computer is a smart machine that runs on electricity.
- A computer never makes mistakes or gets tired. It is very fast and stores a lot of information.
- Different types of computers are desktop, laptop, tablet and smartphone.

Recap

A summary of the concepts taught in the chapter

Brain Teaser

Various kinds of questions to test the gained knowledge

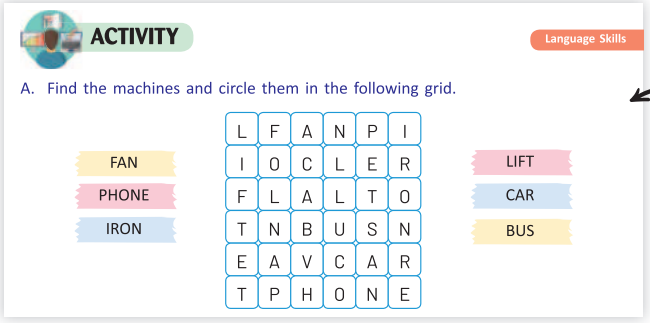
BRAIN TEASER

A. Fill in the blanks.

1. All _____ are man-made.
2. A computer is a _____ machine.
3. A computer stores a lot of _____.
4. A computer never makes _____.
5. A _____ is a computer used to make calls.

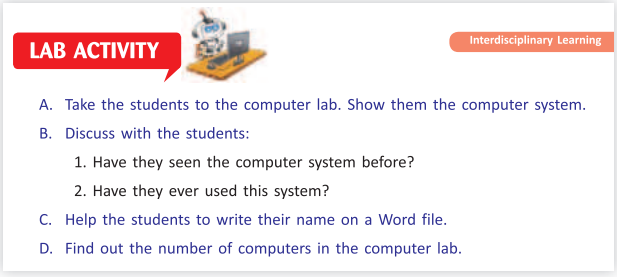
Hints

smart
information
mistakes
smartphone
computers



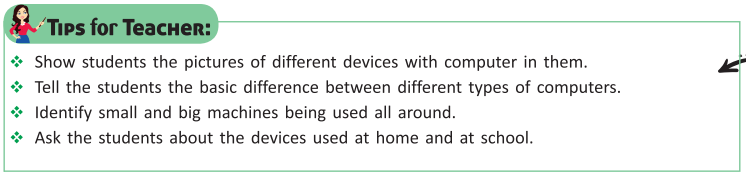
Activity

Practical activity to enrich learners knowledge



Lab Activity

Gives instructions to the learners to perform various tasks in the lab

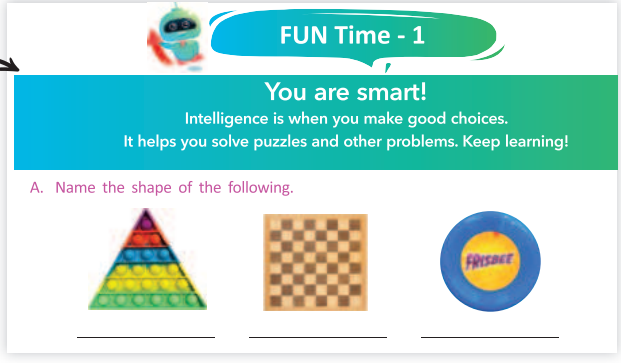


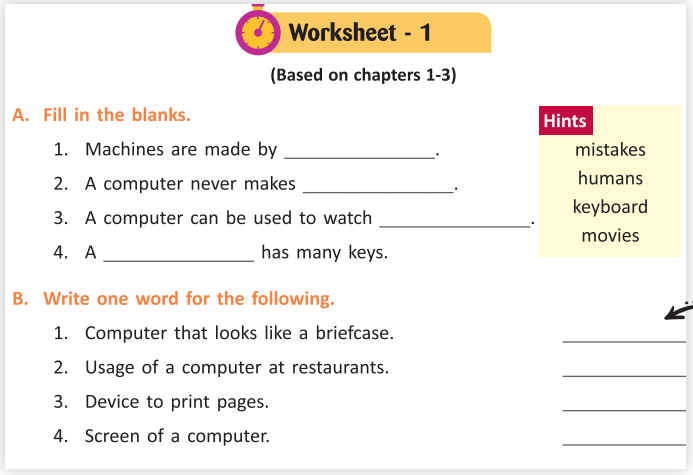
Tips for Teacher

Guidance for educators to enhance teaching methods

FUN Time

Enables the learners to brainstorm a in attempting activities



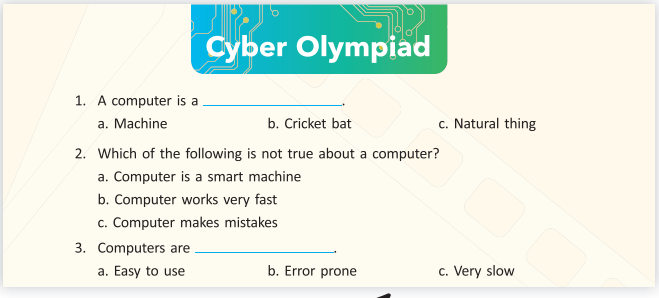


Worksheets

Evaluate the learner's knowledge in a subject

Project

Develops an inquisitive mind and become critical thinkers and problem-solvers



Cyber Olympiad

A competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

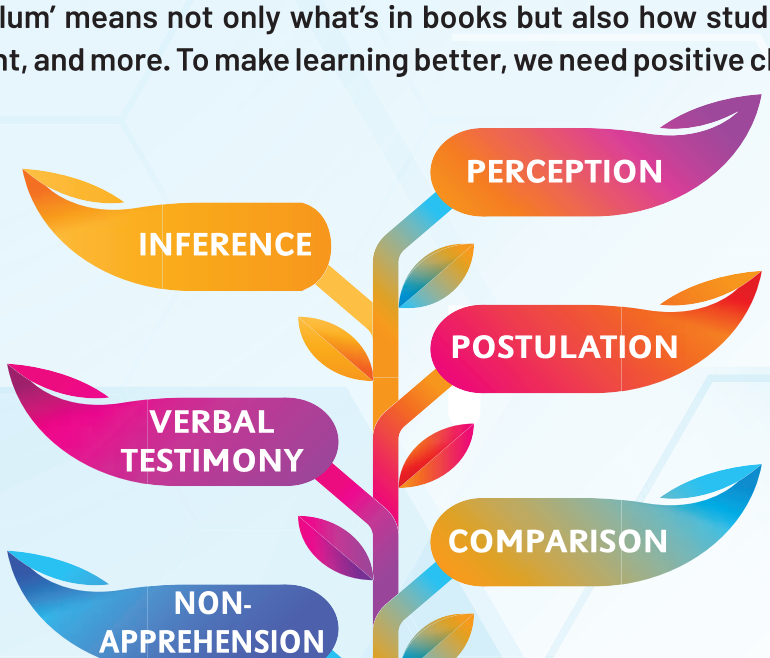
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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

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

Based on NCF 2023

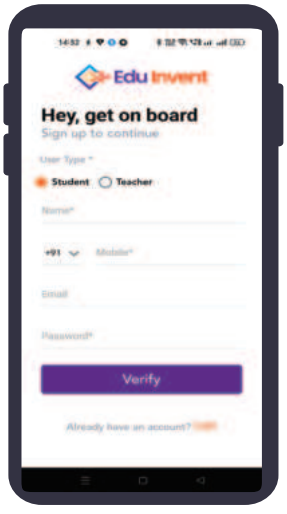
In this NCF, 'curriculum' means not only what's in books but also how students learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

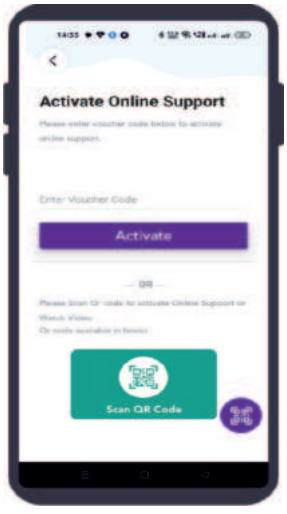


The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

1. For Mobile App Users Edu Invent





STEP 1 Download & Install

- 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.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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- Video Lessons/Animated Lessons
- Online Quiz
- Live Classes
- Webinars
- Study Materials and More
- Interactive exercises

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For any assistance, please reach us at info@inventanteducation.com
website www.inventanteducation.com

CONTENTS

1 Computer – A Machine

ICODE-msRP

Learning Outcomes

The students will be able to:

- understand natural things and human-made things
- know about machine
- know about computers and its characteristics
- know about the different types of computers

Think and Tell!

Students! Which objects do you observe in the above picture? Write their names.

Let us look at some more objects given here. Identify them and write their names in the space provided.

NATURAL THINGS

ICODE-K7g1

Things that are given to us by nature are called **natural things**.

Apple, tree, and water are **available in nature** so these are natural things.

HUMAN-MADE THINGS

ICODE-2b2F

Things that are made by humans are called human-made things.

Pencil, shoes, and clothes are made by humans, so these are human-made things.

Brain Power ON

All human-made things are made by using some natural things. Example, shirt is made from fibre that is natural.

MACHINE

ICODE-EoSQ

A machine is an object that helps us with our work.

Machines make our work easy. A machine has many different parts. These parts work together to perform a task.

Machines are human-made.

How Do the Machines Work?

Different machines use different power to work.

Let us see some machines and how they work.

Mobile

Toy

Run on **battery**.

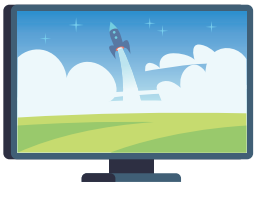
Bicycle

Lock

Work with **human effort**.

Refrigerator

Television



Run on **electricity**.

Bus

Car

Run on **fuel**.

Activity-1

Critical Thinking

Paste pictures of two machines that you use everyday.
Also, write how they work.

Characteristics of a Machine

COMPUTER – A SMART MACHINE

ICODE-eTjn

A computer is also a machine.
It runs on electricity.
It allows you to do many different tasks like playing games, doing calculations, drawing, watching movies, listening to songs, and much more.

CHARACTERISTICS OF A COMPUTER

ICODE-5qgJ

A computer needs our instructions to work. It is a very useful machine.

It is a smart machine used to do many tasks.

I store a large amount of information and never forget it.

I never get tired.

I never make mistakes.

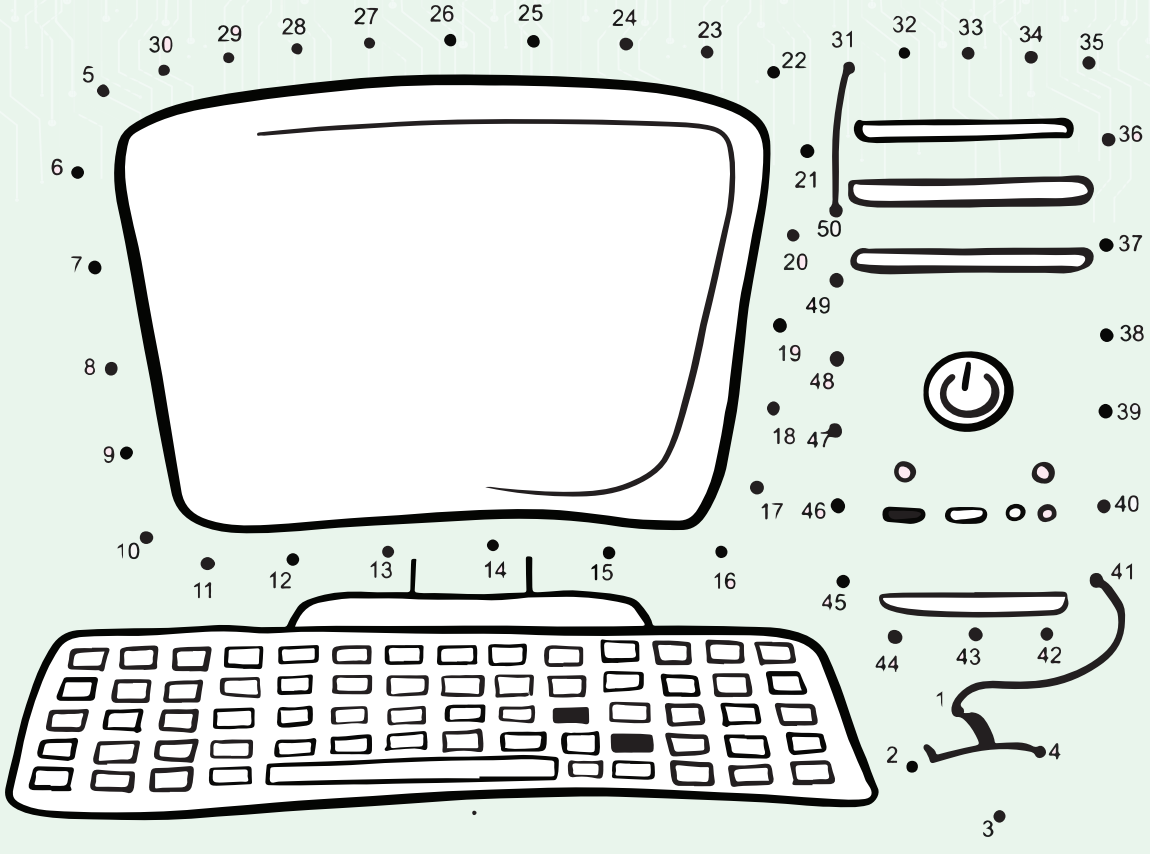
I make your work easy.

I work very fast.

Activity-2

Creativity

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



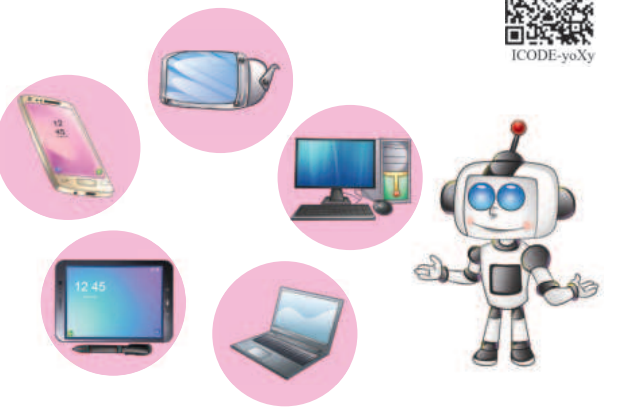
I am a _____ _____ _____ _____ _____ _____ _____ _____ .

TYPES OF COMPUTERS

ICODE-yoXy

Different computers come with different shapes and sizes. Some computers are big and some are small.

Let us learn about some different types of computers based on their size.



Desktop Computers

- The computers that are kept on desks are called desktop computers.
- They are also known as Personal Computers.
- They work on electricity.
- They are big in size.

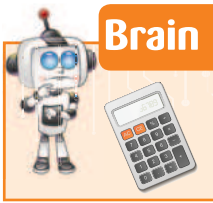
Laptop

- The computers that you can **keep on your lap and work** on are called laptop computers.
- They are **smaller** and **thinner** than the desktops.
- They can be **carried** while moving from one place to another.
- They look like a **notebook**.

Tablet

- A tablet is a computer which allows you to **work by touching** its screen.
- A tablet is **smaller** in size than a laptop.
- It can be **carried** anywhere.
- You can play **games**, **solve sums**, **create drawings**, **or watch movies** on it.
- It works on a **battery**.

Brain Power ON



Most machines, even a calculator, have a computer in them.

Smartphone

- A smartphone is a **phone** used by **touching its screen**.
- You can make and receive **calls** and **messages** on it.
- You can also play **games** on it.
- It works on a **battery**.

AI Update

VR Device

It is also known as **Virtual Reality Device**.

It is used for **gaming** and **entertainment**.

It is worn on the head and it **tracks hand and body movements**.

Activity-3

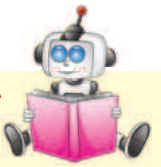
Tick (✓) on the devices that are a type of a computer.

Activity-4

Critical Thinking

Can you think of three types of computers that you can play games on? Draw them.

Recap



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BRAIN TEASER

A. Fill in the blanks.

1. All _____ are human-made.
2. A computer is a _____ machine.
3. A computer stores a lot of _____.
4. A computer never makes _____.
5. A _____ is a computer used to make calls.

Hints

smart
information
mistakes
smartphone
computers

B. Match the following types of computer:

1.	Desktop	a.	
2.	Smartphone	b.	
3.	Laptop	c.	
4.	Tablet	d.	
5.	VR Device	e.	

C. Write T for True and F for False.

1. A desktop can be kept on the laps. ☐
2. All human-made things are natural. ☐
3. A refrigerator runs on electricity. ☐
4. A computer never gets tired. ☐

D. Tick (✓) the correct answer.

1. Which of the following is a natural thing?

   a. Water ☐ b. Car ☐ c. Robot ☐

2. Which of the following runs on electricity?

   a. Bicycle ☐ b. Door ☐ c. Television ☐

3. Which of the following cannot be done by a computer?

   a. Gaming ☐ b. Cycling ☐ c. Accounting ☐

4. Which of the following is not a type of computer?

   a. Bicycle ☐ b. Laptop ☐ c. VR Device ☐

E. Write one word for the following.

Tomato Laptop Desktop Computer Washing machine

1. Another name for a personal computer. _____
2. A computer that you can keep on your lap. _____
3. Any one natural thing. _____
4. Any one machine that runs on electricity. _____

ACTIVITY

Language Skills

A. Find the machines and circle them in the following grid.

FAN

PHONE

IRON

L	F	A	N	P	I
I	O	C	L	E	R
F	L	A	L	T	O
T	N	B	U	S	N
E	A	V	C	A	R
T	P	H	O	N	E

LIFT

CAR

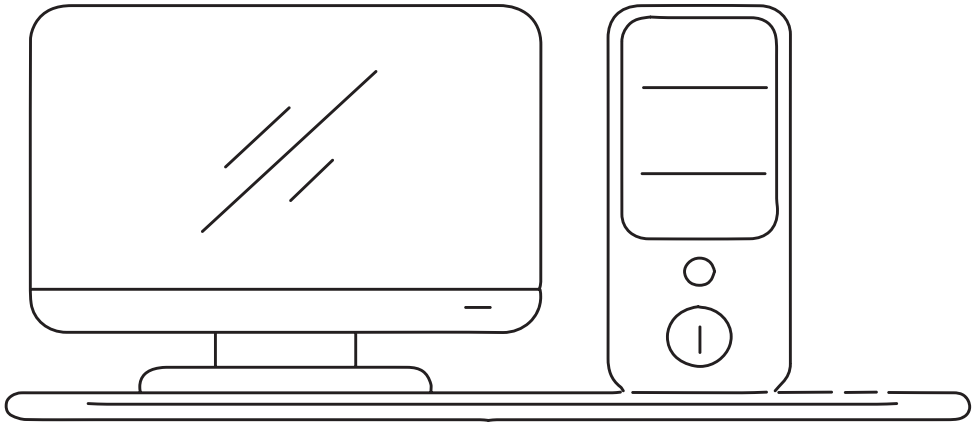
BUS

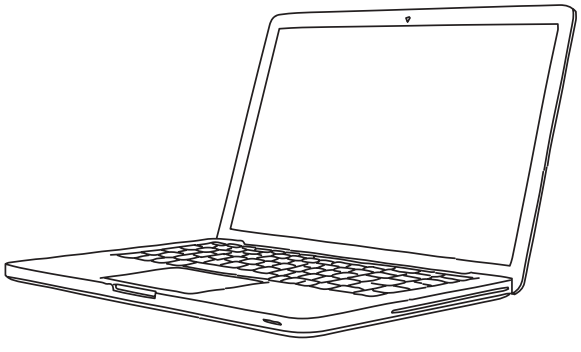
B. Colour the pictures according to the given colour codes.

Art Integration

1. Computer that can be carried anywhere.

   Computer that cannot be carried anywhere.

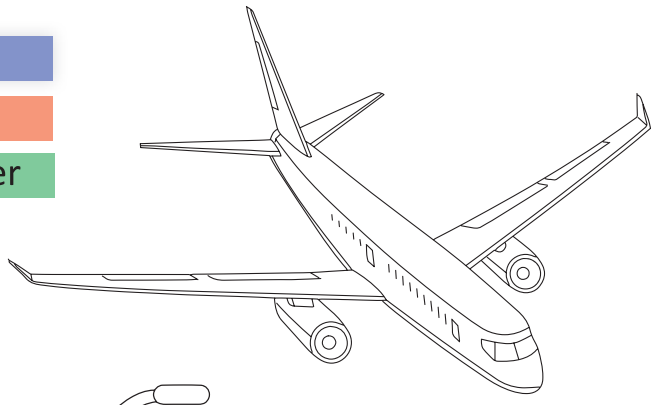


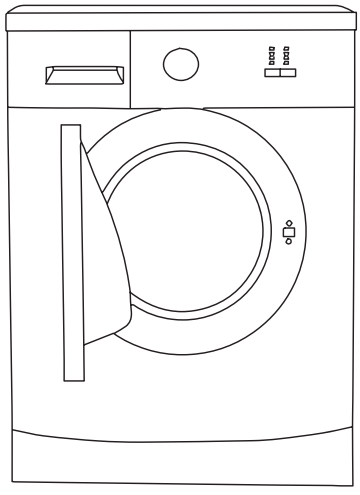


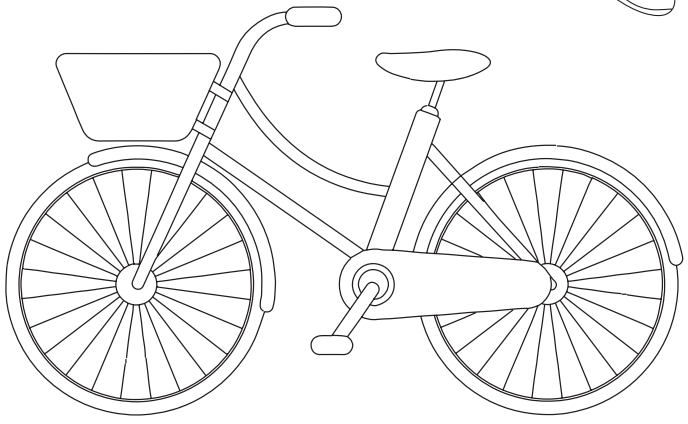
2. Machine that run on fuel

Machine that run on electricity

Machine that run on human power







LAB ACTIVITY

Inter-disciplinary Learning

A. Take the students to the computer lab. Show them the computer system.

B. Discuss with the students:

1. Have they seen a computer system before?
2. Have they ever used this system?

C. Help the students to write their name on a Word file.

D. Find out the number of computers in the computer lab.

Tips for Teacher:

- Show students the pictures of different devices with computer in them.
- Tell the students the basic difference between different types of computers.
- Identify small and big machines being used all around.
- Ask the students about the devices used at home and at school.

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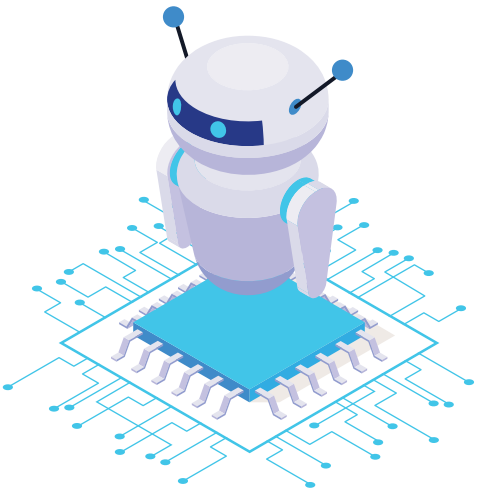

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With warm regards,

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About the Series

1 Computer – An Electronic Device

Learning Outcomes

The students will be able to:

- learn about computers as an electronic device
- compare humans and computers
- know about the functioning of a computer
- know the advantages and disadvantages of computers

Learning Outcomes

The goals to be reached by the end of the chapter

Think and Tell!

Who all play important role in your life and how?
Write names of some people that are important to you.

_____ _____

_____ _____

Think and Tell!

To exercise the powers of judgment, conception, or inference

Brain Power ON

Computer reduces physical effort so much that now people are being encouraged to take time off computers to make some physical effort.

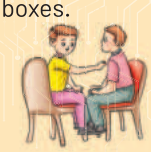
Brain Power On

Some interesting pieces of knowledge related to the topic

Activity-1 Critical Thinking

Who does these activities better?
Write **C** for computer and **H** for human in the given boxes.





Activity

Helps the learners to recall and recapitulate the topic discussed

Recap

- Computer is an electronic device.
- A computer follows basic steps of input, process, and output to operate.
- Input is the data and the instructions that are given to the computer.
- Process is working on the data.
- Output is the result of processing.
- Advantages of a computer are its easy access to information, accuracy, multi-tasking, etc.
- Disadvantages of a computer are its screen time, distractions, addiction, etc.

Recap

A summary of the concepts taught in the chapter

Brain Teaser

Various kinds of questions to test the gained knowledge

BRAIN TEASER

A. Fill in the blanks.

1. Uses of a computer at _____ are managing accounts, preparing presentations, etc.
2. At hospitals computers are also used to manage _____.
3. At school, computers are used for learning and _____.
4. _____ make classrooms interactive.
5. Computers are used to listen to _____.

Hints

smart boards
appointments
office
teaching
music

ACTIVITY

Critical Thinking

A. Find and encircle 6 meaningful terms extracted from this chapter.

	A	D	C	L	O	S	E
FILE	E	U	R	D	P	O	I
CLOSE	F	O	L	D	E	R	A
FOLDER	I	P	J	A	N	D	R
	L	G	R	T	A	B	A
	E	D	S	A	V	E	D

DATA
OPEN
SAVE

Activity

Practical activity to enrich learners knowledge

LAB ACTIVITY

Usage of Keys

1. Type “Good Morning” using alphabet keys and press Spacebar Key between the two words.
2. Type “Mmoonittorrr" after this.
3. Using the arrow keys move the cursor from r to m to delete the enter number of letters. (Use delete key)
4. Now press Enter Key.
5. Type "Hello Everyone.”

Lab Activity

Gives instructions to the learners to perform various tasks in the lab

Tips for Teacher

- Discuss some other electronic devices while explaining a computer as an electronic device.
- Explain the working of a computer and compare it with that of humans.
- Discuss advantages and disadvantages of a computer and that of a human.
- Discuss healthy practices while using a computer.

Tips for Teacher

Guidance for educators to enhance teaching methods

FUN Time

Enables the learners to brainstorm in attempting activities

FUN Time - 1

1. Take the help of your teacher to open this link https://www.happyclicks.net/maze-games/index.php.
2. You get a list of maze games available.

Worksheet – 1

(Based on chapters 1-3)

A. Fill in the banks.

1. _____ is the result of processing.
2. _____ also use computers for managing money.
3. Smart _____ are very interactive for teaching.
4. CPU is the _____ of the computer.
5. A mouse has _____ buttons and a scroll wheel.

Worksheets

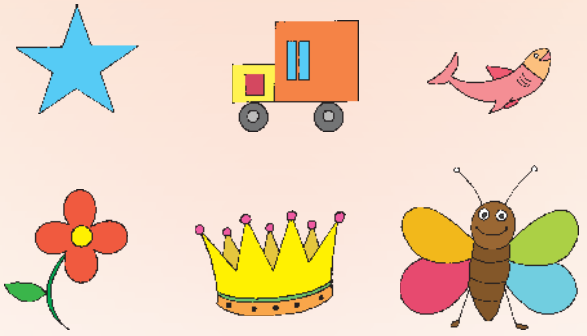
Evaluate the learner’s knowledge in a subject

Project Work

Develops an inquisitive mind and become critical thinkers and problem-solvers

Project Work

Draw and color the following shapes in the Paint program by using the different tools.



Cyber Olympiad

1. A computer works on:
   a. Electricity b. Fuel c. Manpower
2. Which of the following is used to perform many tasks?
   a.  b.  c. 
3. Which of the following tasks can you do on a computer?
   a. Solve sums b. Watch movies c. Both a. and b.
4. The information you put into the computer is called _____.
   a. Output b. Input c. Data

Cyber Olympiad

A competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

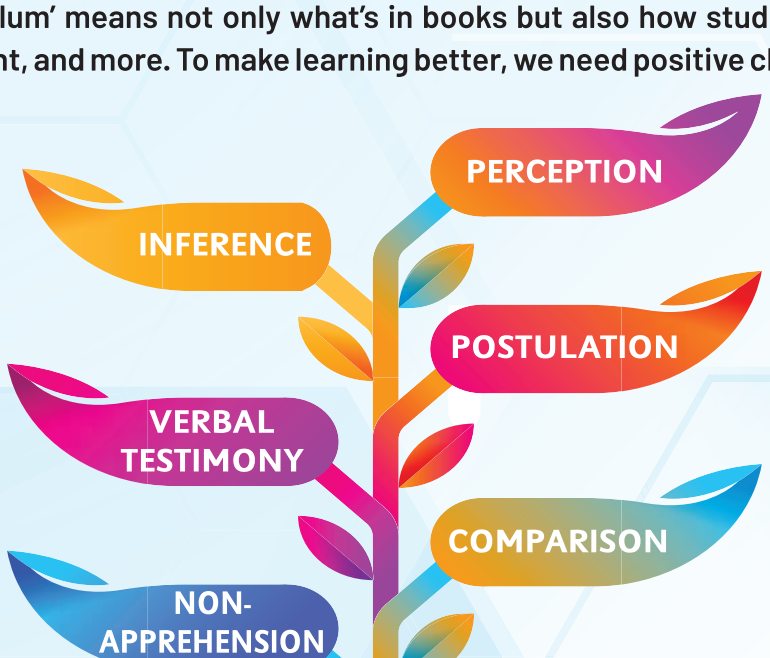
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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

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

Based on NCF 2023

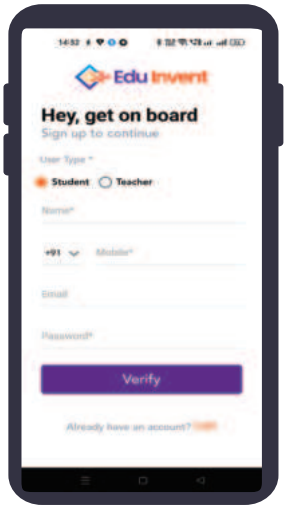
In this NCF, 'curriculum' means not only what's in books but also how students learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

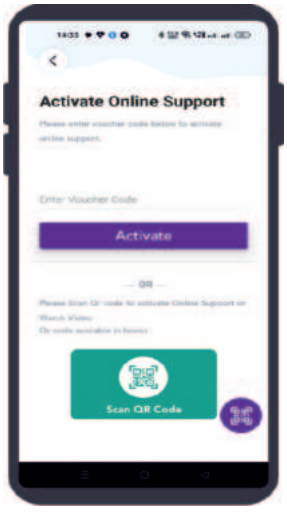


The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

1. For Mobile App Users Edu Invent





STEP 1 Download & Install

- 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.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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Key Features

- Scan and Learn
- Video Lessons/Animated Lessons
- Online Quiz
- Live Classes
- Webinars
- Study Materials and More
- Interactive exercises

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For any assistance, please reach us at info@inventanteducation.com
website www.inventanteducation.com

CONTENTS

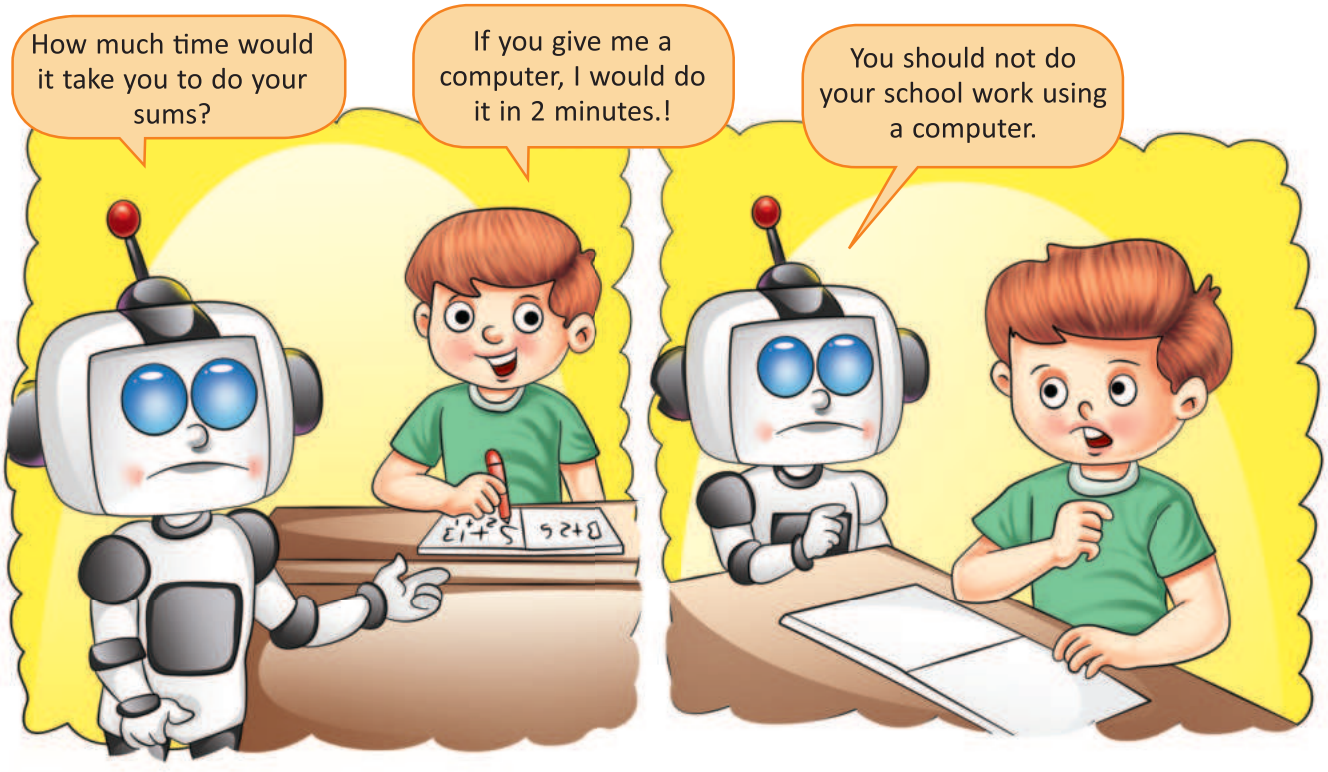
1 Computer – An Electronic Device

ICODE-vM8b

Learning Outcomes

The students will be able to:

- learn about computers as an electronic device
- compare humans and computers
- know about the functioning of a computer
- know the advantages and disadvantages of computers



Think and Tell!

How would you want to do the following activities? Using a computer or yourself.

Calculations _____ Talking to your friend _____

Playing chess _____ Shopping _____

Computer runs on electricity so it is an **electronic device**. Computer helps humans in a lot of day-to-day activities. It has proved to be much smarter than humans.

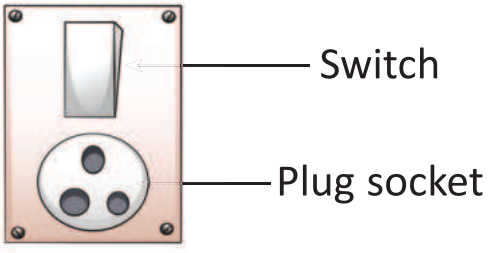
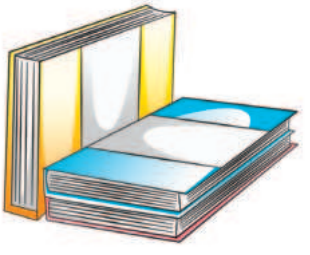
Let us compare the features of humans with computers.

Brain Power ON

Computer reduces physical effort so much that now people are being encouraged to take time off computers to make some physical effort.

ICODE-4y5x

HUMANS VS COMPUTERS

Human	Computer
	
Humans need food to survive.	A computer runs on electricity.
	
A human learns from experience.	A computer is good at calculations.
	
A human tends to forget things.	A computer has a huge memory.

A human takes time to finish things.

A computer takes much lesser time than humans.

A human may make mistakes.

A computer never makes mistakes.

A human has feelings.

A computer has only emojis, no feeling.

Humans get tired after doing some work.

A computer never gets tired.

Activity-1

Critical Thinking

Who does these activities better?

Write **C** for computer and **H** for human in the given boxes.

HOW DOES A COMPUTER FUNCTION?

ICODE-69bJ

Computer is an electronic device and needs electricity to run.

What to do and how to do, is based on the instructions given to it by the user.

The user enters data and instructions, the computer processes the data based on the instructions, and returns the output.

Look at the following examples:

Example 1:

Put fruits in the food processor, press a button to spin it.

It spins and processes the fruits.

The juice is ready to serve.

Example 2:

Laundry clothes are fed in a washing machine.

The washing machine washes the clothes.

The clothes are clean after wash.

Activity-2

Creativity

Paste the pictures of one more such activity and write the steps.

A computer also follows these three basic steps.

These are called Input > Process > Output.

Input

Input is all the **data** and the **instructions** that are given to the computer.

In the given examples, fruit and dirty laundry are the inputs.

Keyboard

Mouse

For a computer, the text and commands that we given using a keyboard and a mouse are the inputs.

Give it a Try!

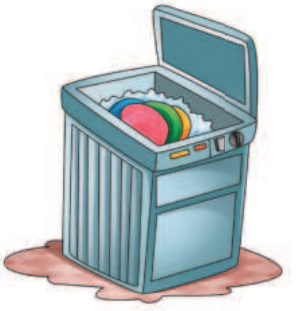
Write the input for a calculator if we want to calculate 3 + 5.

_____

Process

The computer accepts the input given by the user and performs the specified instructions. This is called **processing**.

In the given examples, juicer and washing machine do the processing.



For a computer, the CPU (Central Processing Unit) does the processing.

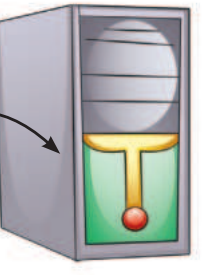
CPU is fixed inside the system cabinet.

Give it a Try!

What calculates the answer for 3 + 5?

_____

CPU

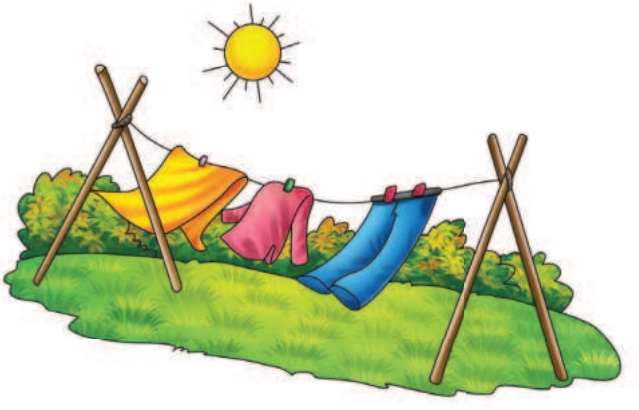


System cabinet

Output

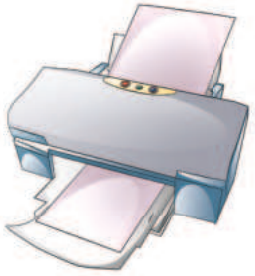
Output is the **result** given by the computer after processing.

In the given examples, juice and washed clothes are the output.



For a computer, monitor and printer display the output.

Monitor



Printer

Give it a Try!

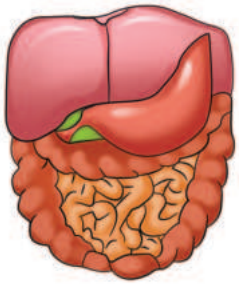
Write the result of processing 3 + 5.

_____

When we eat, **food** acts as input, our **digestive system** acts as the **processing device**, and the **energy** we get from food is the **output**.

Input

>>



Process

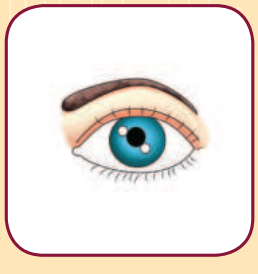
>>

Output

Activity-3

Critical Thinking

Identify the body part used for input, process, and output. Write **I** for Input, **P** for Process and **O** for Output.



☐

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ADVANTAGES OF A COMPUTER

ICODE-vdFb

A computer system has many advantages.

- **Storage:** It stores large amounts of data.
- **Speed:** It works very fast without getting tired.
- **Accuracy:** It doesn't make any mistakes.
- **Automated:** It works automatically and needs minimal human interference.
- **Flexible:** It can perform tasks in most fields.
- **Teaching and Learning:** It helps in many activities including teaching and learning.
- **Multi-tasking:** It can do multiple tasks at the same time.

DISADVANTAGES OF A COMPUTER

ICODE-XHKT

A computer system is everywhere and helps in lots of fields.

But, it also has some disadvantages.

- **Health Issues:** It can cause health issues to the user if used for long hours.
- **Virus:** It is prone to virus attacks, may function improperly.
- **Environment Impact:** Making and disposing off computer parts impacts the environment.
- **Care and Cleaning:** It requires care and cleaning.
- **Dependence:** It depends on humans for input and programs. It cannot take its own decisions.
- **Cybercrime:** It increases the number of crimes.

AI Update

Ameca, a robot, is capable of displaying human emotions.

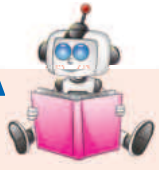
Activity-4

Critical Thinking

Match the following features with advantages and disadvantages of a computer.

Advantages of a computer		Disadvantages of a computer
	ACCURACY	
	SCREEN TIME	
	ADDICTION	
	MULTI-TASKING	
	VIRUS	
	CYBERCRIME	

Recap



- Computer is an electronic device.
- A computer follows basic steps of input, process, and output to operate.
- Input is the data and the instructions that are given to the computer.
- Process is working on the data.
- Output is the result of processing.
- Advantages of a computer are its easy access to information, accuracy, multi-tasking, etc.
- Disadvantages of a computer are its screen time, distractions, addiction, etc.

BRAIN TEASER

A. Fill in the blanks.

1. Humans rely on _____.
2. _____ does not make any mistake.
3. _____ is the data and instructions fed into the computer.
4. Output is the _____ of processing.
5. A computer can store _____ amount of data.

Hints

computer
food
result
large
input

B. Match the following features to the centre image:

1. Accurate
2. Large storage
3. Forgetful
4. High Speed

a. Electricity
b. Feelings
c. Multi-tasking
d. Emotions

C. Write T for True and F for False.

1. Input is the processing done on data. ☐
2. Computer is prone to virus attacks. ☐
3. Computer works on three basic steps, input > process > output. ☐
4. Humans do not make mistakes. ☐
5. Computer is an electronic device. ☐

D. Tick (✓) the correct answer.

1. Which of the following is a computer capable of?

   a. Understand feelings ☐ b. Work fast ☐ c. Eat food ☐

2. Humans rely on _____.

   a. Food ☐ b. Electricity ☐ c. Fuel ☐

3. _____ takes time to finish work.

   a. Computer ☐ b. Machine ☐ c. Humans ☐

4. _____ is the result of processing.

   a. Output ☐ b. Process ☐ c. Input ☐

E. Write one word for the following.

Computer Virus Output Input

1. Computer is prone to these attacks. _____
2. This is an electronic device. _____
3. Data and instructions given to computer. _____
4. The third basic step that a computer follows. _____

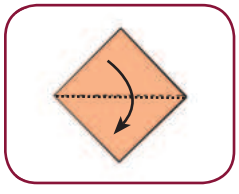
ACTIVITY

Creativity

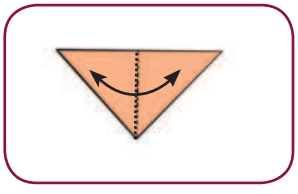
A. DIY Activity

Make a puppy face out of paper.

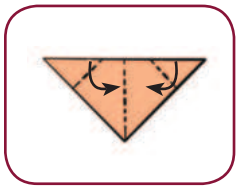
Materials required: Square paper (preferably thin or lightweight paper), Colour pens.



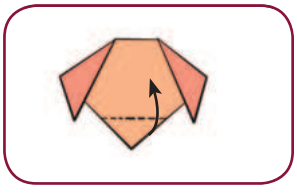
Step 1 : Fold the square diagonally in half to form a triangle.



Step 2 : Fold the triangle in half to make a smaller triangle and unfold it.

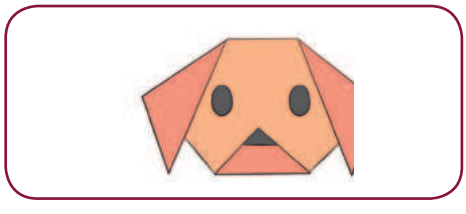


Step 3 : Fold the corners as in the image.



Step 4 : Fold the lower corner inside and make eyes and mouth using colour pen.

Step 5 :



Identify the input, processing, and output in this activity.

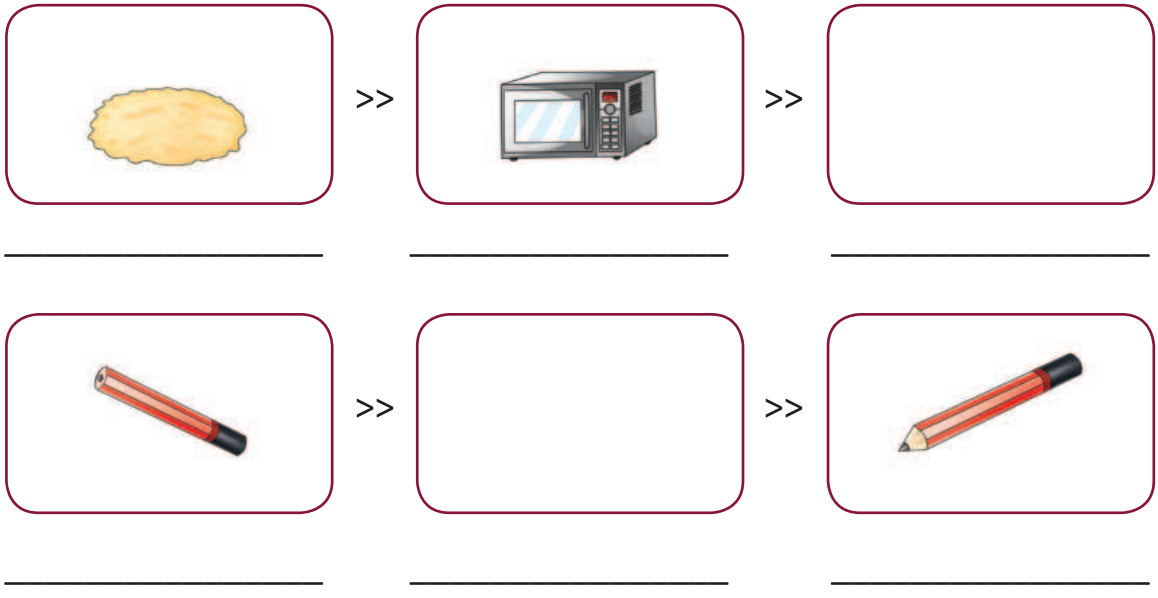
Input _____

Process _____

Output _____

B. Draw the pictures of the missing steps and write the names of the steps.

Critical Thinking



LAB ACTIVITY

Exploration

A. Visit your computer lab and check out all the devices that are there.

Enter the names of each in the correct column.

Input	Process	Output

B. Make a chart or a poster on the topic "Input-Process-Output". Explain the concept with the help of two examples.

Art Integration

Tips for Teacher

- Discuss some other electronic devices while explaining a computer as an electronic device.
- Explain the working of a computer and compare it with that of humans.
- Discuss advantages and disadvantages of a computer and that of a human.
- Discuss healthy practices while using a computer.

As per NEP 2020 and NCF 2023

Based on Windows 7 and MS Office 2010

i-Boot

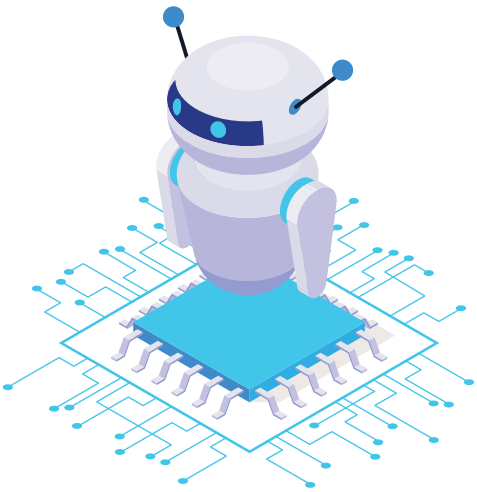
A Textbook of Computer Science

3

For ICSE Schools

By

Editorial Team
Inventant Education



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Introduction

Welcome to the world of **Inventant Education's** cutting-edge computer series, **i-Boot** designed to empower the learners from **classes 1 to 8** on their journey through the digital realm. The series is aligned as per the latest curriculum designed by the **Council for the Indian School Certificate Examination (CISCE) 2023**. It has been developed in accordance with the guidelines set forth by the **National Education Policy (NEP) 2020** and the **National Curriculum Framework (NCF) 2023**. In recent years, there has been a paradigm shift towards designing a learner-centric curriculum that is based on activity-based approach. So, in this series, we have incorporated key points from the NEP 2020 into practical activities, covering essential **21st Century Skills**, such as My healthy Guide, Computational Thinking, Artificial Intelligence, Robotics, Cyber Olympiad, etc. Our chapters are also aligned with the six phases of logical understanding outlined in the NCF 2023, fostering skills in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

In today's digitally driven world, computer proficiency is not just a skill; it's a necessity. Whether you are a student, a professional, or someone looking to enhance your computer literacy, this series is your roadmap to mastering the fundamentals of **Windows 7** and **Microsoft Office 2010**. The world of computer systems and technology is continuously evolving and has touched virtually each and every aspect of your life. At **Inventant Education**, we are committed to nurturing the potential of young minds. More than a series of books i-Boot is a gateway to a future where the learners harness their talents and work diligently to excel in the computer world.

Core features of i-Boot series (for classes 1 to 8) are:

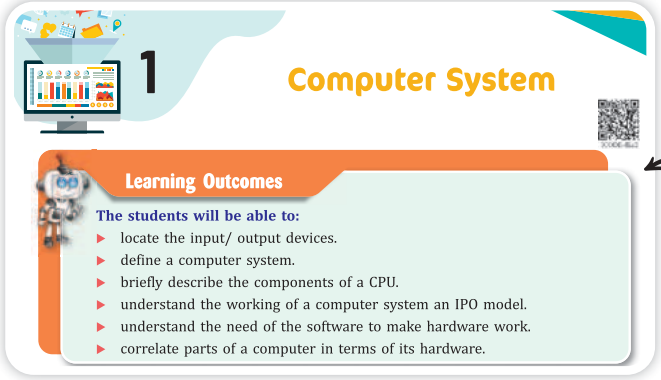
- **Learning Outcomes:** Describes the goals required to achieve at the end of the chapter
- **Think and Tell:** Enhances analytical abilities, stimulates memories and broadens the imagination
- **For Your Information:** Give extra and useful information on the topic being covered
- **Let's do it:** Helps the learners to recall and recapitulate the topic discussed
- **Quick Tips:** Gives a shortcut method of the topic being covered
- **Gather More:** Includes facts about the topic being covered
- **Sum-up:** Gives a brief summary of the topics being taught in the chapter
- **Time To Learn:** Includes a variety of questions to evaluate the knowledge of the learners
- **Activity Zone:** Encourages the learners to explore some real life use of the topics being covered
- **Lab Zone:** Gives instructions to the learners to perform various tasks in the lab
- **Tips for Teacher:** Gives suggestions to the teachers to make enhance teaching methods
- **Worksheets:** Comprehensive four test papers for thorough assessment
- **Project:** Challenging projects that apply learned concepts
- **Cyber Olympiad:** Sample paper for competitive advancement
- **Annexure:** A treasure trove of knowledge tidbits to inspire the learners

We believe that every learner should have the opportunity to become computer-savvy from a young age. This series is our contribution to making that goal a reality. We hope that learners will find it a valuable resource in their learning journey and it will inspire their curiosity and creativity. Any suggestions for improvement will be gratefully acknowledged.

With warm regards,

The Inventant Education Team

About the Series

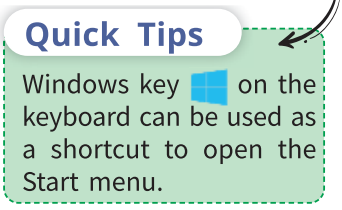


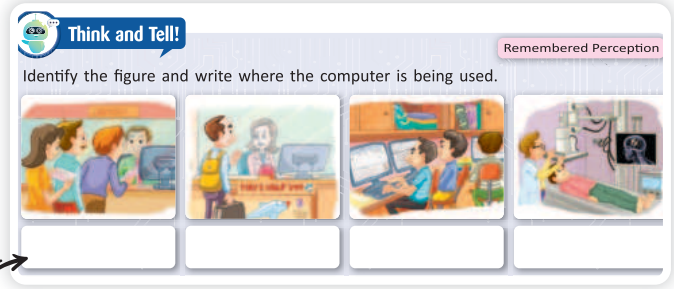
Learning Outcomes

The goals to be reached by the end of the chapter

Quick Tips

Gives a shortcut method of the topic being covered



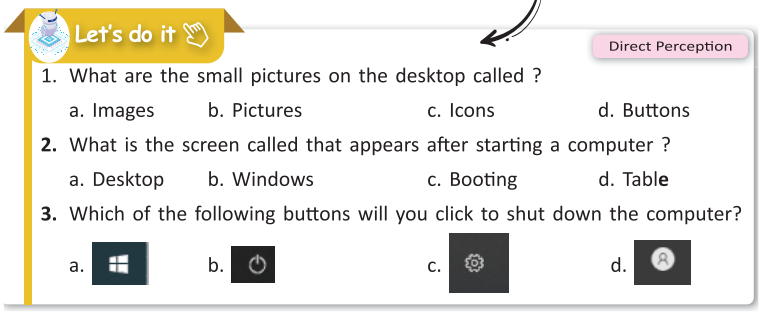


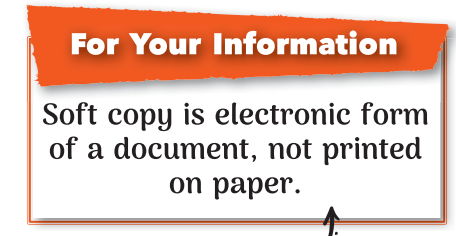
Think and Tell!

To exercise the powers of judgment, conception, or inference

Let's do it

Helps the learners to recall and recapitulate the topic discussed





For Your Information

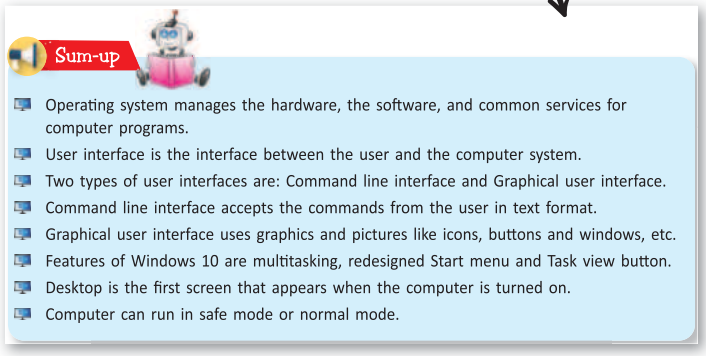
Some interesting pieces of knowledge related to the topic

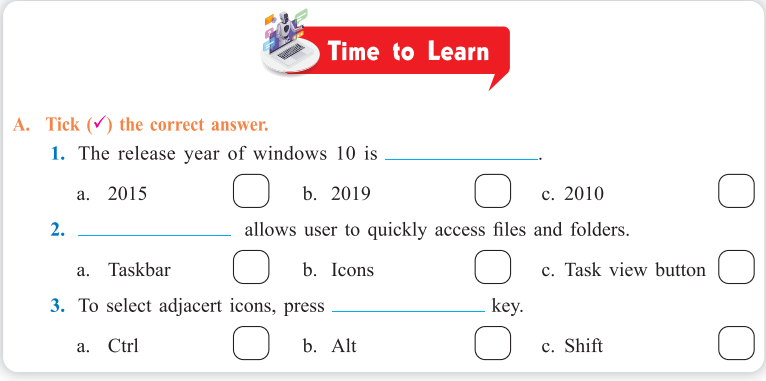
My Healthy Guide

Represents major food groups that contribute to the total diet

Sum-up

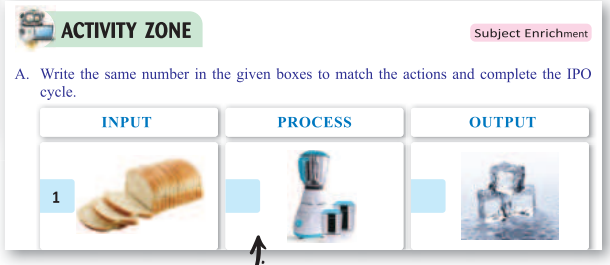
A summary of the concepts taught in the chapter





Time to Learn

Various kinds of questions to test the gained knowledge

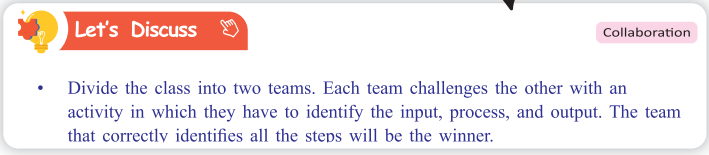


Activity zone

Practical activity to enrich student's knowledge

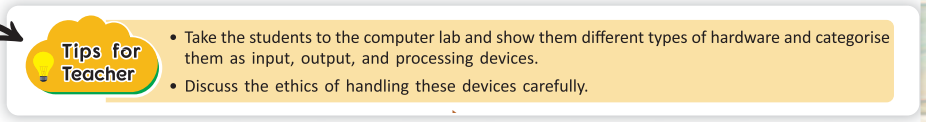
Let's Discuss

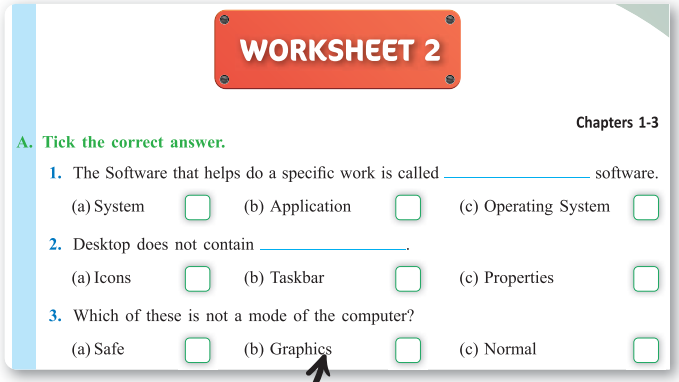
A collaborative conversation for sharing ideas



Tips for Teacher

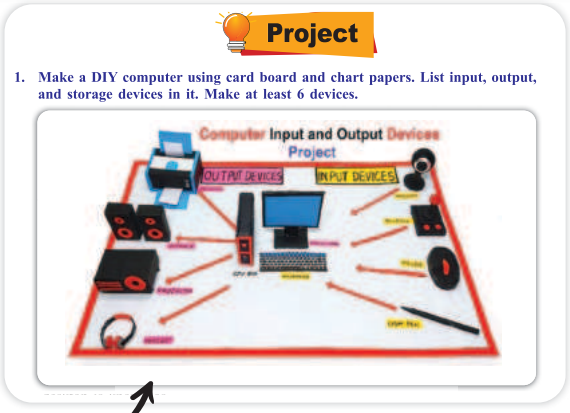
Guidance for educators to enhance teaching methods





Worksheets

Evaluate the learner's knowledge in a subject

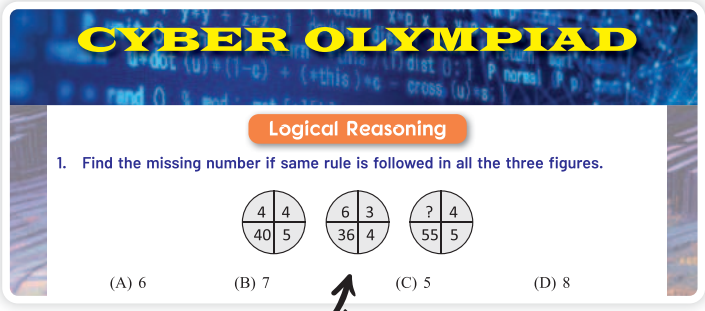


Project

Develops an inquisitive mind and become critical thinkers and problem-solvers

Coding with Code

Fun activity to enhance the thinking power



Cyber Olympiad

A competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

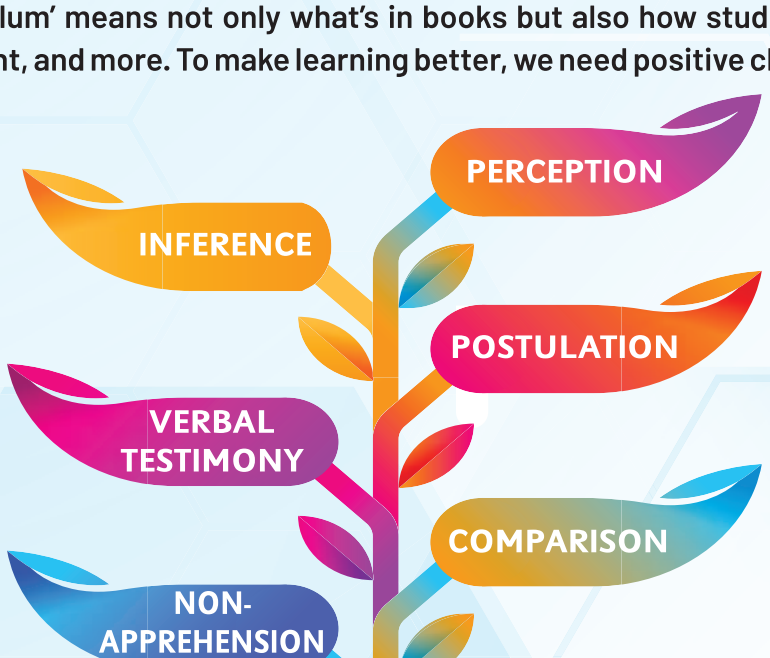
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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



The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

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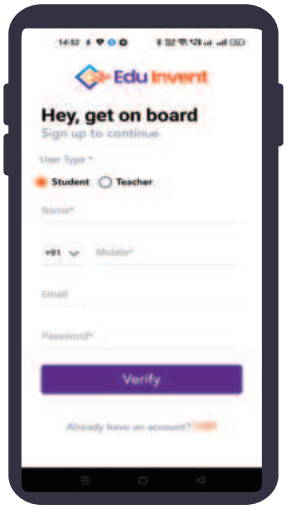

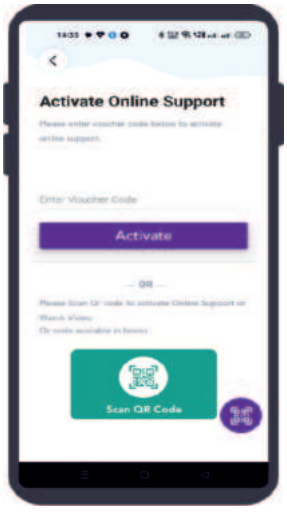

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- Go to Google Play Store or Apple App Store.
- Type 'Edu Invent' in the search bar.
- Tap 'Install'. The app will take a few moments to download and install.
- Once installed, tap 'Open' to launch the app.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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CONTENTS

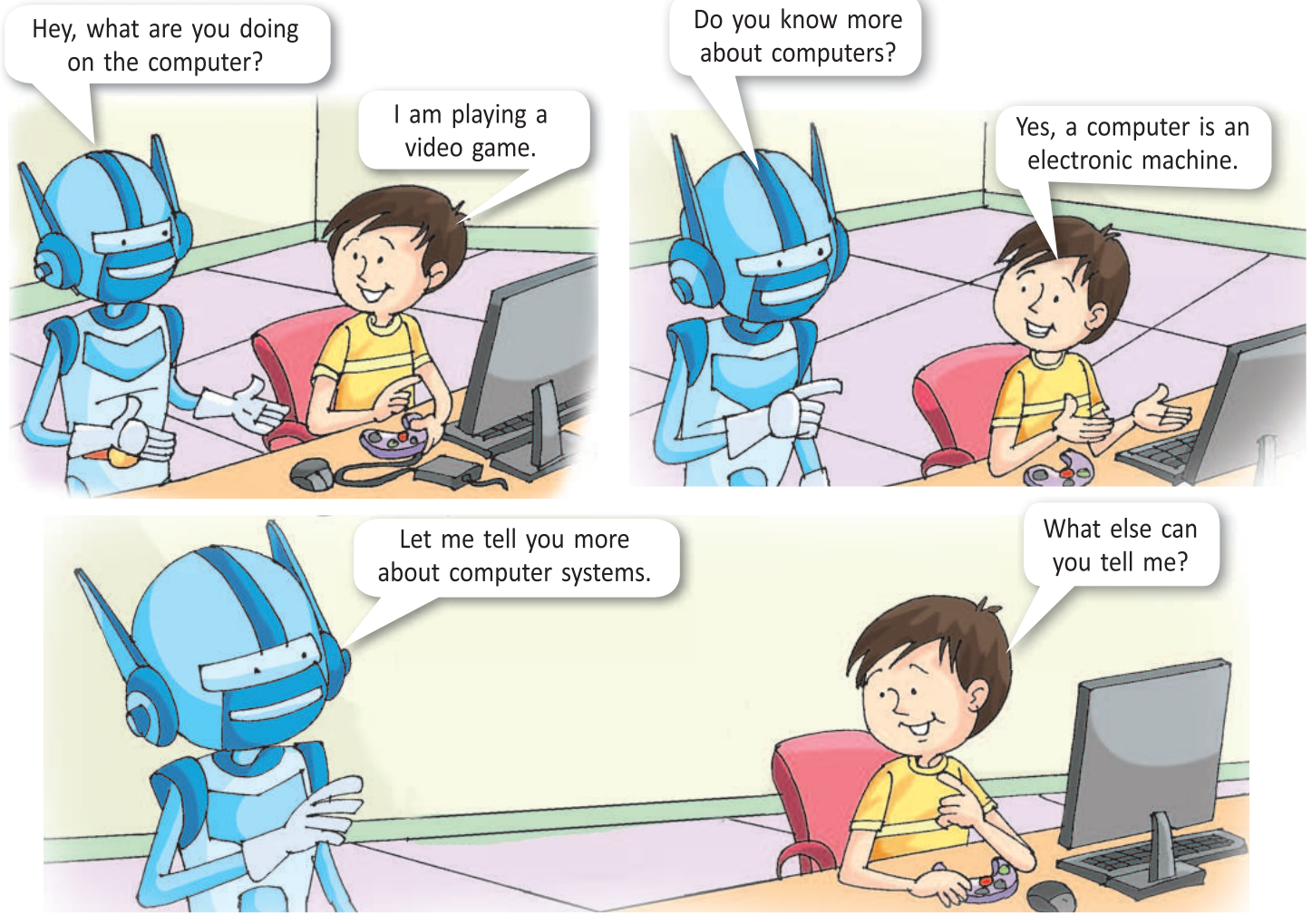
1 Computer System

ICODE-fKc2

Learning Outcomes

The students will be able to:

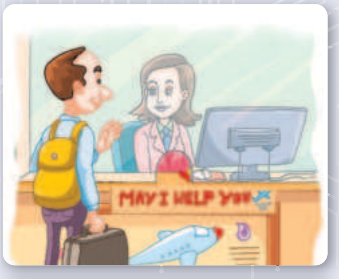
- locate the input/ output devices.
- define a computer system.
- briefly describe the components of a CPU.
- understand the working of a computer system an IPO model.
- understand the need of software to make hardware work.
- correlate parts of a computer in terms of its hardware.

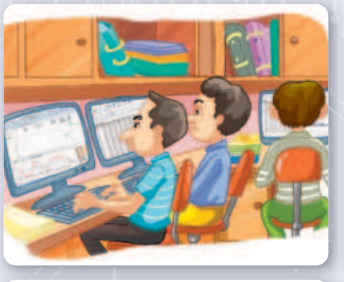
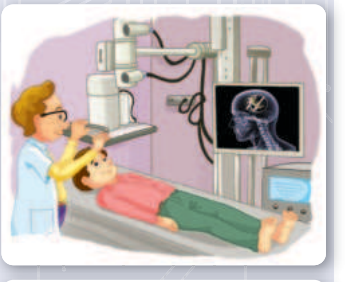


Think and Tell!

Remembered Perception

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

Computers are used everywhere, even in sports. They are used to maintain records, analyse performance, make sports gear, and record games.

A computer system is a machine that uses hardware and software to complete tasks.

For Your Information

First computer was invented in 1822 by Charles Babbage.

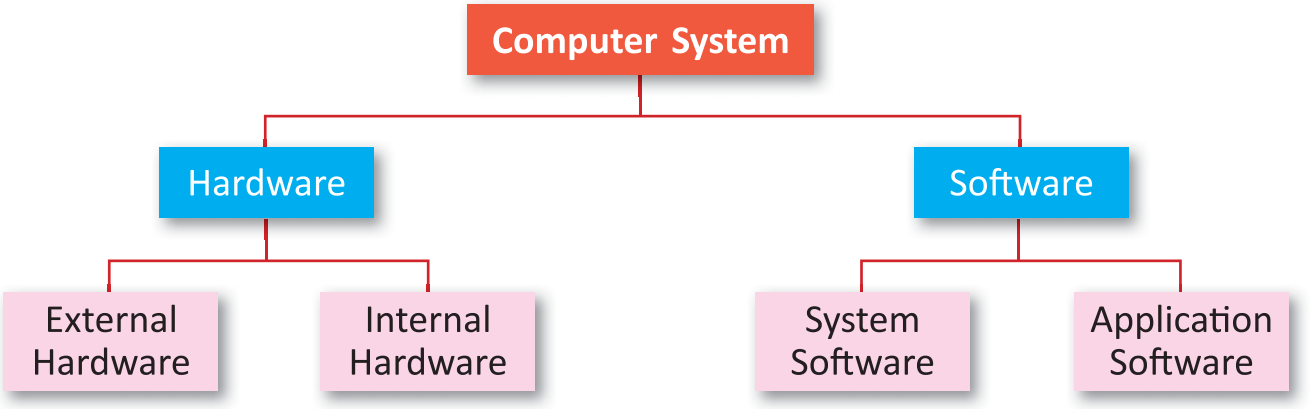


Fig. 1.1: Computer System

HARDWARE

Hardware are the physical parts of the computer. These are those parts that you can see, touch, and feel. The hardware parts of a computer are connected to it internally or externally.

External Hardware

These devices are physical devices that are located outside the system cabinet. These are portable. For example, monitor, keyboard, mouse, printer, etc.

Internal Hardware

These devices are physical devices that are located inside the system cabinet. These are not portable. For example, CPU, hard drive, motherboard, video card, RAM, etc.

Remember the four main parts of a computer system. Name them.

Fig. 1.2: Computer System

These are all hardware of the computer. Let's know more about them.

Monitor

Monitor is the screen of a computer, also known as a VDU (**Visual Display Unit**). An external hardware device that displays the result of processing on a screen. It shows the **soft copy** of the data and the movement of the mouse pointer.

For Your Information

Soft copy is electronic form of a document, not printed on paper.

A monitor is mainly of three types:

 Cathode Ray Tube (CRT)	 Liquid Crystal Display (LCD)	 Light Emitting Diode (LED)
Big in size	Flat screen type	Better display
Consumes more power	Consumes less power	Consumes even lesser power
Heavy in weight	Less bulky	Thinner and lighter in weight
Outdated these days	Used at some places only	They are mostly used these days

CPU

CPU stands for **Central Processing Unit**. It is the computer's brain, handles data processing, calculations, and sending output. It is an essential internal hardware device.

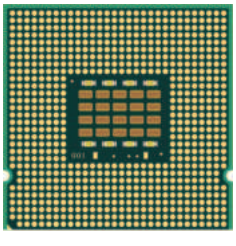


Fig. 1.3: CPU

A CPU has three components:

1. ALU (Arithmetic and Logic Unit)
2. CU (Control Unit)
3. MU (Memory Unit)

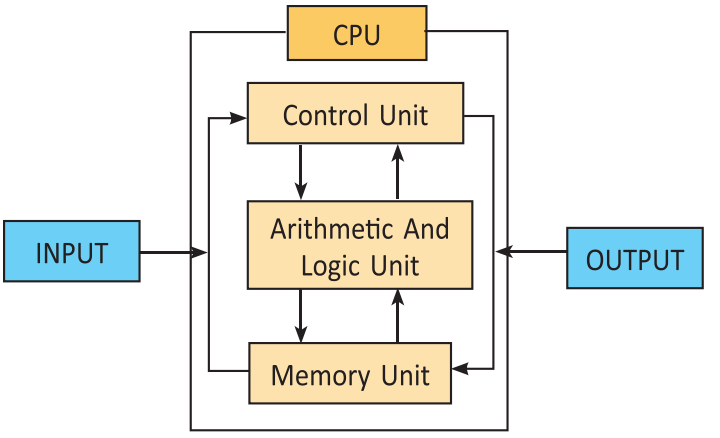


Fig. 1.4: Parts of CPU

Arithmetic and Logic Unit (ALU)

The CPU's arithmetic unit handles calculations (addition, subtraction, etc.) and logic (comparisons like less than, equals, etc.).

Control Unit

This part of the CPU controls the flow of information between various parts of the computer. It controls the working of all parts of the computer.

Memory Unit

This part of the CPU stores the input data and instructions and the output of processing. There are two types of memory unit: RAM and ROM. **ROM** is the permanent memory. The data stored in ROM cannot be changed. **RAM** stores information temporarily. The data can be erased, if you shut down the computer without saving your work.

For Your Information

ROM: Read Only Memory
RAM: Random Access Memory

Keyboard

A keyboard is the main input device for typing on a computer. It has 104 keys for letters, numbers, and instructions. These are:

Fig. 1.5: Keyboard

Alphabet keys	26 in number, labelled with the English letters 'A' – 'Z'
Number keys	20 in number, 2 sets of numbers '0' - '9'
Punctuation keys	", :, !, ., ?, etc.
Function keys	12 in number, specified task assigned to them, labelled as F1, F2,..., F12
Arrow keys	4 in number, labelled with up, down, right, and left arrows
Symbol keys	@, #, $, %, etc.
Combination keys	Shift, Ctrl, Alt, etc.

Mouse

A mouse is a common pointing device, moving the cursor on-screen. It is for pointing, selecting, opening, gaming, and drawing. It has two buttons and a scroll wheel, an external hardware device.

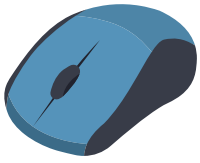


Fig. 1.6: Mouse

For Your Information

The first computer mouse was wooden.

Fig. 1.7: Microphone

Microphone

A microphone is an input device used to input voice data. It may be an internal or an external hardware device.

Trackball and Joystick

These are input devices used to play games. These also act as pointing devices. Trackball has a ball on the top and the joystick can be operated using its handle. Both are external hardware devices.

Fig. 1.8: Trackball

Fig. 1.9: Joystick

Fig. 1.10: Touch Screen

Touch Screen

A Touch Screen is an input device that allows you to enter data and instructions by touching the screen device like a tablet, smartphone, etc. It is an internal hardware device.

Scanner

Scanner is an input device. It is used to read data from pictures and papers. A scanner makes a soft copy from a hard copy of a document. It is an external hardware device.

Fig. 1.11: Scanner

Barcode Reader

A Barcode reader is an input device that reads barcodes to identify products. It is an external hardware.

Fig. 1.12: Barcode Reader

For Your Information

Barcodes are widely used in supermarkets for recording the sale of items quickly.

Fig. 1.13: Light Pen

Light pen

Light pen is an input device. It is a pen shaped pointing device. It needs a pad that can sense the movement of the pen. It's an external hardware device.

Printer

Printer is an output device. It is used to display pictures and/or data on a paper. This printed data or images are called **hard copy**. It can be both black and white or coloured. It is an external hardware device.

Fig. 1.14: Printer

For Your Information

Hardcopy is a physical, printed document or output from a computer.

Plotter

Plotter is an output device. It is a printer that prints your work on very large size of paper. It uses pen, pencil, or marker to do the printing. It is used to print banners, posters, hoardings, etc. It is an external hardware device.

Fig. 1.15: Plotter

Fig. 1.16: Headphone

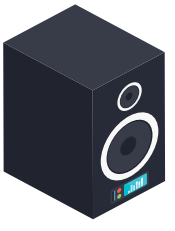


Fig. 1.17: Speaker

Speaker and Headphone

Headphones and speakers provide sound output for music, games, and conversations. Headphones are external, while speakers can be internal or external.

ICODE-DbZ7

STORAGE DEVICES

Devices that are used to store data and information on the computer are called storage devices. Different storage devices have different capabilities. These vary in

sizes, capacity, how they are connected with the computer system, etc. Some of the commonly used storage devices are:

Hard Disk

A hard Disk is an essential internal storage device that stores software and data, holding large amounts of information for the computer.

Fig. 1.18: Hard Disk

CD/ DVD

CD stands for **Compact Disc** and DVD stands for **Digital Versatile Disc** (Fig 1.19) are portable storage disks inserted into drives, offering less storage than hard drives or pen drives. CDs are external hardware devices.

Fig. 1.19: CD/DVD

Pen Drive

A pen drive, also known as a flash drive, is a portable device with more storage capacity than a CD or DVD. It connects to a computer's USB port, allowing easy data transfer between computers. Pen drives are external hardware devices.

Fig. 1.20: Pen Drive

SOFTWARE

ICODE-pN58

Software that cannot be seen or touched is essential for computer operation, consisting of programs that perform specific tasks, like drawing with Paint software.

It is a set of instructions, data, or programs used to operate computers and execute specific tasks.

There are two types of software:

1. System software
2. Application software

System Software

System Software is a computer program that is designed to run the computer hardware and application programs. For example, the operating system. It makes both the hardware and the software work together to complete a task.

Operating System

Operating System is a part of system software that can link between different parts of the computer and the user.

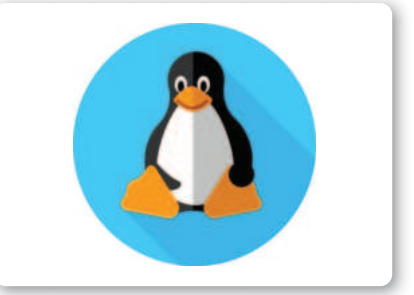



Fig. 1.21: Operating System [System Software]

Examples of operating system are Microsoft Windows, Mac OS, Linux, Microsoft Disk Operating System (MS DOS), etc.

Application Software

It is a software that allows you to do a specified type of business task.

For example, the applications that you can download on the phone, like different OTT platforms, gaming applications, etc., are the application software.

Some examples of application software that we have used so far are, Paint, Word, Wordpad, calculator, etc.

Fig. 1.22: Paint

Fig. 1.23: Word

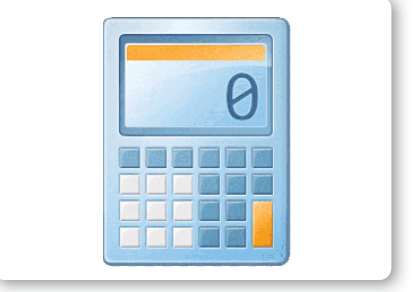


Fig. 1.24: Calculator

Let's do it

Problem Solving

Classify the given items as hardware or software

Paint	Printer	Pen Drive	CPU	Monitor
Keyboard	Wordpad	Windows 7	Mouse	Linux

Hardware	Software

IPO CYCLE

ICODE-UgTo

A computer follows the three-step process of **Input – Process – Output**.

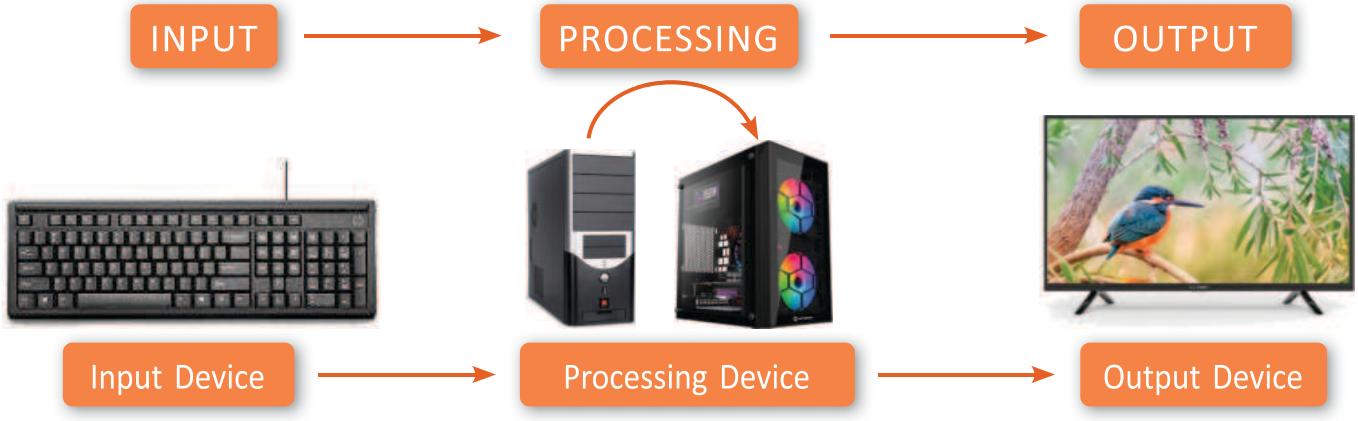


Fig. 1.25: IPO Circle

Input

The data and the instructions that are entered by the user into the computer is the input. The devices used to enter the input are called the input devices. Input can be text, numbers, pictures, sound, instructions, programs, etc.

Quick Tips

Producing output without input is impossible

Process

Processing means the work done by the CPU on data and instructions entered by the user.

Output

The result of processing is called the output. It is the meaningful information that is obtained after processing is completed.

For example, vegetables are bought from the market. Your mom cuts the vegetables, makes the food by following a recipe, and then the dish is ready.

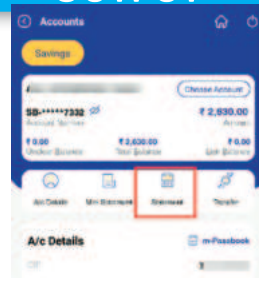
Cooking vegetables is a three step process:

INPUT	PROCESS	OUTPUT
		
Vegetables	Cooking	Cooked dish

Similarly, wheat to flour is also a three-step process:

INPUT	PROCESS	OUTPUT
		
Wheat	Flour Mill	Flour

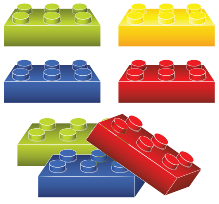
Every banking process is an IPO cycle, if you go to deposit some cash in your account:

INPUT	PROCESS	OUTPUT
		
Cash	Depositing	Deposit reflecting

Let's do it

Critical Thinking

Stages to make a Lego toy.



Blocks

Building a pyramid

Pyramid

Think and write one IPO cycle process on your own.

Sum-up

- A computer is a combination of hardware and software.
- Hardware is the physical part of the computer that you can see, touch and feel. It may be internal or external.
- There are three types of monitors, CRT, LCD, and LED.
- CPU has three components: ALU, CU, and MU.
- Software is a set of instructions given to the computer for working of each hardware. It may be a system software or an application software.
- A computer follows three basic steps, input-process-output, called the IPO cycle.
- Input is the data and instructions that are fed into the computer. Processing means working on the data. The output is the result of processing.

Time to Learn

A. Tick (✓) the correct answer.

1. Which of the following is a storage device?

   a. Pen drive ☐ b. Microphone ☐ c. Monitor ☐

2. IPO cycle stands for Input-Process-_____.

   a. Outward ☐ b. Output ☐ c. Outlay ☐

3. Which of the following is a system software?

a. Paint ☐ b. Word ☐ c. Windows ☐

4. Speakers are _____ devices.

a. Output ☐ b. Input ☐ c. Storage ☐

5. Which of these is not a pointing device?

a. Light Pen ☐ b. Mouse ☐ c. Keyboard ☐

6. What types of keys are Ctrl and Shift?

a. Alphabet keys ☐ b. Number keys ☐ c. Combination keys ☐

B. Fill in the blanks.

HINTS
monitor
Hardware
outside
CPU
Software
Microphone

1. _____ are the physical parts of the computer.
2. CRT is a type of _____.
3. _____ is used to record a sound.
4. _____ is the part of the computer that cannot be seen.
5. _____ is an essential internal hardware device.
6. External devices are located _____ the system cabinet.

C. State True (T) or False (F).

1. Plotter is a storage device. ☐
2. Operating system is a system software. ☐
3. CD/DVD is a processing device. ☐
4. Mouse is an external hardware device. ☐
5. CU stands for central unit. ☐

D. Write the full form of the following.

1. CRT _____
2. RAM _____
3. LED _____
4. LCD _____

E. Think and write.

1. I need to print banners to advertise my products. Which device should I use?
2. I am packing a gift for my friend. What are the input, process, and output here?
3. My friend is playing game on his computer. He is using a device that has a ball on the top. Which device is it?

F. Answer the following.

1. Differentiate between the system software and the application software.
2. What does the ALU do?
3. Explain IPO cycle.
4. Define Hardware.
5. Define Software.

ACTIVITY ZONE

Subject Enrichment

A. Write the same number in the given boxes to match the actions and complete the IPO cycle.

INPUT	PROCESS	OUTPUT
1 		
2 		
3 		

4 		

B. Name the following devices and identify them as input, output and storage types:

			
Device:	Device:	Device:	Device:
Type:	Type:	Type:	Type:

			
Device:	Device:	Device:	Device:
Type:	Type:	Type:	Type:

LAB ZONE

Experiential Learning

1. Identify the type of monitor that is used in your school lab.

2. Identify the hardware used in your lab. Each hardware has its own IPO cycle. Identify and write about it. One has been done for you.

Example:

Hardware	Input	Process	Output
Keyboard	Pressing a key	Character being typed	Typed character

Project

Creativity

- Make a collage of input devices, output devices, and storage devices.

Let's Discuss

Collaboration

- Divide the class into two teams. Each team challenges the other with an activity in which they have to identify the input, process, and output. The team that correctly identifies all the steps will be the winner.

Open-ended Assignment

Inference

- Can hardware work without software? Write in your own words.

Tips for Teacher

- Take the students to the computer lab and show them different types of hardware and categorise them as input, output, and processing devices.
- Discuss the ethics of handling these devices carefully.

As per NEP 2020 and NCF 2023

Based on Windows 7 and MS Office 2010

i-Boot

A Textbook of Computer Science

4

For ICSE Schools

By

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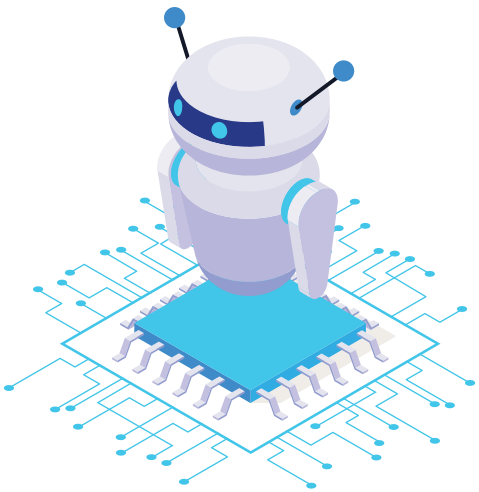
Inventant Education



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

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Introduction

Welcome to the world of **Inventant Education's** cutting-edge computer series, **i-Boot** designed to empower the learners from **classes 1 to 8** on their journey through the digital realm. The series is aligned as per the latest curriculum designed by the **Council for the Indian School Certificate Examination (CISCE) 2023**. It has been developed in accordance with the guidelines set forth by the **National Education Policy (NEP) 2020** and the **National Curriculum Framework (NCF) 2023**. In recent years, there has been a paradigm shift towards designing a learner-centric curriculum that is based on activity-based approach. So, in this series, we have incorporated key points from the NEP 2020 into practical activities, covering essential **21st Century Skills**, such as **My healthy Guide**, Computational Thinking, Artificial Intelligence, Robotics, National Cyber Olympiad, etc. Our chapters are also aligned with the six phases of logical understanding outlined in the NCF 2023, fostering skills in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

In today's digitally driven world, computer proficiency is not just a skill; it's a necessity. Whether you are a student, a professional, or someone looking to enhance your computer literacy, this series is your roadmap to mastering the fundamentals of **Windows 7** and **Microsoft Office 2010**. The world of computer systems and technology is continuously evolving and has touched virtually each and every aspect of your life. At **Inventant Education**, we are committed to nurturing the potential of young minds. More than a series of books i-Boot is a gateway to a future where the learners harness their talents and work diligently to excel in the computer world.

Core features of i-Boot series (for classes 1 to 8) are:

- **Learning Outcomes:** Describes the goals required to achieve at the end of the chapter
- **Think and Tell:** Enhances analytical abilities, stimulates memories and broadens the imagination
- **For Your Information:** Give extra and useful information on the topic being covered
- **Let's do it:** Helps the learners to recall and recapitulate the topic discussed
- **Quick Tips:** Gives a shortcut method of the topic being covered
- **Gather More:** Includes facts about the topic being covered
- **Sum-up:** Gives a brief summary of the topics being taught in the chapter
- **Time To Learn:** Includes a variety of questions to evaluate the knowledge of the learners
- **Activity Zone:** Encourages the learners to explore some real life use of the topics being covered
- **Lab Zone:** Gives instructions to the learners to perform various tasks in the lab
- **Tips for Teacher:** Gives suggestions to the teachers to make enhance teaching methods
- **Worksheets:** Comprehensive four test papers for thorough assessment
- **Project:** Challenging projects that apply learned concepts
- **Cyber Olympiad:** Sample paper for competitive advancement
- **Annexure:** A treasure trove of knowledge tidbits to inspire the learners

We believe that every learner should have the opportunity to become computer-savvy from a young age. This series is our contribution to making that goal a reality. We hope that learners will find it a valuable resource in their learning journey and it will inspire their curiosity and creativity. Any suggestions for improvement will be gratefully acknowledged.

With warm regards,

The Inventant Education Team

About the Series

Learning Outcomes

The goals to be reached by the end of the chapter

Quick Tips

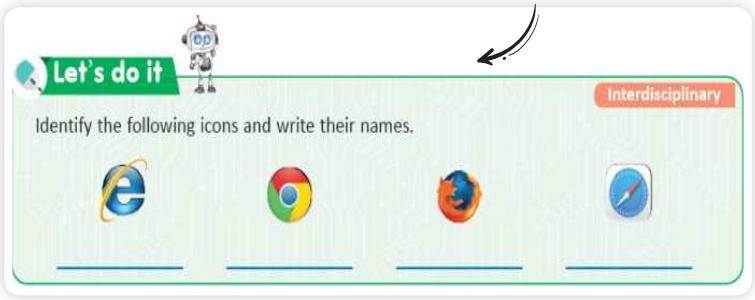
Gives a shortcut method of the topic being covered

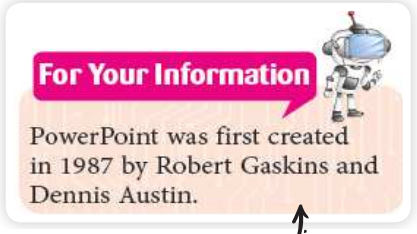
Think and Tell!

To exercise the powers of judgment, conception, or inference

Let's do it

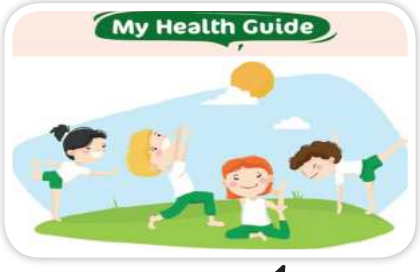
Helps the learners to recall and recapitulate the topic discussed





For Your Information

Some interesting pieces of knowledge related to the topic

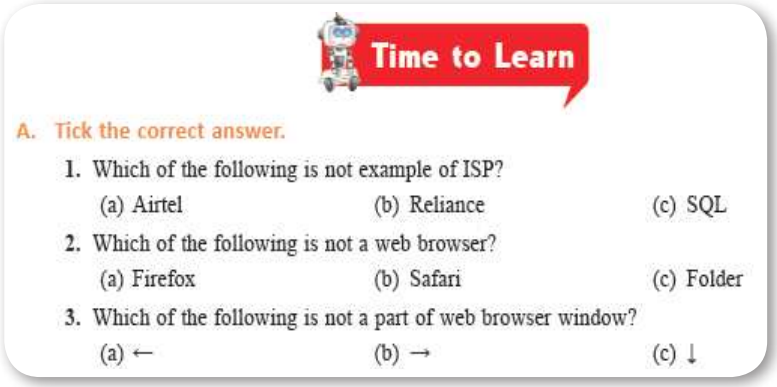


My Healthy Guide

Represents major food groups that contribute to the total diet

Sum-up

A summary of the concepts taught in the chapter

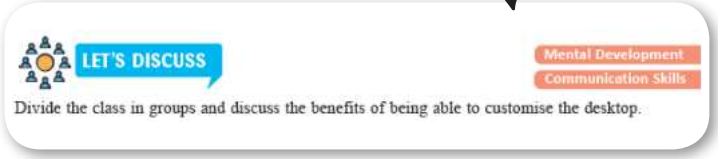


Time to Learn

Various kinds of questions to test the gained knowledge

Let's Discuss

A collaborative conversation for sharing ideas

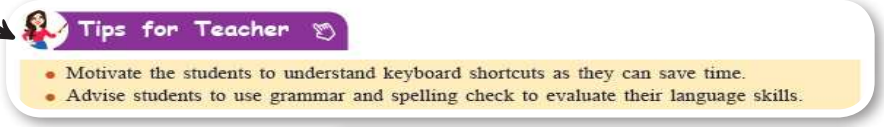


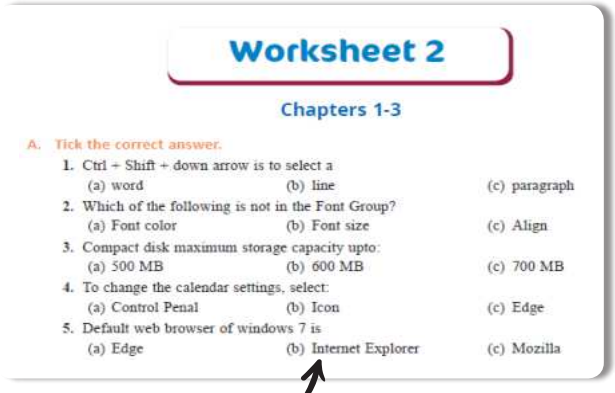
Activity zone

Practical activity to enrich student's knowledge

Tips for Teacher

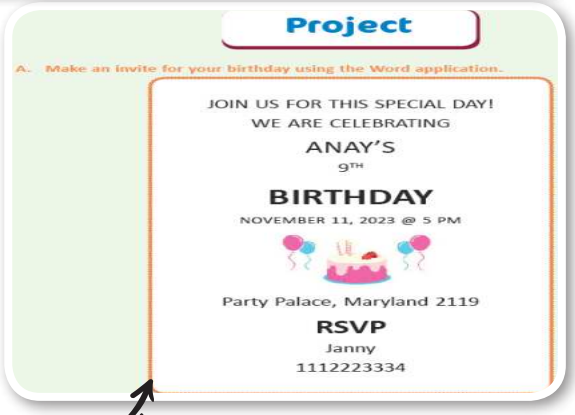
Guidance for educators to enhance teaching methods





Worksheets

Evaluate the learner's knowledge in a subject

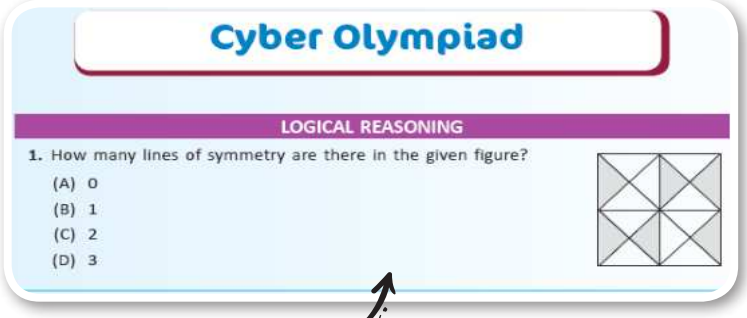


Project

Develops an inquisitive mind and become critical thinkers and problem-solvers

Coding with Code

Fun activity to enhance the thinking power



Cyber Olympiad

A competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

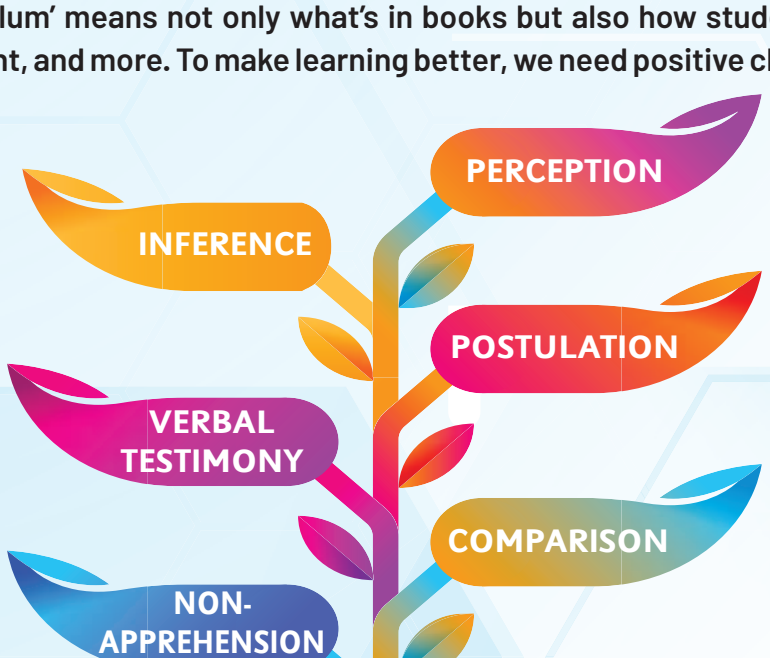
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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

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

Based on NCF 2023

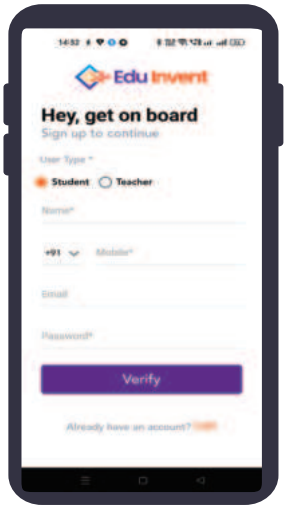
In this NCF, 'curriculum' means not only what's in books but also how students learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

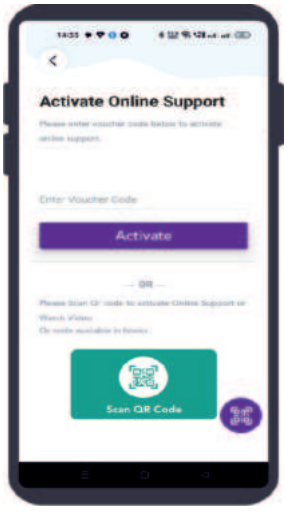


The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

1. For Mobile App Users Edu Invent





STEP 1 Download & Install

- 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.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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- Online Quiz
- Live Classes
- Webinars
- Study Materials and More
- Interactive exercises

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For any assistance, please reach us at info@inventanteducation.com
website www.inventanteducation.com

CONTENTS

1 Computers – Storage and Memory device

ICODE-Rifu

Learning Outcomes

The students will be able to:

- distinguish between the terms data and information;
- explain the purpose of internal and external memory;
- describe different data storage units;
- list the primary and secondary data storage devices.

A computer has a defined storage capacity and it can recall anything that is stored in that storage any time. You can choose what to store and what not to store in the computer memory. Unlike, a human brain which has an undefined memory capacity and to recall something may take time. Sometimes, humans tend to forget things as well. A human cannot choose what to remember and what to forget.

Think and Tell!

Remembered Perception

What should be kept where? Match the following.

Pens

Clothes

Vase

Luggage

Cabinet

Store room

Shelf

Pen stand

Each storage place listed here has a limited amount of space. A pen stand can contain only a few pens and only a couple of vases can be kept on the shelf.

1. Where do you store the information you get from reading, listening, watching, etc.?

   _____

2. How much information can you store there?

   _____

Data and Information

ICODE-fZFs

The numbers, figures, facts, measurements, observations, etc. that are fed into the computer through different mediums is called **data**. Information is the data that is obtained after processing. After the data is fed into the computer, it is processed, the output thus obtained on processing is called **information**. The data is raw and unorganised where as the information is useful and organised.

For example, if a survey is conducted in a class to know the favourite ice-cream of each child. Name of the ice-cream next to each child's name is data. Drawing the conclusion which is the most popular ice-cream is the information.

Computer memory

ICODE-Equk

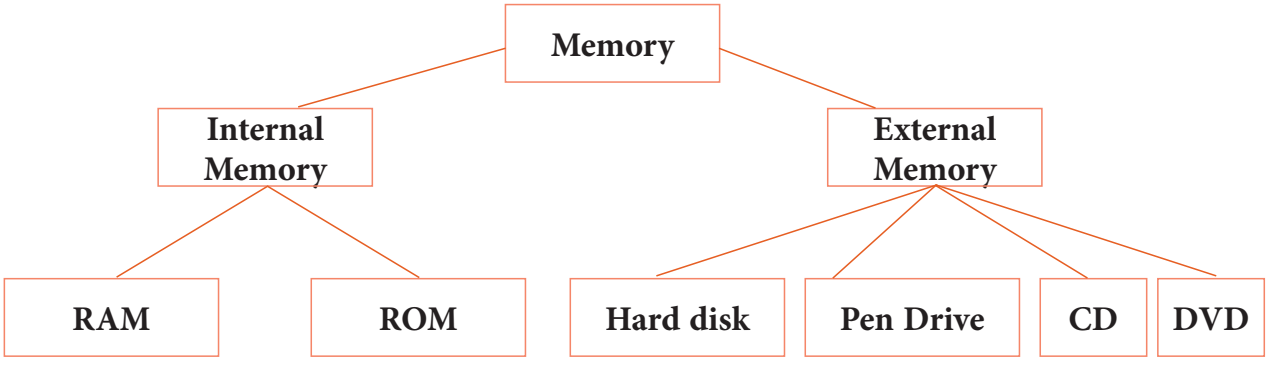
Computer memory is the space where computer stores data and information. To process the data and information, they are obtained from the memory and then returned to the memory. This task is done by the **CPU**. The CPU obtains the data from the memory, processes it and returns it to the memory as the output. A computer has both short term and long-term memory, just like us humans. The computer data leaves its memory only when it is deleted but a human memory tend to forget over a period of time.

The computer memory can store text, videos, pictures, etc. The computer memory stores data in the form of **0's** and **1's**. Here, **0** represents the **OFF** state and **1** represents the ON state. These digits, '0' and '1' are called **bi**nary digi**ts** or **bits**. The data stored in a computer is in the form of bits and the memory is measured in bytes. A **byte** is the smallest unit of computer memory.

8	bits	=	1 byte			
1024	bytes	=	1 kilobyte	=	1 KB	
1024	KB	=	1 Megabyte	=	1 MB	
1024	MB	=	1 Gigabyte	=	1 GB	
1024	GB	=	1 Terabyte	=	1 TB	
1024	TB	=	1 Petabyte	=	1 PB	
1024	PB	=	1 Exabyte	=	1 EB	
1024	EB	=	1 Zettabyte	=	1 ZB	
1024	ZB	=	1 Yottabyte	=	1 YB	

Types of Computer Memory

Every computer system has two types of memory: **Internal** and **External.**



Computer Memory

Internal Memory

The internal memory is also called the **primary memory** or the **main memory** of the computer. This memory is used to store data and instructions when the processing is being done and the instructions are being executed. The main memory is mounted on the electronic circuit board as **silicon chips**. This electronic circuit board is called the **motherboard**.

Primary memory can be of two types: **RAM** and **ROM.**

Random Access Memory (RAM)

RAM (Fig. 1.1) means that the processor can directly access any part of this storage anytime. This memory stores any information temporarily. It is a **volatile** memory as it loses all the data every time it is turned off. It stores data and programs that are currently running on the computer. The first program that loads into the RAM when a computer is turned on is the Operating System. It is the **fastest** memory. RAM comes in sizes like 2 GB, 4 GB, 6 GB, 8 GB, and so on. The capacity of RAM suggests how many programs can be run simultaneously on the computer. If more programs are opened then the system becomes very slow.

Fig. 1.1: RAM

For example, when we create a new word file and type in it. When this file is not yet saved, it exists in the RAM. If we close the word file without saving, this data is lost.

For Your Information

Primary memory is also known as Instant Access Storage (IAS).

Read Only Memory (ROM)

ROM (Fig. 1.2) means that the processor can only read this memory and cannot write or modify it. It is a **non-volatile** memory which retains the data and instructions even after the computer is turned off. This memory stores data and instructions that helps computer in the booting process i.e. the starting up and loading process of the system. This type of memory is more secure and stable.

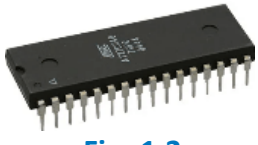


Fig. 1.2: ROM

Gather More

RAM can be upgraded but ROM cannot be.

For example, when you turn ON the computer, computer knows where to start booting the system. This information is stored in ROM.

External Memory

External memory is the memory that can store data and information and is not part of the internal memory. It is also called the **secondary memory** or the **auxiliary memory**. It is a non-volatile memory i.e. data in external memory doesn't get lost until they are deleted or the memory device is damaged.

For Your Information

- ROM stores processes like BIOS i.e. Basic Input Output System.
- In the early 1940s, memory technology often permitted a capacity of a few bytes.

Gather More

Hard disks are available upto a capacity as large as 20 TB.

It is used to store information for long period. External memory devices provide large amount of storage space as compared to the internal memory. Any program on a computer is stored in the secondary memory. When it is first loaded it is copied into the internal memory. Then the working on it is done.

For example, when we create a new Word file and type in it. When this file is not yet saved, it exists in the RAM. If we close the Word file without saving, this data is lost. When we save this file, from the RAM it goes to the secondary memory.

A computer may use different secondary storage devices like hard disk, pen drive, CD/ DVD, etc. Some may be fixed inside the CPU cabinet some may be used from outside, same may even need another device to be attached to use the storage device.

Let's study these.

Hard Disk

It is the main secondary storage unit that every computer must have (Fig. 1.3). The data on the hard disk is recorded on both sides of the disk. They store all the system data and programs. Traditionally these disks are fixed inside the CPU cabinet but nowadays portable disks are also available which connect to the USB port of the computer system. These are also called **external hard disks**. These hard disks are most commonly used for taking backup of the computer system and to port data. Hard disks come in various sizes based on their capacities, 512 GB, 1 TB, 2 TB, 5 TB, and so on.

Fig. 1.3: Hard Disk

Compact Disk (CD)

A CD is an acronym for **compact disc** (Fig. 1.4). It is an optical media for saving digital audio, graphics, text, video, etc. CDs are shiny circular disks that are **4.7 inch** in diameter and **1.2 mm** (0.05 inch) thick. It is made from hard plastic. It can store up to **700 MB** data. To play a CD on a computer system it needs to be inserted in the CD drive which is located on the front of the computer system. A CD may be read only (no changes can be made to it), **CD-R** (recordable; you can write data on this CD just once) or **CD-RW** (re-writable; you can change the data on a CD any number of times).

Fig. 1.4: CD

Fig. 1.5: DVD

DVD

A DVD is an acronym for **Digital Versatile Disc** or **Digital Video Disc** (Fig. 1.5). It is an optical media used for data storage and recording high quality videos and sound. A DVD looks like a CD in shape and size. It can store more data than a CD. It may store data that is 4.7 GB to 17 GB i.e. up to 6 times a CD. To play a DVD on a computer system it needs to be inserted in the DVD drive which is located on the front of the computer system. Every DVD drive supports a CD as well.

Blu-ray Disc

A Blu-ray disc is another type of optical disc that can store high-definition video and large amounts of data (Fig. 1.6). It looks similar to a CD and a DVD. It can store up to 25 GB of data and the dual side disk can store up to 50 GB data which is five times the DVD. It uses a blue-violet laser to read and write data.

Fig. 1.6: Blu-ray disc

For Your Information

Reynold B. Johnson invented a disk drive on 13 Sept 1956 and so he is considered to be the father of Disk Drive.

Gather More

Floppy disk is a now obsolete storage medium. It stored very small amount of data. It was invented by IBM.

Pen Drive

The other name for a pen drive is **USB Flash Drive** (Fig. 1.7). It is connected to the computer system by connecting it to the USB port (**Universal Serial Bus**) of the computer system. This port may be at the front or at the back of the computer system. It is a small and portable device.

The first pen drive had a storage capacity of 8 MB but now pen drives with storage capacity of over **1 TB** are also available.

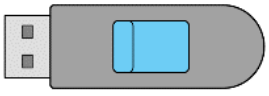


Fig. 1.7: Pen Drive

For Your Information

Pen drives were invented in 1999 by an Israeli company called M-Systems.

Memory Card

It is an electronic data storage device for storing digital information (Fig. 1.8). Memory card is the memory device for portable computers like mobile phones, cameras, etc. It allows to add memory to such devices. These memory cards can be used to transfer music, videos and images from the mobile phones, cameras, etc. to the computer system. Either there is a memory card slot on the system cabinet or a memory card reader that can be attached to the system to read the memory card. These cards are available in various storage capacities of up to 512 GB.

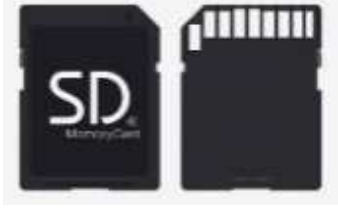


Fig. 1.8: Memory Card

Let's do it

Technology Literacy

Play a CD or a DVD.

First, you need to know what kind of disc drive your computer has. It could be a tray that slides out, a slot that you insert the disc into, or an external drive that you connect with a USB cable

1. You can usually find the disc drive on the side or front of your computer. Insert the disc into the disc drive. Make sure that the side with the label or writing is facing up.

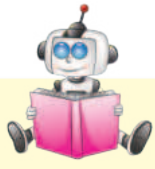
If you have a tray, press the eject button to open it and then place the disc inside. If you have a slot, gently push the disc into it until it clicks.

If you have an external drive, plug it into your computer and then insert the disc.

2. Now, choose what you want to do with the disc. Depending on your computer settings, you may see a menu pop up on your screen when you insert the disc.

   This displays the content of the CD/DVD or plays the audio or movie.

3. If the menu is not displayed on its own, double click on the CD/DVD drive and the content will be displayed.



Sum-up

- Data is the raw input given by the user and information is the processed data.
- Data is stored in the form of 0's and 1's, called bits.
- Byte is the smallest unit of computer memory.
- There are two main types of memory: Internal and External.
- RAM is volatile and stores data temporarily.
- ROM is non-volatile but very small amount of storage. Data in ROM cannot be changed.
- Hard disk, CD, DVD, Blu-ray disc, pen drive, Memory card, are a few of the external storage device.

TIME TO LEARN

A. Tick the correct answer.

1. Primary memory is installed on the _____.

(a) hard disk (b) motherboard (c) CPU

2. DVD stands for _____.

(a) Digital Versatile Disc (b) Disc Versatile Digital (c) Disc Verses Digital

3. The device that records data on both sides.

(a) Hard Disk (b) CD (c) Pen Drive

4. This is not a type of memory.

(a) Primary (b) Secondary (c) Premier

5. External memory device that is inside the CPU box.

(a) Hard disk (b) Pen drive (c) DVD

B. Fill in the blanks.

Hints Blu-ray | data | volatile | Memory card | Byte

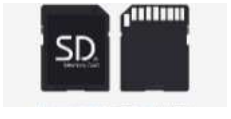
1. Information is obtained after _____ is processed.
2. _____ is the smallest unit of memory.
3. RAM is very _____ type of memory.
4. _____ is used in cameras and mobile phones to expand their memory.
5. _____ disk can store data up to 50 GB.

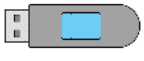
C. State True (T) or False (F).

1. Secondary memory is a volatile memory as it loses all data every time. ☐
2. Blu-ray disk uses blue-violet laser. ☐
3. A byte is the largest unit of computer memory. ☐
4. CD stands for compact drive. It is a small and portable device. ☐
5. ROM stands for Read Only Memory. ☐

D. Match the following.

1. RAM
2. Pen Drive
3. CD
4. ROM
5. Memory Card



E. Think and write.

1. Sanaya is taking pictures during her family trip. She wants to click more pictures but the memory of her camera is full. What would you suggest her to do?

2. Kavya is working on a paint window. She hasn't saved her drawing yet, where do you think her painting is getting saved temporarily?
3. Mohan could not finish his project work in the class. So, he wants to carry the softcopy of the project to his house to finish it. Which device will you suggest him to copy his work?

F. Answer the following questions.

1. Differentiate between RAM and ROM.
2. Define a Hard Disk.
3. List different disks and their storage capacities.
4. Differentiate between primary and secondary memory.
5. Define pen drive and memory card.

ACTIVITY ZONE

Language Skills

Inference

A. Unjumble the names of the devices and match.

RMRYPIA	_____	auxiliary memory
SCNDEYOAR	_____	main memory
MMREOYARDC	_____	memory device for cameras
ILEVOATL	_____	internal memory that is short lived
URYBLASKID	_____	disk that can store up to 50 GB data

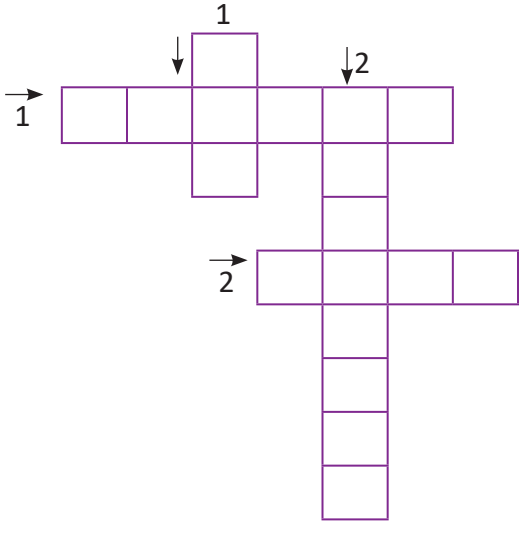
B. Solve the following crossword by filling the missing letters.

Across

1. Stores small amount of data and hardly used nowadays.
2. A type of CD that you may erase data of.

Down

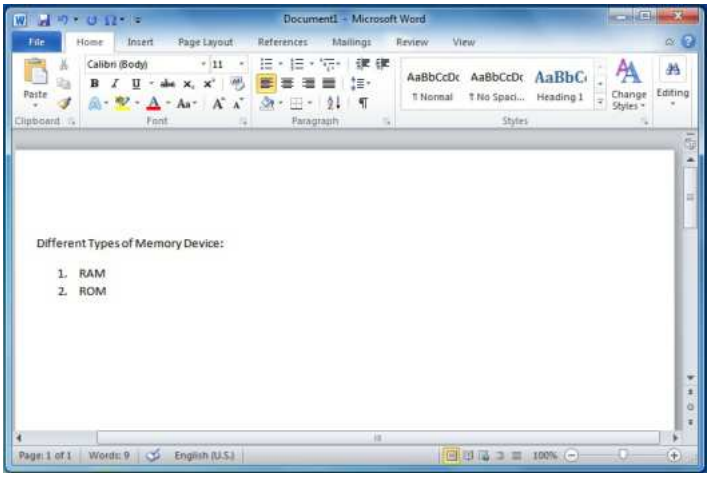
1. A non-volatile primary memory.
2. A small portable device to store data.

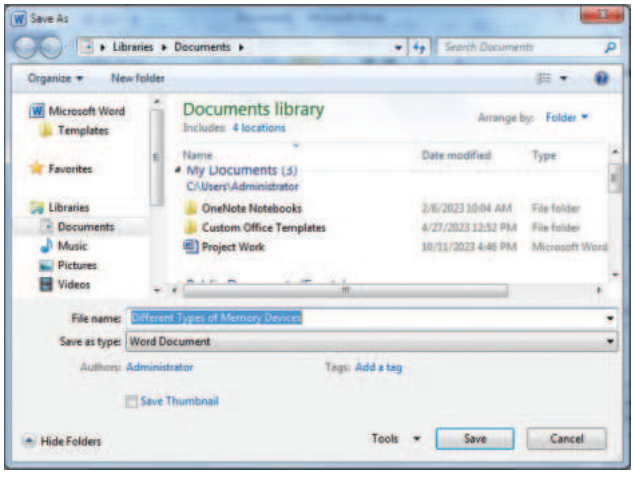


LAB ZONE

Technology Literacy

1. Open a word file and start working on it.
2. List different types of computer memory devices.





3. Now save the file and exit.
4. Check where the file gets saved and find out which memory device it is. Write about this experience in this Word file and save it.

LET'S DISCUSS

Communication Skills

Divide the class into groups and discuss about using different types of external memory.

Project

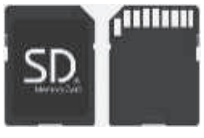
Creativity and Innovation

Draw a chart showing different types of memories and devices used for each.

Open ended Assignment

Analogy and Comparison

Arrange the following storage devices (1 to 4) in descending order of storage capacity.



Tips for Teacher

- Teacher should explain the different types of memory.
- Students should be told to do mathematics with the bits and bytes of computer memory.

As per NEP 2020 and NCF 2023

Based on Windows 7 and MS Office 2010

i-Boot

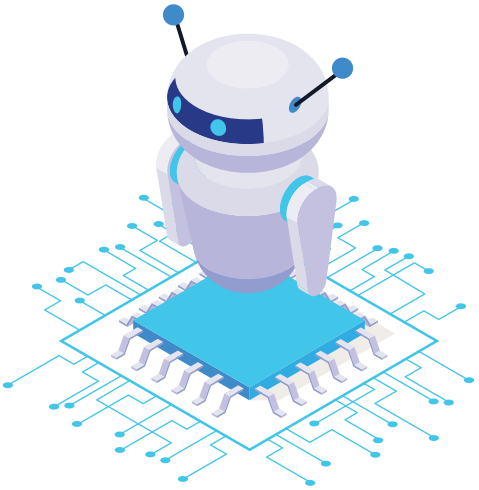
A Textbook of Computer Science

5

For ICSE Schools

By

Editorial Team
Inventant Education



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

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Introduction

Welcome to the world of **Inventant Education's** cutting-edge computer series, **i-Boot** designed to empower the learners from **classes 1 to 8** on their journey through the digital realm. The series is aligned as per the latest curriculum designed by the **Council for the Indian School Certificate Examination (CISCE) 2023**. It has been developed in accordance with the guidelines set forth by the **National Education Policy (NEP) 2020** and the **National Curriculum Framework (NCF) 2023**. In recent years, there has been a paradigm shift towards designing a learner-centric curriculum that is based on activity-based approach. So, in this series, we have incorporated key points from the NEP 2020 into practical activities, covering essential **21st Century Skills**, such as **My healthy Guide**, Computational Thinking, Artificial Intelligence, Robotics, National Cyber Olympiad, etc. Our chapters are also aligned with the six phases of logical understanding outlined in the NCF 2023, fostering skills in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

In today's digitally driven world, computer proficiency is not just a skill; it's a necessity. Whether you are a student, a professional, or someone looking to enhance your computer literacy, this series is your roadmap to mastering the fundamentals of **Windows 7** and **Microsoft Office 2010**. The world of computer systems and technology is continuously evolving and has touched virtually each and every aspect of your life. At **Inventant Education**, we are committed to nurturing the potential of young minds. More than a series of books i-Boot is a gateway to a future where the learners harness their talents and work diligently to excel in the computer world.

Core features of i-Boot series (for classes 1 to 8) are:

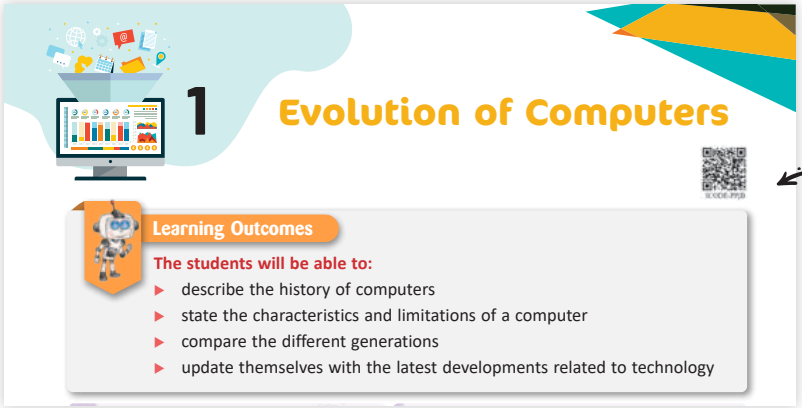
- **Learning Outcomes:** Describes the goals required to achieve at the end of the chapter
- **Think and Tell:** Enhances analytical abilities, stimulates memories and broadens the imagination
- **For Your Information:** Give extra and useful information on the topic being covered
- **Let's do it:** Helps the learners to recall and recapitulate the topic discussed
- **Quick Tips:** Gives a shortcut method of the topic being covered
- **Gather More:** Includes facts about the topic being covered
- **Sum-up:** Gives a brief summary of the topics being taught in the chapter
- **Time To Learn:** Includes a variety of questions to evaluate the knowledge of the learners
- **Activity Zone:** Encourages the learners to explore some real life use of the topics being covered
- **Lab Zone:** Gives instructions to the learners to perform various tasks in the lab
- **Tips for Teacher:** Gives suggestions to the teachers to make enhance teaching methods
- **Worksheets:** Comprehensive four test papers for thorough assessment
- **Project:** Challenging projects that apply learned concepts
- **Cyber Olympiad:** Sample paper for competitive advancement
- **Annexure:** A treasure trove of knowledge tidbits to inspire the learners

We believe that every learner should have the opportunity to become computer-savvy from a young age. This series is our contribution to making that goal a reality. We hope that learners will find it a valuable resource in their learning journey and it will inspire their curiosity and creativity. Any suggestions for improvement will be gratefully acknowledged.

With warm regards,

The Inventant Education Team

About the Series

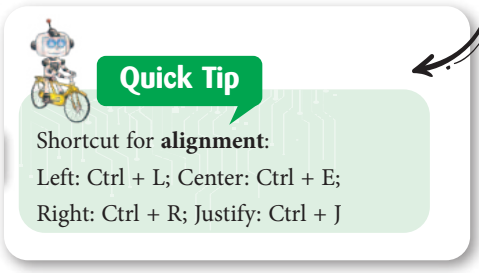


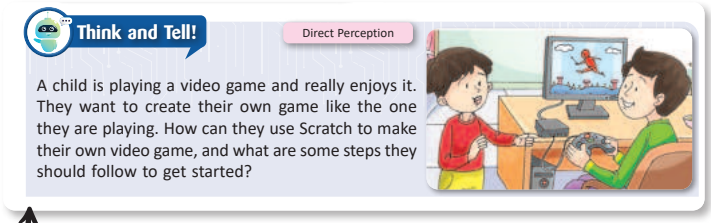
Learning Outcomes

The goals to be reached by the end of the chapter

Quick Tips

Gives a shortcut method of the topic being covered



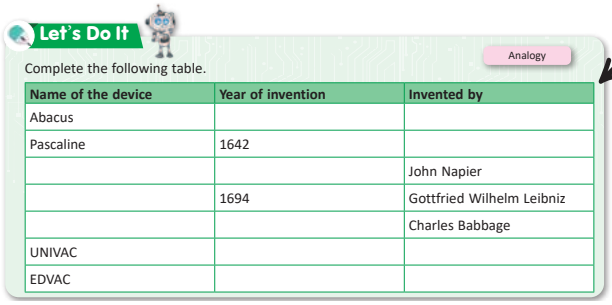


Think and Tell!

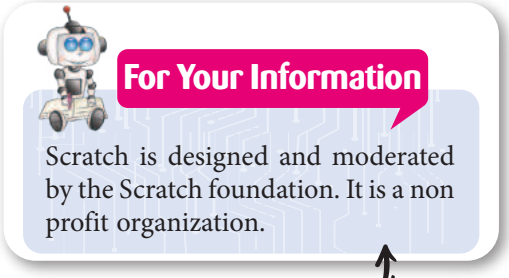
To exercise the powers of judgment, conception, or inference

Let's do it

Helps the learners to recall and recapitulate the topic discussed

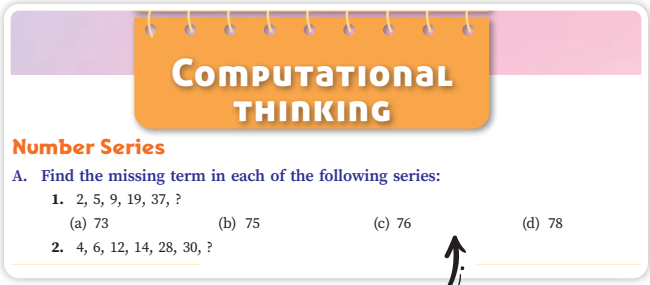


Name of the device	Year of invention	Invented by
Abacus		
Pascaline	1642	
		John Napier
	1694	Gottfried Wilhelm Leibniz
		Charles Babbage
UNIVAC		
EDVAC		



For Your Information

Some interesting pieces of knowledge related to the topic

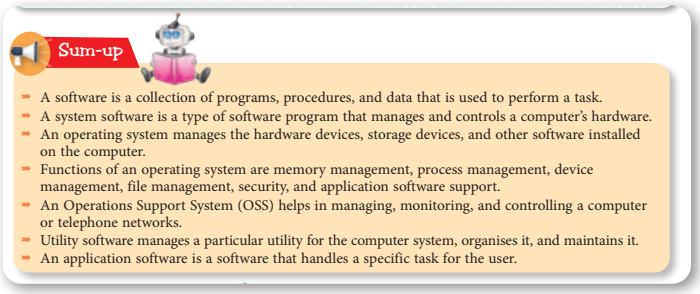


Computational Thinking

Emphasises thinking or problem solving ability

Sum-up

A summary of the concepts taught in the chapter



TIME TO LEARN

A. Tick (✓) the correct answer.

1. All software on the computer depend on this software.
   (a) Operating system (b) Application (c) Word
2. Which of the following is not a type of utility software?
   (a) File management (b) Disk Management (c) Notebook management
3. Which of the following is used to Defragment disk?
   (a) Cleanup (b) Defragmentation (c) Compression

Time to Learn

Various kinds of questions to test the gained knowledge

ACTIVITY ZONE

Collaboration

- Make 2 students each in one group and do the Lab activity given below and see whose document stole the show.
  - Set the margins to top, bottom, left, right all to 1
  - Write 100 words essay on your school.
  - Insert a watermark with the text "your school name" diagonally on your document.
  - Set the page orientation to be "Landscape"

Activity zone

Practical activity to enrich student's knowledge

Let's Discuss

Creativity/Critical thinking

- Discuss different drawing tools. Also, discus the Draw tab and its uses.

Let's Discuss

A collaborative conversation for sharing ideas

Tips for Teacher

Guidance for educators to enhance teaching methods

Tips for Teacher

- Share real-life examples of computers from each generation.
- Explain the key characteristics of each generation, including their size, speed, etc..

WORKSHEET 1

Chapters 1–3

A. Fill in the blanks.

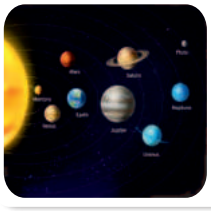
1. Pascaline is also known as Pascal's _____ Machine.
2. ENIAC stands for Electronic Numeric _____ and Calculator.
3. The _____ software manages and controls computer hardware.
4. Macintosh is a _____ software.
5. _____ is the character that is smaller in size and written lower.

Worksheets

Evaluate the learner's knowledge in a subject

Project 4

Make a PowerPoint presentation describing the solar system.



Project

Develops an inquisitive mind and become critical thinkers and problem-solvers

Have Fun Coding Blockly

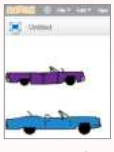
Program Outline: Racing of two cars. If one of the cars touches the edge of the stage will say"I WIN THE RACE" for 10 seconds. Perform the following program step-by-step a view the output of the game.

To make this game, a number of steps are to be followed.

STEP I: Delete the Cat Sprite

STEP II: Insert two new cars sprites namely

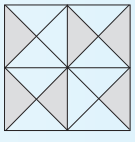

Convertible 1 and 
Convertible 2 .


Two new sprites on the stag

Cyber Olympiad

LOGICAL REASONING

1. How many lines of symmetry are there in the given figure?
   (A) 0
   (B) 1
   (C) 2
   (D) 3



Cyber Olympiad

A competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

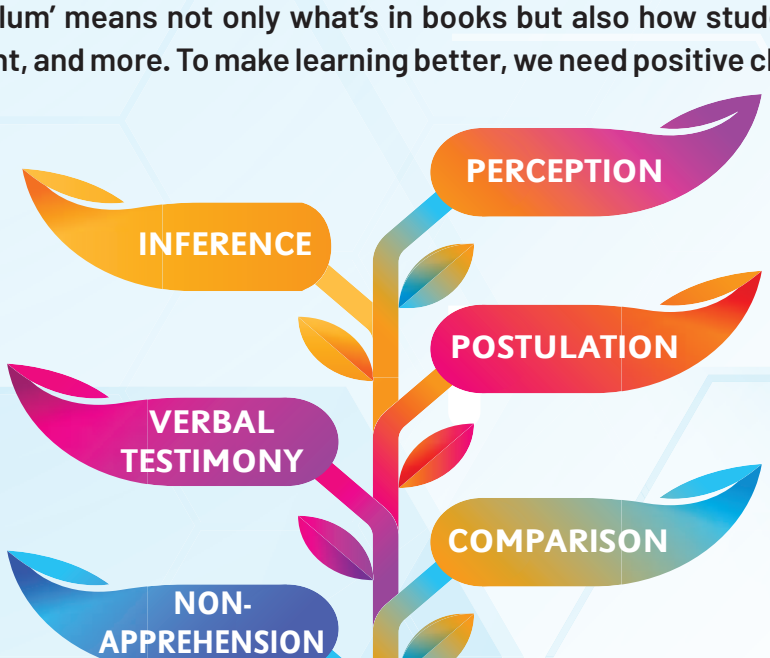
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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

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

Based on NCF 2023

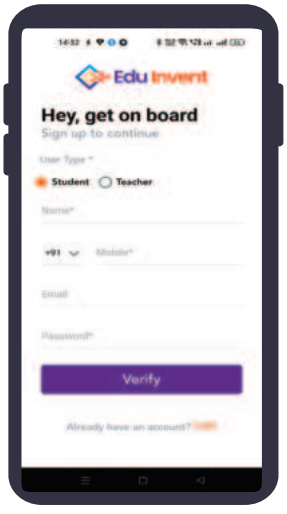
In this NCF, 'curriculum' means not only what's in books but also how students learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

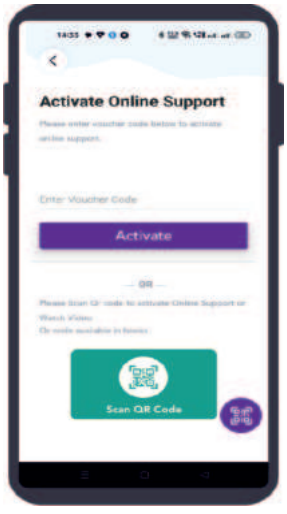


The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

1. For Mobile App Users Edu Invent





STEP 1 Download & Install

- 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.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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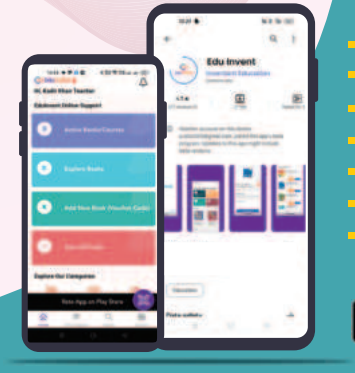

Key Features

- Scan and Learn
- Video Lessons/Animated Lessons
- Online Quiz
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- Study Materials and More
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For any assistance, please reach us at info@inventanteducation.com
website www.inventanteducation.com

CONTENTS

1 Evolution of Computers

ICODE-PPJB

Learning Outcomes

The students will be able to:

- describe the history of computers
- compare the different generations
- state the characteristics and limitations of a computer
- update themselves with the latest developments related to technology

Think and Tell!

Which type of Monitor is used in the given picture?

In today's world, computers are an essential part of one's everyday life. Computers have impacted human life immensely. But it wasn't always so. At first, computers were huge in size and capable of just doing calculations, but now with the evolution of computers, they have become compact and portable, perform more complicated tasks, become faster, store more data, display better graphics, and enable better communication. Computers are now being used at homes, offices, banks, railway stations, airports, hospitals, schools, restaurants, and so on.

As soon as a child is born, the birth registration is done in hospital records on a computer, and thereafter in every aspect of life a computer is either used for them or by them.

The term computer is obtained from the Latin word **computare** which means to 'calculate' or 'count'. A computer was named a computer in the 17th century.

Let's learn about the evolution of computers.

ICODE-9PXg

EVOLUTION OF COMPUTERS

The evolution of computers spans many centuries. This evolution is both in terms of hardware and software. From the invention of an abacus in around 3000 BC to the computers we use today it has been a fascinating journey. Foremost is the difference in how they look, Fig. 1.1.

Fig. 1.1: Evolution of computers

Early Computing Devices

Computers started with very simple computing devices that were used for calculations.

Abacus

- The abacus is also known as a **counting frame**. It is a hand- operated tool used since ancient times and developed in China about 5000 years ago.
- It has slidable beads arranged on vertical rods divided into two parts: Heaven and Earth.
- Heaven, is the top part of the abacus, has two beads. The Earth, is the bottom part of the abacus, has 5 beads as in Fig. 1.2.
- It is used to teach basic math operations and helps in developing mental arithmetic skills.
- It also helps in improving memory and concentration.

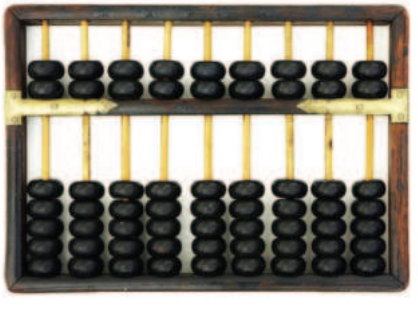


Fig. 1.2: Abacus

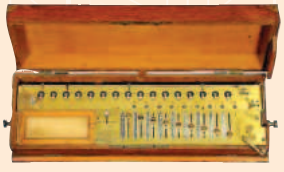
Pascaline

- It is a mechanical calculating device invented in 1642 by Blaise Pascal, a French Mathematician.
- It could only perform addition and subtraction up to 8 digits using its gears, wheels, and dials as in Fig. 1.3.
- It is also known as **Pascal's Adding Machine**.
- It allows carrying and borrowing in arithmetic operations.

Fig. 1.3: Pascaline

Gather More

Arithmometer was the first commercial calculating device. It was invented by Charles Xavier in 1820.



Napier Bones

- It was invented by John Napier in 1617, a Scottish mathematician.
- It has nine 3D square rods with numbers 1–9 engraved on the left edges as in Fig. 1.4.
- Each rod contains 9 squares with a single digit and multiples.
- It performs multiplying numbers with Napier's rods, reading products on diagonal lines.
- There is no rod for the number 0 in the set, as it is not needed for calculations involving these rods.

Fig. 1.4: Napier Bones

Leibniz Calculator

- Also known as the Stepped Reckoner is a mechanical calculator invented by Gottfried Wilhelm Leibniz in 1694.
- It was the first device that could perform all four basic math operations.
- It was an extension of the Pascaline as in Fig. 1.5.
- It could handle calculations up to 16 digits.

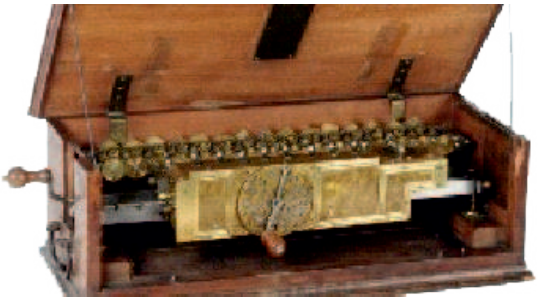


Fig. 1.5: Leibniz Calculator

Difference Engine and Analytical Engine

- In the 19th century, Charles Babbage designed two mechanical computers namely, differential engine and analytical engine.
- Difference engine was designed in 1823 to solve complex functions and calculations (Fig. 1.6).
- Analytical engine was designed in 1834 as a general-purpose computer that could perform any calculation (Fig. 1.7).

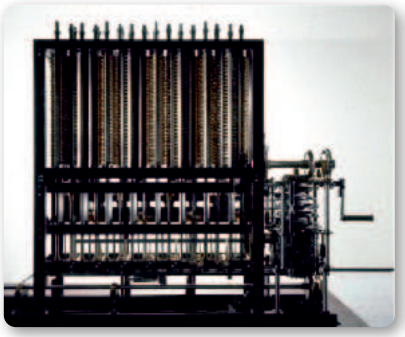


Fig. 1.6: Difference Engine

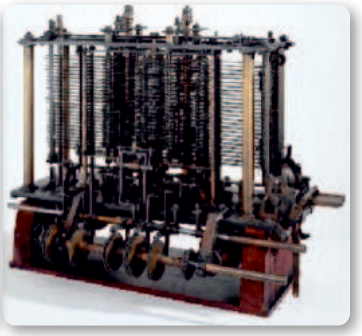


Fig. 1.7: Analytical Engine

- Both these were visionary and influential inventions but they were complex and very expensive to build. They had many challenges technically and financially and were not publicly accepted.

Tabulating Machine:

- In 1890s Dr. Herman Hollerith developed the first machine that could process data stored on punched cards (Fig. 1.8).
- It could read, sort, and print the cards and perform simple calculations such as counting and adding.
- Punched cards were used to input, output, and store data for computers and machines.

Fig. 1.8: Tabulating Machine

Gather More

A punched card is a piece of paper that has holes punched in it to store digital data.

For Your Information

Charles Babbage is the Father of Computers.

Mark 1

- It was designed by Howard Aiken in 1944 at IBM.
- It is known as the Harvard Mark 1 or IBM Automatic Sequence Controlled Calculator (ASCC).
- It was 50 feet long and had 7,50,000 parts as in Fig. 1.9.
- It was the first fully automated digital computer.
- It influenced the design of the computer built after this.

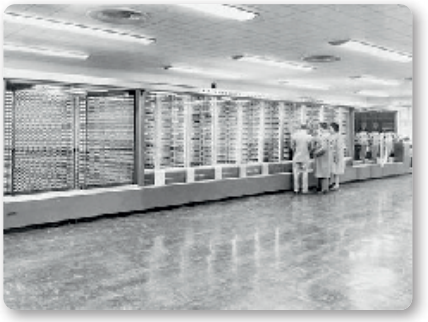


Fig. 1.9: Pascaline

ENIAC

- ENIAC stands for **Electronic Numeric Integrator and Calculator**.
- It was designed by John Mauchly and J. Presper Eckert in 1946.
- It was 1000 times faster than the Mark 1.
- It was the first programmable general purpose electronic digital computer.
- It was an 1800 square feet machine with 18000 vacuum tubes as in Fig. 1.10.

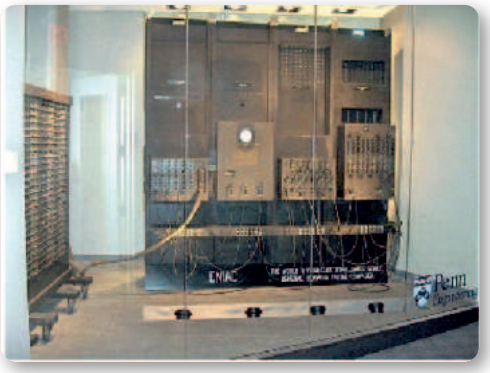


Fig. 1.10: ENIAC

For Your Information

EDSAC: Electronic Delay Storage Automatic Computer
It was an early British computer built at University of Cambridge.
It was inspired by EDVAC.

EDVAC

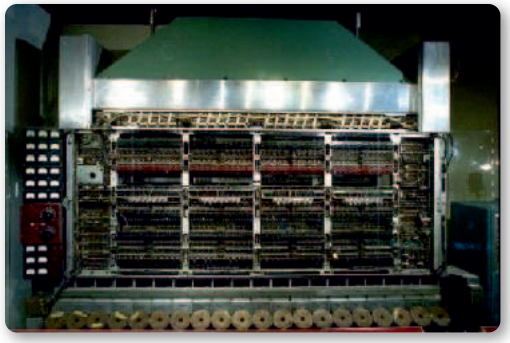


Fig 1.11: EDVAC

- EDVAC stands for **Electronic Discrete Variable Automatic Computer** (Fig. 1.11).
- It was built by Moore School of Electrical Engineering in Pennsylvania.
- It stored data and instructions in binary mode.
- It had memory of 5.6 Kb.
- It was used for scientific and military applications.

UNIVAC1

- UNIVAC 1 stands for **Universal Automatic Computer** *1* (Fig. 1.12).
- It was designed by John Mauchly and J. Presper Eckert in 1951.
- It was the first computer to handle both numeric and text data.
- It was equipped with a magnetic tape unit and a buffer memory and was the first computer to do so.

Fig. 1.12: UNIVAC1

Let's Do It

Subject Enrichment

Complete the following table.

Name of the device	Year of invention	Invented by
Abacus		
Pascaline	1642	
		John Napier
	1694	Gottfried Wilhelm Leibniz
		Charles Babbage
UNIVAC		
EDVAC		

GENERATIONS OF COMPUTERS

ICODE-UogC

There are five generations of computers that are broadly marked by the development of technology in hardware and software. Each generation shows significant change in technology. The reduction in size of devices, the increase in speed, capability, and storage space over generations have proved to be significant. The five generations of computers are:

First Generation (1940-1956)

Fig. 1.13: Vacuum Tubes

- The first generation of computers used **vacuum tubes** (Fig. 1.13). These vacuum tubes produced a large amount of thermal energy i.e. the energy from heat.
- These computers were **expensive** and **big** in size but very **slow**.
- Examples are UNIVAC 1, EDVAC, and ENIAC.
- These computers solved only one problem at a time and were dependent on machine language.

Storage medium	Input medium	Output medium
Magnetic drums	Punched cards and paper tapes	Printouts

For Your Information

A vacuum tube is a glass tube win is gas removed creating a vacuum.

Second Generation (1956-1963)

- The second generation of computers used **transistors** (Fig. 1.14) and magnetic core. These transistors could amplify or switch electrical signals. Magnetic core memory used tiny magnetic rings to store binary data.
- These computers were cheaper, and smaller in size, and faster.
- Examples are IBM 1920, IBM 7094, CDC 1604, etc.
- These computers enabled easier programming and assembly languages and high-level languages like **FORTRAN** and **COBOL** were introduced.

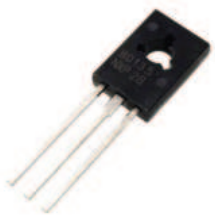


Fig. 1.14: Transistors

Storage medium	Input medium	Output medium
Magnetic core and tapes	Punched cards and paper tapes	Printouts

For Your Information

Transistors were invented in 1947 by John Bardeen, Walter Brattain, and William Shockley.

Third Generation (1963-1971)

- The third generation of computers emerged due to the invention of **integrated circuits** (IC) (Fig. 1.15).

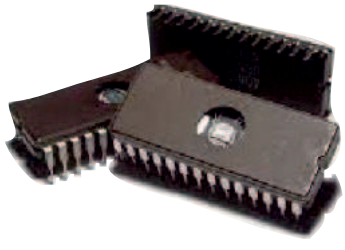


Fig. 1.15: Integrated Circuits

For Your Information

Christopher Latham Sholes invented the first keyboard.

Storage medium	Input medium	Output medium
Magnetic core and tapes	Keyboard	Monitors and printers

- These computers were cheaper, had huge storage capacity, much smaller in size and much faster.
- Examples are IBM 360, Apple 1, Apple 2C, Altair, etc.
- These computers used high-level programming languages.

Fourth Generation (1971-Present)

Fig. 1.16: VLSI

- The fourth generation computers use **microprocessors** that are based on very large-scale integrated circuits (VLSI) (Fig. 1.16). These computers are also linked together and they share storage, data, and information, and are used for entertainment as well.
- The These computers are cheapest, have huge storage capacity, became portable and much faster.
- The examples are personal computers, tablets, laptop, etc.
- These computers use high-level programming languages and Graphical User Interface.

For Your Information

Microprocessors were invented by Mercian "Ted" Hoff in 1971.

Storage medium	Input medium	Output medium
Magnetic disks	Keyboard, mouse, scanner	Monitors, printers, speakers, etc.

Fifth Generation (Present and beyond)

Fig. 1.17: ULSI

- The fifth generation computers are based on artificial intelligence and parallel computing. These are based on **ultra-large-scale integrated circuits** (ULSI) (Fig. 1.17).
- These computers are still under development phase. There are some applications that are being used today.
- The fifth-generation computers aim to respond to natural language and behave like humans. The goal is to create systems that are self-learning and organising.

For Your Information

John McCarthy is the father of artificial intelligence.

Storage medium	Input medium	Output medium
Magnetic disks and cloud storage	Touchscreens, voice commands, gesture commands	Advanced monitors, printers, speakers, etc.

CHARACTERISTICS OF A COMPUTER

ICODE-PSu6

A computer system can be characterised into the following competencies:

Speed: A computer works very fast and can solve the most complex problems in a fraction

of a second. It can do billions of calculations in seconds that humans cannot match. The speed of a computer is calculated on the basis of the number of instructions it can execute per second. The speed of a computer is measured in **gigahertz** (GHz).

Accuracy: Accuracy is the ability to give correct results. If the input and instructions given to a computer are correct, the result will be 100% accurate. The accuracy depends on the program and the processor using the program. A computer doesn't make mistakes unless there is an error with the hardware or the software.

Diligence: It is the ability to work for long durations without getting tired. Since the computer is a machine, it doesn't get tired, stressed, or fatigued. It doesn't need to rest.

Versatility: The ability to perform different kinds of tasks with utmost accuracy and efficiency is called versatility. A computer can perform tasks in different fields like education, research, business, etc. accurately and efficiently.

Reliability: It refers to the performance of the computer according to the specification without facing a system failure. A computer must not crash, reboot, or show errors that pose obstruction in the user's work.

Storage: Storage of a computer tells how much information or data can be stored on a computer. This data can be used anytime. Computers now a days store large amounts of data and portable storage mediums are also available.

Battery/Power: Computers are electronic devices and they operate on electricity. There are certain computer devices that have an inbuilt chargeable battery, this battery acts as the source of power for the computer.

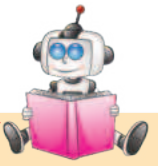
Multitasking: Multitasking refers to the ability to run multiple tasks at the same time. It enhances the performance of a computer. Computers are capable of seamlessly multitask.

LIMITATIONS OF A COMPUTER

Computer is a powerful machine but it does have some limitations.

1. **Lack of common sense:** Computers work on instructions given by the user. It cannot take its own decisions and depends on humans for instructions. A computer cannot act on situations if these are not programmed into them.
2. **No feelings:** A computer doesn't have any feelings and does not understand emotions.
3. **Lack of decision-making:** Computers cannot make their own decisions, it needs human interference at every step.
4. **Dependence on power:** The computers depend on electricity to work. No electricity means no computers.

Sum-up



- Abacus was the first computing device invented in China 5000 years ago.
- Pascaline, Napier Bones, Leibniz calculator, are all calculating devices.
- Charles Babbage is the father of computers. He designed differential and analytical engines.
- Mark 1 was the first computer.
- ENIAC, EDVAC, UNIVAC1, are some of early computers.
- First generation of computers used vacuum tubes.
- Second generation of computers used transistors.
- Third generation computers used integrated circuits.
- Fourth generation of computers use microprocessors.
- Fifth generation of computers is based on Artificial intelligence and is under development.
- Computers can be characterised on the basis of their speed, accuracy, diligence, versatility, reliability, ability to multitask, and storage capacity.
- Limitations of a computer are lack of common sense, feelings, and decision making. It is dependent on humans and electricity.

TIME TO LEARN

A. Tick (✓) the correct answer.

1. Which device was invented by John Napier?

(a) Napier Bone (b) Napier Stick (c) Napier Calculator

2. The 50 feet long machine is

(a) Abacus (b) Mark 1 (c) ENIAC

3. Which of the following is a generation 1 machine?

(a) EDVAC (b) Apple 1 (c) IBM 1920

4. Keyboard was introduced in this generation.

(a) Fourth (b) Second (c) Third

5. Fifth generation of computers is based on

(a) Artificial Intelligence (b) VLSI (c) Microprocessors

B. Fill in the blanks.

Hints EDVAC | abacus | fourth | punched cards | Charles Babbage

1. The first calculating device was _____.
2. _____ is the father of computers.
3. _____ has a memory of 5.6 kb.
4. Second generation used _____ as input device.
5. The VLSI are used in _____ generation computers.

C. State True (T) or False (F).

1. Pascaline is also called Pascal's Calculating Machine.
2. Tabulating machine was the first machine based on punched cards.
3. UNIVAC 1 was equipped with buffer memory.
4. Third generation computers were based on microprocessors.
5. Computers can make their own decisions.

D. Match the following.

1. First device to perform all four basic operations	(a) ENIAC
2. Device with 1800 vacuum tubes	(b) Generation 3
3. Machines with transistors	(c) Generation 5
4. Monitors	(d) Leibniz Calculator
5. Parallel Computing	(e) Generation 2

E. Think and write.

1. Ashish has forgotten the name of the inventor of an early calculating device that can multiply, divide, and find square roots. This device has 9 rods. Can you help?
2. Kyrah is forgetting the name of the inventor of differential and analytical engines. He is also known as the father of computers. Can you tell her?
3. Simran was telling her friend about Mark 1. She forgot where it was developed. Can you help her?
4. Shruti was preparing a chart for different generations when Simran asked her which generation laptops belong to. Can you answer that?

F. Answer the following questions.

1. List the limitations of a computer.
2. Write 3 characteristics of a computer.
3. Write the input, storage, and output devices that are being used in generation 5 of computers.
4. Write a note on generation 4 computers.
5. Write a note on differential and analytical engines.
6. Write a note on UNIVAC 1.
7. Describe Pascal's adding machine.

ACTIVITY ZONE

Problem Solving

A. Find the different technologies on which the five generations of computers are based.

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

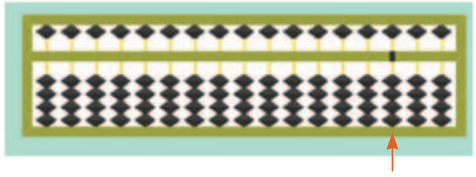
B. Fill in the input, output, and storage devices used in different generations of computers.

	Generation	Input	Storage	Output
1	First			
2	Second			
3	Third			
4	Fourth			
5	Fifth			

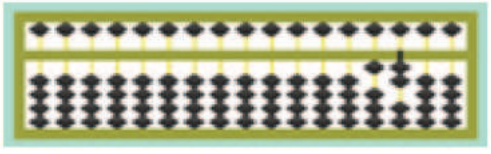
LAB ZONE

Digital Literacy

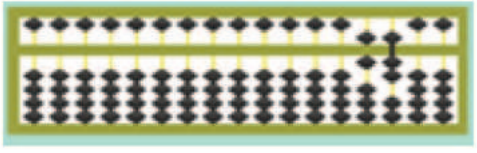
1. Use an abacus and try to add and subtract numbers using it.
2. To use an online abacus, visit this webpage https://supermaths.co.uk/online-virtual-abacuses/



Every bead on the Heaven counts for 5 and every bead on the Earth counts for 1. The units place is marked with an arrow.



This abacus represents a 12



This represents a 67.

Let's Discuss

Collaboration

- Divide the class in groups and discuss the characteristics and limitations of a computer.

Project

Creativity

- Make a collage showing computers of 1970s, 1980s, 1990s, and 2000s look.

Open-ended Assignment

Mental Development

- Find out more about the Fourth-generation computers.

Tips for Teacher

- Share real-life examples of computers from each generation.
- Explain the key characteristics of each generation, including their size, speed, etc..

As per NEP 2020 and NCF 2023

Based on Windows 7 and MS Office 2010

i-Boot

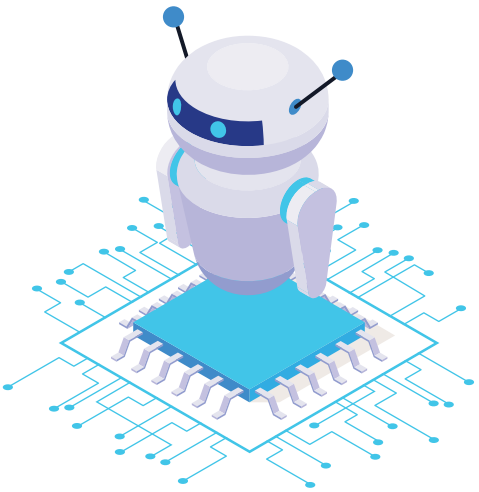
A Textbook of Computer Science

6

For ICSE Schools

By

Editorial Team
Inventant Education



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Present Meets Future
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Introduction

Welcome to the world of **Inventant Education's** cutting-edge computer series, **i-Boot** designed to empower the learners from **classes 1 to 8** on their journey through the digital realm. The series is aligned as per the latest curriculum designed by the **Council for the Indian School Certificate Examination (CISCE) 2023**. It has been developed in accordance with the guidelines set forth by the **National Education Policy (NEP) 2020** and the **National Curriculum Framework (NCF) 2023**. In recent years, there has been a paradigm shift towards designing a learner-centric curriculum that is based on activity-based approach. So, in this series, we have incorporated key points from the NEP 2020 into practical activities, covering essential **21st Century Skills**, such as **Fun with AI, Board Game**, **Computational Thinking**, **Cyber Olympiad Questions**, etc. Our chapters are also aligned with the six phases of logical understanding outlined in the NCF 2023, fostering skills in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

In today's digitally driven world, computer proficiency is not just a skill; it's a necessity. Whether you are a student, a professional, or someone looking to enhance your computer literacy, this series is your roadmap to mastering the fundamentals of **Windows 7** and **Microsoft Office 2010**. The world of computer systems and technology is continuously evolving and has touched virtually each and every aspect of your life. At **Inventant Education**, we are committed to nurturing the potential of young minds. More than a series of books i-Boot is a gateway to a future where the learners harness their talents and work diligently to excel in the computer world.

Core features of i-Boot series (for classes 6 to 8) are:

- **Chapter Objectives:** Describe the goals requires to achieve at the end of the chapter
- **Short & Crisp:** Provide a short overview of the chapter's content
- **Before We Start:** Enhances analytical abilities, stimulates memories and broadens the imagination
- **Note:** Includes facts about the topic being covered
- **Know More:** Give extra and useful information on the topics being covered
- **Inter-Disciplinary (English):** Helps the learners to relate the concept in easy way
- **Try Now:** Helps the learners to recall and recapitulate the topic discussed
- **Group Discussion:** Encourage learners to participate in order to obtain a deeper understanding of subject
- **Keyboard Shortcuts:** Provide keyboard shortcuts to improve computer skills
- **In a nutshell:** Gives a brief summary of the topics being taught in the chapter
- **Brain Exercises:** Includes a variety of questions to evaluate the knowledge of the learners
- **Case Study Based Questions:** Encourages the learners to explore some real life use of the topics being covered
- **Activity Time:** Encourages the learners to develop their imagination and creativity
- **In the Computer Lab:** Gives instructions to the learners to perform various tasks in the lab
- **Teacher's Note:** Gives suggestions to the teachers to make enhance teaching methods
- **Worksheets:** Comprehensive four test papers for thorough assessment
- **Project Work:** Challenging projects that apply learned concepts
- **Annexure:** A treasure trove of knowledge tidbits to inspire the learners

We believe that every learner should have the opportunity to become computer-savvy from a young age. This series is our contribution to making that goal a reality. We hope that learners will find it a valuable resource in their learning journey and it will inspire their curiosity and creativity. Any suggestions for improvement will be gratefully acknowledged.

With warm regards,
The Inventant Education Team

About the Series

2 Organisation of Data

Chapter Objectives

- *Performing cut and copy operations on files and folders*
- *Searching for a file or a folder*
- *Learning about various file formats*
- *Working with multiple applications at the same time*

Chapter Objectives

The goals to be reached by the end of the chapter

Short & Crisp

Offers a concise description of the chapter's content

Short & Crisp

The data on a computer is organised in the form of files. Each file is given a name which is called a file name. The files can be organised under different folders, so that you can locate any file easily.

Before We Start

Communication

Group Discussion

Conduct a discussion in the class on why we arrange our papers in files, and then keep them in separate drawers or cabinets. This will help students in understanding the importance of organising data in files and folders.

Before We Start

To exercise the powers of judgment, conception, or inference

Note

Provide relevant facts about the topic

Note

You can use the Ctrl key to select multiple non-consecutive files/folders and the Shift key to select multiple consecutive files.

Know More

Subject Enrichment

*There are some special symbols which are used to replace or represent one or more characters in the Search box. These symbols are known as Wildcards. Wildcards are typically either an asterisk (*) which represents zero or more characters or question mark (?) which represents a single character. For example, if you write *.docx in the Search box, it will display all files with .docx extension.*

Know More

Some interesting pieces of knowledge related to the topic

Inter-Disciplinary (English)

Simplifies the concept to help learners make easy connections

Inter-Disciplinary (English)

- **Citation:** giving credit to the original author
- **Offend:** to hurt someone's feelings
- **Unintentional:** not done on purpose
- **Harassment:** any unwanted behaviour, physical or verbal, that makes a person feel uncomfortable or insulted
- **Apologise:** say sorry

Keyboard Shortcuts — Subject Enrichment

- **Windows Key + E** : *Open File Explorer*
- **Ctrl + W** : *Close File Explorer*
- **Ctrl + C** : *Copy a file/folder*
- **Ctrl + X** : *Cut a file/folder*
- **Ctrl + V** : *Paste the cut/copied file or folder*

Keyboard Shortcuts

Give a shortcut method of the topic being covered

Brain Exercises

Various kinds of questions to test the gained knowledge

Brain Exercises — As Per NEP 2020

1. Tick (✔) the correct option.

(a) Which of the following refers to special sound and visual effects that can be added to text or objects on the slide?

(i) Transition ☐ (ii) Graphics ☐ (iii) Animation ☐

(b) On which tab is the Audio button present?

(i) Animations ☐ (ii) Insert ☐ (iii) Transitions ☐

In a Nutshell

- A web page is a single document or file containing content such as text, images, videos, and other multimedia elements.
- A website is a collection of interconnected web pages that are related to a common theme, purpose, or subject.
- HTML (Hypertext Markup Language) is the standard markup language used to create web pages in the form of documents to be displayed on the World Wide Web (WWW).
- Different components that together make up an HTML code include elements, tags, and attributes.
- An HTML element that has both opening and closing tags is called a container element. An HTML element that has only the opening tag is called an empty element.
- Attributes in HTML provide additional information about an HTML element.
- An HTML editor is a software application which is used to create and save the HTML documents. There are two main types of HTML editors – WYSIWYG and text editor.
- Every HTML document consists of four major container elements: html, head, title, and body.
- Every HTML document starts with the `<html>` opening tag and ends with the `</html>` closing tag.

In a nutshell

A summary of the concepts taught in the chapter

Teacher's Note

Guidance for educators to enhance teaching methods

Teacher's Note

- Explain to students the role of animations and transitions in making the presentation lively.
- Demonstrate the steps to add different animations and transitions effects to the slides.
- Demonstrate how to insert sound files and video clips in a presentation.
- Explain how to add action buttons to the presentation.
- Explain students how to import data from Word 2010 to PowerPoint.
- Discuss about different presentation views and how to switch from one view to another.

WORKSHEET–2

(Based on Chapters 5 to 8)

1. Tick (✔) the correct option.

(a) Which category of animation effects make the object move along a specified path on the slide?

(i) Entrance ☐ (ii) Exit ☐ (iii) Motion Paths ☐

(b) Which symbol appears on the left of the slide thumbnail when an animation effect is applied to the slide?

(i) * ☐ (ii) & ☐ (iii) # ☐

Worksheets

Evaluate the learner's knowledge in a subject

Project Work

WORD 2010

2. You have learnt to create letters using mail merge. Now, with the help of your to create mailing labels and envelopes using mail merge.

POWERPOINT 2010

3. Create a presentation on the 'Continents and Oceans of the World' in Powe The presentation should contain the following slides.

Project Work

Develops an inquisitive mind and become critical thinkers and problem-solvers

Cyber Olympiad Questions

1. Which of the following is a web browser?

a.Microsoft Edge ☐ b.Google Chrome ☐

c.Mozilla Firefox ☐ d.All of these ☐

Cyber Olympiad Questions

A Competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

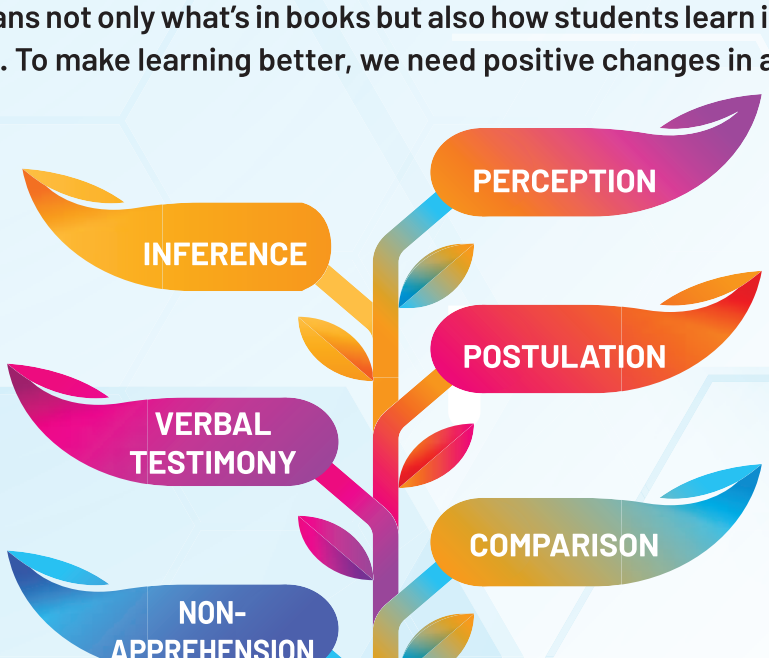
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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, 'curriculum' means not only what's in books but also how students learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.



The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

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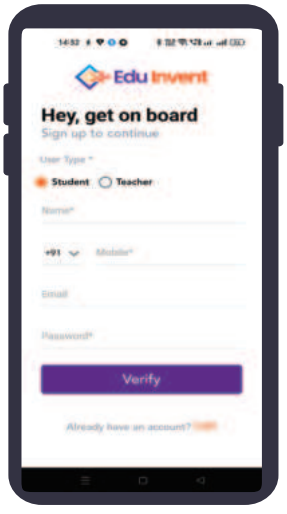

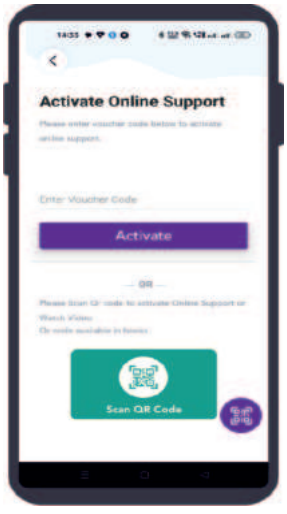

STEP 1 Download & Install

- 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.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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- Interactive exercises

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website www.inventanteducation.com

CONTENTS

1 Types of Computer and Computer Languages

Chapter Objectives

- *Knowing about different categories of computers*
- *Talking about types of computer languages*
- *Listing features of various computer languages*
- *Understanding the use of language processors*

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Short & Crisp

A computer is an electronic device that processes, stores, and manipulates data to perform various tasks and functions. Computers come in various forms, from large mainframes and high-performance supercomputers to desktop PCs, laptops, tablets, smartphones, and embedded systems.

Before We Start

Critical Thinking

Identify the type of computer and write its name in the space provided.

_____

_____

CATEGORIES OF COMPUTERS

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Computers can be categorised in various ways based on different criteria, such as their size, functionality, architecture, and usage. Let us know about different types of computers.

Microcomputers

Microcomputers, often referred to as Personal Computers (PCs), are a category of computers that are typically designed for individual use. Major manufacturers of microcomputers include Dell, HP, Lenovo, Apple, Acer, ASUS, and many others. Let us read some features of microcomputers.

- They are small and compact compared to other types of computers, and are specially designed for general usage such as entertainment, education and work purposes.

- Microcomputers are generally more affordable than larger and more specialised computing systems, making them accessible to a wide range of users.
- There are different types of devices that come under microcomputer category, including desktop PCs, laptops, ultrabooks, tablet PCs, and 2-in-1 devices that can function as both laptops and tablets.

Note

Laptops with screens that can be rotated or detached to function as tablets are known as 2-in-1 convertible laptops (or hybrid laptops).

Desktop computer

Laptop

Tablet PC

2-in-1 convertible laptop

Smartphones

Smartphones are advanced mobile phones that combine the functionality of a traditional mobile phone with features and capabilities typically found in a personal computer. The following are the features and functions of smartphones.

- They are portable, handheld devices.
- Smartphones allow users to make voice and video calls, and send text messages. They also support email, social media, and messaging apps.
- Smartphones provide access to the Internet via mobile data networks (3G, 4G, 5G) or Wi-Fi connections.
- Most smartphones have touchscreen displays, allowing users to interact with the device through gestures, taps, and swipes.
- They have extensive app stores where users can download and install a wide variety of apps.
- Smartphones use biometric security options, such as fingerprint scanners and facial recognition, as well as password and PIN protection.

Game Consoles

Game consoles are specialised electronic devices designed primarily for playing video games. These devices are distinct from personal computers and smartphones in their hardware and software that are optimised for gaming. Each game console has its own exclusive and non-exclusive game library. Users can purchase physical game discs or download games from an online store specifically tailored to that console. Popular game consoles include Sony PlayStation, Microsoft Xbox, and Nintendo Switch.

Know More — Subject Enrichment

Game consoles often include parental control features to help parents manage and restrict their children's access to certain content and online interactions.

Embedded Computer

An embedded computer is a type of computer system designed to perform dedicated functions or tasks within a larger system or product. These computers are referred to as "embedded" because they are tightly integrated into a specific device or application. An embedded computer typically consists of a processing device, memory, input/output interfaces, and specialised hardware components such as sensors, actuators, and communication interfaces.

Inter-Disciplinary (English)

- **Actuator:** *A device that causes a machine or other device to operate.*

Know More — Subject Enrichment

A sensor is a device that can sense or detect physical phenomena in the environment, such as light, pressure, temperature, and motion.

Mini Computers

Mini computers (or minicomputers) are more powerful than microcomputers but less powerful than mainframe computers. They are often referred to as midrange computers. Here are some key features and characteristics of mini computers.

- Mini computers typically have enough processing power to handle the needs of multiple users and run complex applications.
- They often have multiple terminals or workstations connected to them, allowing several users to access and use the system at the same time.
- They are often used in specific business, scientific, or industrial applications where a dedicated computing solution is needed.

Know More — Subject Enrichment

The first minicomputer was known as Digital Equipment Corporation (DEC) PDP-1, which was introduced in 1959.

Mainframe Computers

Mainframe computers, often simply referred to as mainframes, are powerful, large, and high-performance computing systems designed for processing and managing massive volumes of

data and handling critical enterprise-level applications. IBM's System z series is a well-known line of mainframes. Here are some key features and characteristics of mainframes.

- Mainframes are known for their substantial processing power. They can handle a vast number of transactions and complex computations simultaneously.
- They can process and manage vast amounts of data, and hence suitable for database management, data warehousing, and business analytics.
- Mainframes are designed to support a large number of concurrent users and workloads, making them suitable for serving multiple users and applications.

Mainframe computers

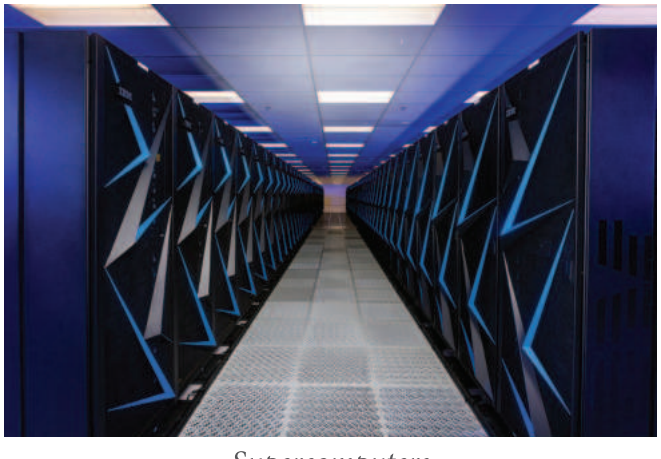
Note

Modern mainframes are energy-efficient and designed with environmental considerations in mind.

Supercomputers

Supercomputers are the most powerful and advanced computers in terms of processing speed and capabilities. They are designed to solve complex and computationally intensive problems that exceed the capabilities of traditional computers. Supercomputers are primarily used in scientific, research, and engineering fields. Here are some key features and characteristics of supercomputers.

- Supercomputers are capable of executing trillions of calculations per second.
- They use massively parallel processing, which means they have a large number of processors working together to solve problems simultaneously.
- Due to their high processing power, supercomputers generate a significant amount of heat, requiring advanced cooling systems.



Supercomputers

Try Now Inter-Disciplinary (Information Technology)

Search the Internet and make a list of top five fastest supercomputers. Also find their location and applications.

WHAT IS A COMPUTER LANGUAGE?

ICODE-r9JD

Whenever you want the computer to perform a task, you need to give instructions to it in a specific computer language. A computer language (also known as a programming language) is a structured method of instructing a computer to perform specific tasks. Computers can only understand and execute instructions written in programming languages.

Note

A set of instructions that tells the computer what to do is called a program. The act of writing instructions in a computer language is called programming.

Group Discussion — Communication

Conduct a group discussion in the class on the topic "Why do we need a language?" Encourage students to give their views on the topic without any hesitation.

GENERATIONS OF COMPUTER LANGUAGES

ICODE-T3iU

Computer languages have evolved over time, and they are often categorised into different generations as shown in the diagram.

Generations of Computer Languages

First Generation (1940s–1950s): Machine Language

Machine language, also called binary language, is the language of a computer. That is, it is the language that a computer understands. It consists of instructions directly understood and executed by a computer's Central Processing Unit(CPU). Thus, it is a low-level language, which is designed to interact directly with the computer's hardware. It is the most basic form of programming language, which is represented using binary digits (0s and 1s).

```
001010111000011
100010111001000
10111010000000000000
```

A hypothetical code written in machine language

Advantages

- A computer can execute machine language instructions directly, without any translation.
- The programs written using machine language take less time to execute and thus, are faster.

Disadvantages

- Machine language is difficult to use and understand.
- It is machine-dependent. This means a program written for a specific machine does not execute on any other machine.
- It is difficult to find and correct errors in a program written in machine language.

Second Generation (1950s–1960s): Assembly Language

Assembly language is also a low-level programming language that provides a symbolic representation of the machine code instructions that a computer can execute. It uses alphanumeric symbols, called mnemonics instead of 0s and 1s, making it more human-readable than a program written in machine language. Mnemonics are two- or three-letter abbreviations that denote some operation. For example, ADD for addition, SUB for subtraction, etc.

Since the computer does not understand mnemonics, they need to be translated into machine language to get executed. This job is done by assembler, which is a translator that converts assembly language code into executable machine code.

```
MOV AX, 42      ; Move the value 42 into the AX register
ADD BX, AX      ; Add the value of AX to the value of BX
CMP CX, 10      ; Compare the value in CX with 10
JEQ label     ; Jump to label if the previous comparison was equal
```

A hypothetical code written in assembly language

Advantages

- Assembly language is easier to use and understand as compared to machine language.
- It is easier to find and correct errors in assembly language.
- The programs written using machine language can be easily modified.

Disadvantages

- Like machine language, assembly language is also machine-dependent. That is, assembly language programs written for one computer cannot be executed on other computers.
- An assembler is needed to translate assembly language into machine language.
- Assembly language programs execute slower as compared to machine language programs.

Third Generation (1950s–Present): High-level Languages

Writing programs in machine or assembly language required the user to have knowledge of computer hardware. This led to the development of high-level languages that were machine-independent and similar to human languages. High-level language (HLL) is an English-like language in which instructions are written using English words and mathematical symbols instead of using binary digits or mnemonics.

COBOL, FORTRAN, Basic, C, C++ and Java are some popular high-level languages.

Know More Subject Enrichment

The high-level language FORTRAN was designed for engineers and scientists, while COBOL was designed for business users.

Advantages

- High-level languages are easier to use and understand.
- They are machine-independent, so programs written on one computer can run on any other computer with few or no changes.
- It is easier to modify the high-level language programs.

Disadvantages

- A language translator is needed to convert high-level language program into machine language.
- High-level language programs execute slower as compared to machine and assembly language programs.

Fourth Generation (1960s–Present)

Fourth-generation languages (4GLs) are also high-level languages designed to be more user-friendly and closer to natural language than earlier generations of programming languages. They often include declarative programming features, allowing programmers to specify what should be done rather than how it should be done. Many 4GLs are specifically designed for database applications. They provide tools and commands for database access and manipulation. SQL (Structured Query Language) is an example of a 4GL.

Fifth Generation (1980s–Present)

Fifth generation language (5GL) is the latest generation of computer languages. They are designed to make software development even more accessible, efficient, and user-friendly, often incorporating elements of artificial intelligence and expert systems to assist in the development process. 5GLs may include tools for building graphical user interfaces and visual representations of software components. The goal of these programming languages is to develop applications which can respond to natural or human language input and are capable of self-learning. Some examples of 5GL are LISP, PROLOG, OPS5 and Mercury.

Know More Subject Enrichment

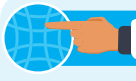
Lady Ada Lovelace is considered the world's first computer programmer. She was an English mathematician and writer.

LANGUAGE TRANSLATORS

Programs written in high-level languages must be translated to machine language to get executed with the help of language translators.

There are two types of language translators, which are as follows.

- **Compiler:** It is a translator program that converts high-level language program code into machine language code. It translates the whole program at once and generates object code if there are no errors. In case of errors, it presents the list of errors to the programmer and asks to fix the errors before executing the program.
- **Interpreter**: It is also a translator program like compiler that translates high-level language program code into machine language code. The difference between the two is that it translates the code line by line. That is, it takes one line of source code at a time, translates it into object code and executes it if there is no error. Then it moves on to the next line of source code. In case of errors, it asks the programmer to fix the errors before executing it.



Know More

Subject Enrichment

A computer program written by programmers using a HLL programming language is known as the source code. When the source code is translated in a format that is understandable by the computer, it is called an object code.

In a Nutshell

- Microcomputers, often referred to as personal computers (PCs), are a category of computers that are typically designed for individual use.
- Mini computers (or minicomputers) are more powerful than microcomputers but less powerful than mainframe computers.
- Mainframes are known for their substantial processing power. They can handle a vast number of transactions and complex computations simultaneously.
- Supercomputers are the most powerful and advanced computers in terms of processing speed and capabilities.
- A computer language (also known as a programming language) is a structured method of instructing a computer to perform specific tasks.
- Machine language, also called binary language, is the language of a computer. That is, it is the language that a computer understands.
- Assembly language is also a low-level programming language that provides a symbolic representation of the machine code instructions that a computer can execute.
- Assembler is a translator that converts assembly language code into executable machine code.
- High-level language (HLL) is an English-like language in which instructions are written using English words and mathematical symbols instead of using binary digits or mnemonics.
- 4GLs often include declarative programming features, allowing programmers to specify what should be done rather than how it should be done.
- Fifth generation language (5GL) is the latest generation of computer languages. They are designed to incorporate elements of artificial intelligence and expert systems to assist in the development process.
- Programs written in high-level languages must be translated to machine language to get executed with the help of language translators. There are two types of language translators: compiler and interpreter.
- Compiler translates the whole program at once while interpreter translates the program line by line.

Brain Exercises

As Per NEP 2020

1. Tick (✔) the correct option.

(a) Which of the following is a category of microcomputer?

(i) Desktop computer ☐ (ii) Laptop ☐ (iii) Both i. and ii. ☐

(b) Which type of computers are primarily used in scientific and research fields?

(i) Supercomputers ☐ (ii) Minicomputers ☐

(iii) Mainframe computers ☐

(c) Which of the following is not a high-level language?

(i) Java ☐ (ii) C++ ☐ (iii) Assembly ☐

(d) Programs written in which language are most difficult to understand?

(i) Machine language ☐ (ii) Assembly language ☐

(iii) High-level language ☐

(e) In which language, the programs are written using mnemonics?

(i) Assembly ☐ (ii) FORTRAN ☐ (iii) Java ☐

2. Fill in the blanks. Choose the words from the help box.

video games *LISP* *biometric* *low-level* *affordable*

(a) Microcomputers are generally more _____ than larger and more specialised computing systems.

(b) Smartphones use _____ security options, such as fingerprint scanners and facial recognition.

(c) Game consoles are designed primarily for playing _____.

(d) Machine language and assembly language are the examples of _____ languages.

(e) _____ is an example of fifth generation language.

3. State true or false.

(a) Microcomputers are specially designed for general usage. ☐

(b) Smartphones cannot be used for sending text messages. ☐

(c) Minicomputers are also known as midrange computers. ☐

(d) SQL (Structured Query Language) is an example of a 4GL. ☐

(e) A compiler translates the code line by line. ☐

4. Give one example of each of the following.

(a) Game console _____

(b) Microcomputer _____

(c) Mainframe computer _____

(d) Supercomputer _____

(e) High-level language _____

5. Answer the following questions.

(a) What is a microcomputer? List any two features.

(b) How is mainframe different from supercomputer?

(c) Why are minicomputers referred to as midrange computers?

(d) What are the different generations of computer languages?

(e) Write a short note on machine language.

(f) What is assembly language? Write the use of an assembler.

(g) Distinguish between a compiler and an interpreter.

(h) Write a short note on 5GL.

Case Study based questions

Critical Thinking

1. Nishant's father has gifted him a computer on his birthday which is specially designed to play video games. What type of computer is it? How is it different from a PC and smartphone?

_____

_____

2. Priyanka has written a program in Java.

(a) Which generation of language does Java belong to?

_____

(b) Give one more example of programming language of this generation.

_____

(c) Write one advantage of this generation of computer language.

_____

3. Swaminathan's grandfather was a computer programmer during the second generation of computer languages. Which computer language did he use then?

_____

4. Tejas is a computer programmer. He has written three different programs to compute the sum of five numbers. The first program is written in machine language, second using assembly language, and third in C++. Which of these programs will execute faster and why?

_____

Activity Time

Art Integration and Communication

1. Use cardboard or thermocoal sheet and create a model of any one type of computer. Display it in your classroom and speak a few lines about it.
2. Divide the class into two groups and conduct a debate on the topic "effects of playing video games on children." One group will talk about the positive effects of playing video games, and second group will discuss the negative effects.

21st Century Skills

3 GOOD HEALTH AND WELL-BEING

In the Computer Lab

Experiential Learning

1. Create a PowerPoint presentation on different types of computers. Add relevant information and images to the slides to make your presentation look attractive.
2. Visit the lab and do the following.
   (i) Open a blank Word 2010 document.
   (ii) Insert a heading 'Computer Languages' using the Word Art feature of Word 2010.
   (iii) Insert a SmartArt Graphics from 'Hierarchy' category and type text in text boxes as shown.

   (iv) Save the document with name 'Computer Languages.docx'.
3. Search the Internet and make a list of at least five computer languages which are currently being used for application development.

Information Literacy

Teacher's Note

- Discuss different categories of computers by listing their features. Give examples of each type.
- Discuss with students the development of computer languages from machine and assembly languages to high-level and fourth generation languages.
- Explain the advantages and disadvantages of different computer languages.

As per NEP 2020 and NCF 2023

Based on Windows 7 and MS Office 2010

i-Boot

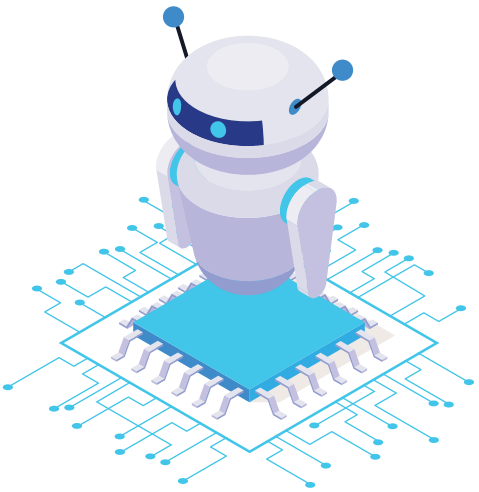
A Textbook of Computer Science

7

For ICSE Schools

By

Editorial Team
Inventant Education



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Present Meets Future
(A Unit of EDULABZ International)

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Introduction

Welcome to the world of **Inventant Education's** cutting-edge computer series, **i-Boot** designed to empower the learners from **classes 1 to 8** on their journey through the digital realm. The series is aligned as per the latest curriculum designed by the **Council for the Indian School Certificate Examination (CISCE) 2023**. It has been developed in accordance with the guidelines set forth by the **National Education Policy (NEP) 2020** and the **National Curriculum Framework (NCF) 2023**. In recent years, there has been a paradigm shift towards designing a learner-centric curriculum that is based on activity-based approach. So, in this series, we have incorporated key points from the NEP 2020 into practical activities, covering essential **21st Century Skills**, such as **Fun with AI, Board Game**, **Computational Thinking**, **Cyber Olympiad Questions**, etc. Our chapters are also aligned with the six phases of logical understanding outlined in the NCF 2023, fostering skills in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

In today's digitally driven world, computer proficiency is not just a skill; it's a necessity. Whether you are a student, a professional, or someone looking to enhance your computer literacy, this series is your roadmap to mastering the fundamentals of **Windows 7** and **Microsoft Office 2010**. The world of computer systems and technology is continuously evolving and has touched virtually each and every aspect of your life. At **Inventant Education**, we are committed to nurturing the potential of young minds. More than a series of books i-Boot is a gateway to a future where the learners harness their talents and work diligently to excel in the computer world.

Core features of i-Boot series (for classes 6 to 8) are:

- **Chapter Objectives:** Describe the goals requires to achieve at the end of the chapter
- **Short & Crisp:** Provide a short overview of the chapter's content
- **Before We Start:** Enhances analytical abilities, stimulates memories and broadens the imagination
- **Note:** Includes facts about the topic being covered
- **Know More:** Give extra and useful information on the topics being covered
- **Inter-Disciplinary (English):** Helps the learners to relate the concept in easy way
- **Try Now:** Helps the learners to recall and recapitulate the topic discussed
- **Group Discussion:** Encourage learners to participate in order to obtain a deeper understanding of subject
- **Keyboard Shortcuts:** Provide keyboard shortcuts to improve computer skills
- **In a nutshell:** Gives a brief summary of the topics being taught in the chapter
- **Brain Exercises:** Includes a variety of questions to evaluate the knowledge of the learners
- **Case Study Based Questions:** Encourages the learners to explore some real life use of the topics being covered
- **Activity Time:** Encourages the learners to develop their imagination and creativity
- **In the Computer Lab:** Gives instructions to the learners to perform various tasks in the lab
- **Teacher's Note:** Gives suggestions to the teachers to make enhance teaching methods
- **Worksheets:** Comprehensive four test papers for thorough assessment
- **Project Work:** Challenging projects that apply learned concepts
- **Annexure:** A treasure trove of knowledge tidbits to inspire the learners

We believe that every learner should have the opportunity to become computer-savvy from a young age. This series is our contribution to making that goal a reality. We hope that learners will find it a valuable resource in their learning journey and it will inspire their curiosity and creativity. Any suggestions for improvement will be gratefully acknowledged.

With warm regards,
The Inventant Education Team

About the Series

1 Hardware Components

Chapter Objectives

- *Knowing about internal and external hardware components*
- *Explaining the usage of different components*
- *Citing examples of input, output, processing and storage devices*

Chapter Objectives

The goals to be reached by the end of the chapter

Short & Crisp

Offers a concise description of the chapter's content

Short & Crisp

Computer hardware refers to the physical components of a computer which we can touch and feel. Depending on their location and how they interact with the computer, hardware is categorised into internal hardware and external hardware.

Before We Start

Tick (✓) the correct statements and cross (×) the wrong ones.

1. Do not use or share copyrighted content without permission. ☐
2. There is no harm in sharing your personal information online. ☐
3. Create strong passwords for each online account. ☐
4. You can use public Wi-Fi for banking transactions. ☐

Before We Start

To exercise the powers of judgment, conception, or inference

Note

Provide relevant facts about the topic

Note

A formula in Microsoft Excel, always begins with an equal to sign (=) followed by some combination of values, text, cell references, functions and operators. If the equal to sign (=) is missing before the formula, Excel considers it as simple text data.

Know More — Subject Enrichment

These days, data can also be stored over the Internet. This storage technique is called the cloud storage. You can access your data from anywhere, at any time and from any device. Some of the popular cloud storage providers are OneDrive, Google Drive, iCloud, and Dropbox.

Know More

Some interesting pieces of knowledge related to the topic

Inter-Disciplinary (English)

Simplifies the concept to help learners make easy connections

Inter-Disciplinary (English)

- **Susceptible**: *At risk*
- **Fraudulent**: *Fake*
- **Overwhelm**: *Give a person too much of something*

Keyboard Shortcuts

Subject Enrichment

- **Ctrl + N** : *Create a new workbook*
- **Ctrl + S** : *Save a workbook*
- **Ctrl + O** : *Open an existing workbook*
- **Ctrl + W** : *Close a workbook*
- **Alt + F4** : *Close the Excel window*

Keyboard Shortcuts

Give a shortcut method of the topic being covered

Brain Exercises

Various kinds of questions to test the gained knowledge

Brain Exercises

As Per NEP 2020

1. **Tick (✓) the correct option.**

a) Which of the following is not an external hardware component?

i. Monitor ☐ ii. Motherboard ☐ iii. Printer ☐

b) Which of the following is a type of monitor?

i. LCD ☐ ii. LED ☐ iii. Both (i) and (ii) ☐

In a Nutshell

- A number system, is a systematic way of representing numbers using symbols and rules.
- Different number systems are used for various purposes, but the most common number systems are decimal number system and binary number system.
- The base of a number system, also known as the radix, is the number of unique symbols or digits used in that system to represent values.
- Decimal number system is a base-10 number system having 10 digits from 0 to 9.
- In the binary system, there are two unique symbols or digits (0 and 1). The digits 0 and 1 are called the binary digits.
- Octal number system is a base-8 number system having 8 digits from 0 to 7.
- Hexadecimal number system has 16 symbols – 0 to 9 and A to F where A to F is equal to 10 to 15, respectively.

In a nutshell

A summary of the concepts taught in the chapter

Teacher's Note

Guidance for educators to enhance teaching methods

Teacher's Note

- Begin the chapter by asking students about the benefits of the Internet. Now, tell them some disadvantages of the Internet.
- Talk about the ethical and unethical practices related to the Internet.
- List some important safety measures to be taken while using the computer and Internet.

WORKSHEET 1

(Based on Chapters 1 to 4)

1. **Tick (✓) the correct option.**

a) Which of the following is not an internal hardware component?

i. RAM ☐ ii. Keyboard ☐ iii. Motherboard ☐

b) Which of the following is the correct way of writing the base of a number system?

i. $(512)_{10}$ ☐ ii. $(11001)_2$ ☐ iii. Both (i) and (ii) ☐

c) Which of the following viruses infect the master boot record of a computer's hard drive?

i. Boot sector virus ☐ ii. Program virus ☐ iii. Trojan horse ☐

d) Which of the following is not an unethical practice over the Internet?

i. Plagiarism ☐ ii. Phishing ☐ iii. Online shopping ☐

2. **Fill in the blanks.**

a) _____ are high-speed, small-capacity storage locations within the CPU.

b) In any binary number, the rightmost digit is called _____ bit.

Worksheets

Evaluate the learner's knowledge in a subject

Project Work

Excel 2010

1. **Open a blank workbook in Excel and enter the data as shown in the figure.**

	A	B	C
1		Item List	
2			
3	Item Code	Item Name	Price
4	AE001	Washing Machine	35000
5	AE002	Cooler	5500
6	AE003	Geyser	7000
7	AE004	Refrigerator	25000
8	AE005	Air Conditioner	18500
9	AE006	Steam Iron	6500
10	AE007	Water Purifier	17500
11	AE008	Mixer Grinder	12000

Now, perform the following operations.

a. Increase the column width to fit the contents in it.

Project Work

Develops an inquisitive mind and become critical thinkers and problem-solvers

Cyber Olympiad Questions

1. **Which of the following hardware components are placed inside the CPU case?**

a. Keyboard ☐ b. Mouse ☐ c. Motherboard ☐ d. Scanner ☐

2. **Which of the following is not a computer virus?**

a. Invader ☐ b. Sunday ☐ c. Zeus ☐ d. Melissa ☐

Cyber Olympiad Questions

A Competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

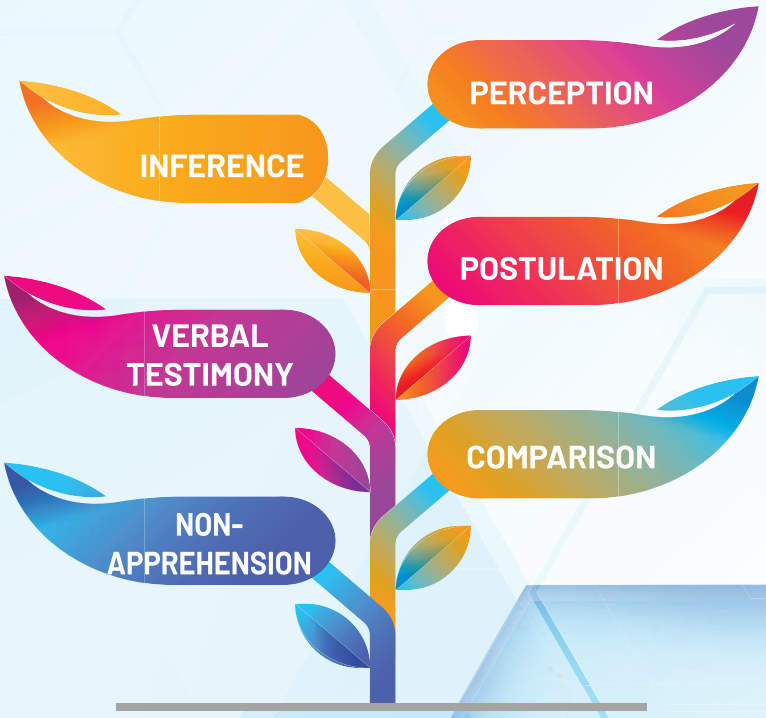
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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

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

Based on NCF 2023

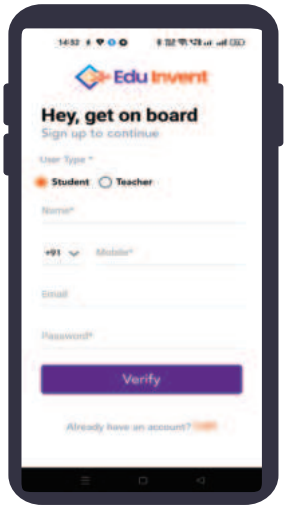
In NCF, 'curriculum' means not only what's in books but also how students learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

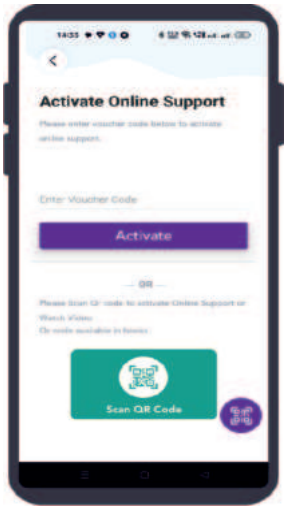


The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

1. For Mobile App Users Edu Invent





STEP 1 Download & Install

- 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.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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website www.inventanteducation.com

CONTENTS

1 Hardware Components

Chapter Objectives

- *Knowing about internal and external hardware components*
- *Explaining the usage of different components*
- *Citing examples of input, output, processing and storage devices*

ICODE-kyaS

Short & Crisp

Computer hardware refers to the physical components of a computer which we can touch and feel. Depending on their location and how they interact with the computer, hardware is categorised into internal hardware and external hardware.

Before We Start

Look at the hardware devices and write their name.

Internal Hardware Components

ICODE-1TNF

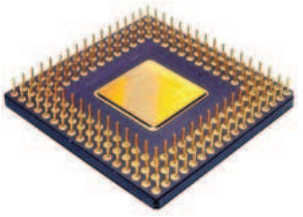
The internal hardware components are located inside the CPU case or CPU cabinet. The computer case houses and protects all the internal components. It also provides ports and connections for external devices. Let us discuss about some of the important internal hardware components.

Components present inside the CPU cabinet

Inter-Disciplinary (English)

- **Port**: *A connection point*
- **Mounted**: *Fixed in a frame*
- **Critical**: *Important*

CPU and its Parts



CPU Chip

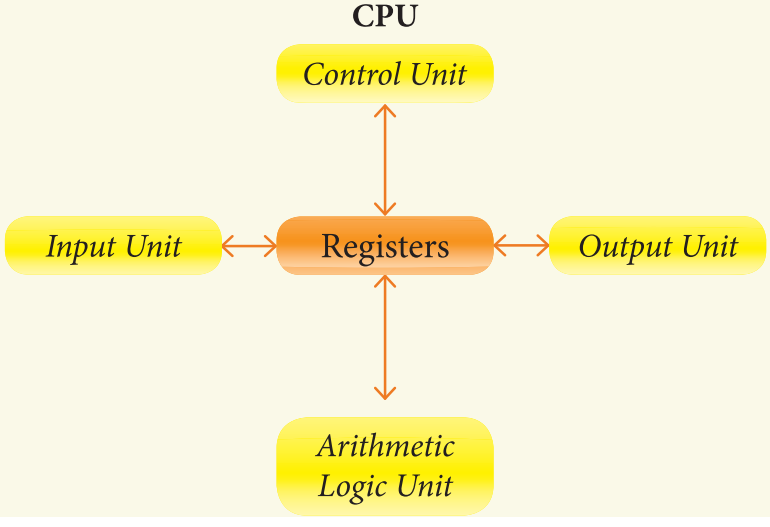
The Central Processing Unit (CPU), also called the microprocessor, is the processing device of a computer. It is the primary hardware component of the computer. It executes the instructions, does all the calculations, and manages the working of all parts of the computer. It acts like the brain of a computer.

The CPU has the following three parts:

- **Arithmetic Logic Unit (ALU)**: This unit is responsible for performing a wide range of arithmetic operations (addition, subtraction, multiplication, division) and logical operations (AND, OR, NOT) as specified by the instructions. It manipulates data and performs calculations.
- **Control Unit (CU)**: This unit manages the execution of instructions and controls the flow of data within the computer. It ensures that instructions are executed in the correct order. It plays a vital role in the control of the CPU's operations.
- **Registers**: Registers are high-speed, small-capacity storage locations within the CPU. They are used for holding data, operands, and intermediate results during the execution of the instructions.

Try Now — Inter-Disciplinary (Mathematics)

Draw the following diagram showing parts of CPU in your notebook.



Motherboard

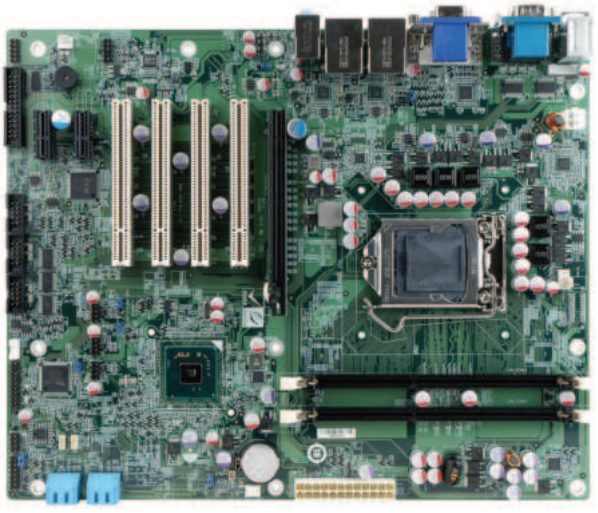
The motherboard is the primary circuit board that serves as the backbone of the computer. It acts as the central hub for connecting all internal hardware components, including the CPU, RAM, storage drives, graphics card, and more. The motherboard also includes a clock generator that sets the system's clock speed and timing, helping to synchronise other components.

Note

A motherboard is also known as 'mobo' or 'mainboard'.

Inter-Disciplinary (English)

- **Synchronise:** *Operate simultaneously*



Motherboard

Exploratory Learning

Search the Internet and find the names of any three companies that manufacture motherboards.

Switched Mode Power Supply (SMPS)

SMPS is a type of power supply unit commonly used in computers to convert the incoming AC voltage to the DC voltage required by the electronic device's components.

SMPS

Know More — Subject Enrichment

AC (Alternating Current) voltage and DC (Direct Current) voltage are the two fundamental forms of electrical voltage that describe how electric charges flow within a circuit.

Computer Fan

A computer fan is a crucial component of a computer's cooling system. It is designed to release heat generated by various computer components.

Computer fan

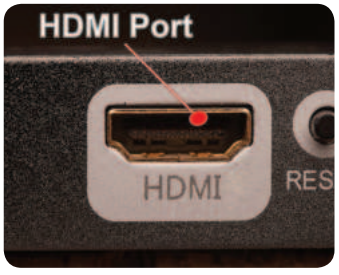
Ports

The term ports can refer to physical connectors on devices that enable communication between devices. Ports play a crucial role in enabling communication and data transfer between different devices. Some of the important ports are given below:

- **USB port**: Universal Serial Bus (USB) ports are used to connect a wide range of external devices, such as keyboards, mouse, external hard drives, printers, and smartphones, to a computer.
- **HDMI port**: High-Definition Multimedia Interface (HDMI) ports are used for connecting audio-visual devices, like monitors, TVs, projectors, and gaming consoles, to transmit high-quality audio and video signals.

- **Thunderbolt port**: Thunderbolt ports offer extremely fast data transfer speeds, making them ideal for transferring large files quickly. They can be used to connect external hard drives for fast data backups.
- **Ethernet port**: Ethernet ports, also known as RJ-45 ports, are used to connect devices to local area networks (LANs) and the Internet through wired connections.

USB port



HDMI port

Thunderbolt port

Ethernet port

Try Now — Inter-Disciplinary (Computer)

Search the Internet and find information about audio jacks.

Modem

A modem, short for modulator-demodulator, is a device that enables transmission of digital data, such as text, images, and files, over telephone lines that were originally designed for analog voice communication. Modems accomplish this by modulating digital signals into analog signals for transmission and demodulating incoming analog signals back into digital form.

Inter-Disciplinary (English)
- **Transmission:** *Communication*

Know More — Subject Enrichment

Modulation is the process of encoding digital data onto an analog signal so that it can be transmitted over a communication channel. Demodulation is the process of extracting the original digital data from a modulated analog signal. It is the reverse process of modulation.

Modem

External Hardware Components

External hardware components refer to physical devices that can be connected to a computer from the outside. The external components of a computer include input, output and storage devices.

Note

*External devices are also called peripheral devices (or simply **peripherals**).*

Input Devices

Input devices are hardware components that enable users to enter data, commands, and

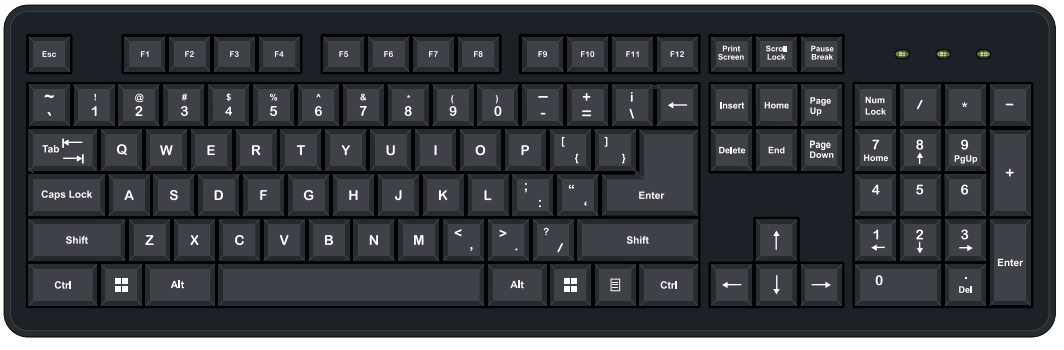
interact with a computer. They facilitate communication between the computer and users by translating user input into a format that the computer can process.

Some of the commonly used input devices are discussed below:

Keyboard

A keyboard is an input device that is used to enter data into the computer. A standard keyboard has 104 keys that are further divided into different groups depending on their functions. Different categories of keys are described as follows:

- **Typing keys**: These keys are used for typing text in a document. These include Alphabet keys, Number keys, Symbol keys (&, ^, $, @, +), the Spacebar, Enter, Backspace, Delete, Shift, Tab, and Caps Lock keys.
- **Navigation keys**: These keys are used to navigate up, down, right or left in a document. These include Arrow keys, Home, End, Page Up, and Page Down.
- **Control keys**: These are used independently or in combination with other keys to perform certain task. These include Ctrl, Alt, Windows logo key, and Esc key.
- **Function keys**: These keys are 12 in number labelled from F1 to F12. Each Function key performs a different function. They are located on top of the keyboard.
- **Numeric keypad**: The Numeric keypad looks like a calculator. It has Number keys (0 to 9), arithmetic operators (+, –, *, /), Enter key, and a decimal point. It is located on the right side of the keyboard. It is mainly used to perform mathematical calculations at a high speed.



Keyboard

Mouse

A mouse is a small, hand-held input device used to interact with a computer. It can be connected to a computer either using a USB cable or using wireless technology (Bluetooth). A mouse has at least two buttons, referred to as the left and right buttons. These buttons are often used for clicking and selecting items on the screen. It also includes a scroll wheel located between the two main buttons. The scroll wheel is used for scrolling through documents, web pages, and other content vertically. We can play games and draw pictures with the help of a mouse.

Note

A mouse is also known as a pointing device because it is used to point at objects on the screen.

Optical mouse

When we move a mouse on a surface, such as a mouse pad or desk, a small arrow on the screen also moves in the same direction. This is known as the mouse pointer.

Scanner

A scanner is an input device used to convert physical documents or images into digital format. It captures the digital representation of the content on a paper, and saves it as an electronic file that can be stored, edited, and shared on a computer or other digital devices. Once scanned, the digital files can be saved in various formats, such as PDF, JPEG, TIFF, or PNG.

Flatbed scanners are the most common type of scanners, which are designed for scanning flat, single-sheet items like documents and photographs. They have a flat glass surface where the item to be scanned is placed.

Other types of scanners are sheet fed scanner, drum scanner, handheld scanner, and 3D scanners.

Drum Scanner *Sheetfed Scanner* *Flatbed Scanner* *Handheld Scanner*

Types of scanners

Microphone

A microphone, often referred to as a mic, is a transducer device that converts sound waves into an electrical signal. It captures audio from a specific source and converts it into an electrical voltage that can be processed, amplified, recorded, or transmitted for various purposes.

Computer microphone

Inter-Disciplinary (English)

- **Transducer**: *An electronic device that transforms one form of energy into another*
- **Amplify**: *Increase, strengthen*

Output Devices

Output devices are components of a computer system that provide information or results in a human-readable form. They are essential for presenting the output of computer programs and allowing interaction with users. Some of the commonly used output devices are discussed below:

Monitor

A computer monitor, also known as Visual Display Unit (VDU), is one of the primary visual

output devices. It presents text, images, videos, and Graphical User Interfaces (GUIs) to the user. The output displayed on the monitor is known as the soft copy. There are various types of monitors, each designed for specific purposes.

- **CRT (Cathode Ray Tube) monitors**: CRT monitors were large, heavy, and took up a lot of desk space. They had a hump like shape on the back side of screen. They consumed more power than other types of monitors and generated a significant amount of heat during operation. CRT monitors are not used these days.
- **LCD (Liquid Crystal Display) monitors**: LCD monitors have flat screens. They consume less power as compared to the CRT monitors.
- **LED (Light-Emitting Diode) monitors**: LED monitor are the most commonly used monitors these days. They are much thinner and lighter in weight, and have a better display. These monitors consume 40 percent less power than an LCD monitor and are more durable.

CRT monitor

LCD monitor

LED monitor

Types of monitors

Know More

Subject Enrichment

Touchscreen monitors allow users to interact with the computer or device by directly touching the screen.

Printer

A printer is an output device that produces a printed copy of the digital data it receives. This output is usually on paper, but it can also be on t-shirts, bedsheets, mugs, and other gift items. The printed copy of the output is called the hard copy. You can print documents, photographs, maps, labels, envelopes, and more. Printers can be monochrome (capable of printing in a single colour, typically black) or colour (capable of printing in multiple colours, including black). The two most commonly used printers are inkjet printer and laser printer.

- **Inkjet printer**: Inkjet printers use small ink droplets to create text and images on paper. They are versatile and can produce high-quality colour or black-and-white prints. Inkjet printers are popular for home and office use, as well as for photo printing.
- **Laser printer**: Laser printers use a laser beam to create a print. They are known for fast printing speeds and high-quality text output. Laser printers are commonly used in offices and businesses for high-volume printing.

Inkjet printer

Laser printer

Try Now Inter-Disciplinary (Computer)

Search the Internet and find information about 3D printers.

Projector

A projector is an optical device that projects images, videos, presentations, or other visual content onto a larger screen, wall, or surface. Projectors are commonly used in classrooms, conference rooms, theaters, home entertainment systems, and more.

Projector

Storage Devices

Storage devices are hardware components or devices that are used to store and manage digital data and information in electronic form. The computer uses multiple devices to store data permanently.

Know More Subject Enrichment

These days, data can also be stored over the Internet. This storage technique is called the cloud storage. You can access your data from anywhere, at any time and from any device. Some of the popular cloud storage providers are OneDrive, Google Drive, iCloud, and Dropbox.

Let us study about some storage devices:

Hard Disk Drive

A hard disk drive (HDD) or simply a hard drive, is a data storage device used for storing and retrieving digital information. It is one of the most common types of storage devices found in computers, which stores operating system files, software applications, documents, photos, videos, and more.

Hard disk drive

External Hard Drives

External hard drives are portable HDD storage devices that are connected to a computer via USB, Thunderbolt, or other interfaces. They are used for taking backups of data, storing movies, music and photos and transferring files between computers.

External hard drive

Optical Disc Drives

Optical discs are flat, circular discs made of plastic or glass, and are commonly used for storing and distributing music, videos, software, and data files. CDs, DVDs, and Blu-ray discs are examples of optical discs. Optical disc drives, such as CD/DVD drives and Blu-ray drives, use optical technology to read and write data on optical discs.

Optical discs

- CDs (Compact Discs) are one of the earliest optical disc formats and are commonly used for music and data storage. It was quite an inexpensive way of moving data from one computer to another. It could store up to 700 MB of data.
- A DVD or Digital Versatile Disc, is a type of optical disc used for storing and playing back digital video, audio, and data files. The storage capacity of a standard single-layer DVD is approximately 4.7GB. It can store up to 17 GB.
- A Blu-ray disc (BD) is a high-capacity optical disc format used for storing high quality sound files, games and movies. It can store up to 128 GB of data. You can read or write data on a Blu-ray disc with the help of a Blu-ray reader.

Flash Drive

Flash drive, popularly known as pen drive, is a small, portable and most popular data backup device. Pen drives are widely being used these days to transfer large amount of information from one computer to another. It can store up to 1TB of data. The copying and moving of data from one device to another is easier using a pen drive.

Flash drive

Know More — Subject Enrichment

The first pen drive was launched in the year 2000 and it had a storage capacity of 8 MB.

In a Nutshell

- The internal hardware components are located inside the CPU case or CPU cabinet.
- CPU is the primary component that carries out the core processing operations of a computer.
- The motherboard acts as the central hub for connecting all internal hardware components of a computer.
- The term ports can refer to physical connectors on devices that enable communication between devices.
- A modem, short for modulator-demodulator, is a device that enables transmission of digital data over telephone lines.
- External hardware components refer to physical devices that can be connected to a computer from outside.
- Some of the commonly used external hardware components are keyboard, mouse, monitor, printer, hard drive, and pen drive.

Brain Exercises

As Per NEP 2020

1. Tick (✓) the correct option.

a) Which of the following is not an external hardware component?

i. Monitor ☐ ii. Motherboard ☐ iii. Printer ☐

b) Which of the following is a type of monitor?

i. LCD ☐ ii. LED ☐ iii. Both (i) and (ii) ☐

c)  Identify the hardware component.

i. SMPS ☐ ii. Microprocessor ☐ iii. Computer fan ☐

d) Which of the following ports provide a high-speed data transfer?

i. USB port ☐ ii. HDMI port ☐ iii. Thunderbolt port ☐

e) Which of the following is not an optical disc?

i. DVD ☐ ii. Blu-ray disc ☐ iii. Pen drive ☐

2. Fill in the blanks with the correct words.

a) The computer case houses and protects all the _____ components.

b) _____ are high-speed, small-capacity storage locations within the CPU.

c) A _____ is a crucial component of a computer's cooling system.

d) A _____ is a transducer device that converts sound waves into an electrical signal.

e) The printed copy of the output is called the _____.

3. State true or false.

a) Motherboard is an internal hardware component. ☐

b) ALU manages and controls the flow of data within the computer. ☐

c) The motherboard serves as the backbone of the computer. ☐

d) USB ports are also known as RJ-45 ports. ☐

e) A standard keyboard has 104 keys. ☐

4. Differentiate between the following.

a) Internal and external hardware components

b) Input and output devices

c) Control keys and Function keys

d) Computer fan and SMPS

e) Monitor and scanner

5. Answer the following questions.

a) What is CPU? Explain its three units.

b) Write a short note on motherboard.

c) What are ports? Explain any two types of ports.

d) What are input devices? Write the use of any two input devices.

e) What is a printer? Explain its two types.

f) What are storage devices? Explain any two storage devices.

Case Study based questions

Critical Thinking

1. Rishi's desktop is getting overheated? Can you tell which component of his computer is not working properly?
2. Swati's father has gifted him a new laptop. Now, she wants to transfer the files from her desktop to her laptop. Name any two storage devices she can use for data transfer.
3. Harshal wants an internet connection for his home computer. Which device should he use?

Activity Time

Art Integration

Collect the pictures of various input and output devices, and paste them in your scrapbook. Also write few lines about each of them.

In the Computer Lab

Experiential Learning

1. **With the help of your computer teacher, open the CPU cabinet of any old computer and try to recognise various internal hardware components.**
2. **Write a paragraph on 'Indian History' in 400-500 words in Microsoft Word. Take a printout of your document.**

Inter-Disciplinary (History)

Teacher's Note

- Open an old CPU cabinet and show the internal components of a computer and their placement on the motherboard.
- Elaborate about CPU, motherboard, SMPS, computer fan, etc., through videos.
- Show the external hardware components of a computer, and ask students to identify and name them.

As per NEP 2020 and NCF 2023

Based on Windows 7 and MS Office 2010

i-Boot

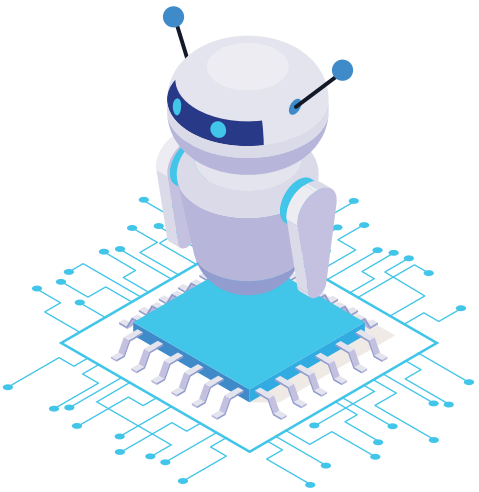
A Textbook of Computer Science

8

For ICSE Schools

By

Editorial Team
Inventant Education



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Present Meets Future
(A Unit of EDULABZ International)

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Introduction

Welcome to the world of **Inventant Education's** cutting-edge computer series, **i-Boot** designed to empower the learners from **classes 1 to 8** on their journey through the digital realm. The series is aligned as per the latest curriculum designed by the **Council for the Indian School Certificate Examination (CISCE) 2023**. It has been developed in accordance with the guidelines set forth by the **National Education Policy (NEP) 2020** and the **National Curriculum Framework (NCF) 2023**. In recent years, there has been a paradigm shift towards designing a learner-centric curriculum that is based on activity-based approach. So, in this series, we have incorporated key points from the NEP 2020 into practical activities, covering essential **21st Century Skills**, such as **Fun with AI, Board Game**, **Computational Thinking**, **Cyber Olympiad Questions**, etc. Our chapters are also aligned with the six phases of logical understanding outlined in the NCF 2023, fostering skills in **Perception, Inference, Comparison, Postulation, Non-Apprehension** and **Verbal Testimony**.

In today's digitally driven world, computer proficiency is not just a skill; it's a necessity. Whether you are a student, a professional, or someone looking to enhance your computer literacy, this series is your roadmap to mastering the fundamentals of **Windows 7** and **Microsoft Office 2010**. The world of computer systems and technology is continuously evolving and has touched virtually each and every aspect of your life. At **Inventant Education**, we are committed to nurturing the potential of young minds. More than a series of books i-Boot is a gateway to a future where the learners harness their talents and work diligently to excel in the computer world.

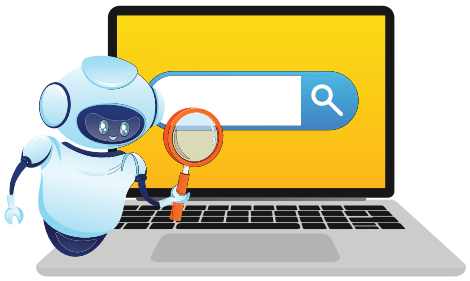
Core features of i-Boot series (for classes 6 to 8) are:

- **Chapter Objectives:** Describe the goals requires to achieve at the end of the chapter
- **Short & Crisp:** Provide a short overview of the chapter's content
- **Before We Start:** Enhances analytical abilities, stimulates memories and broadens the imagination
- **Note:** Includes facts about the topic being covered
- **Know More:** Give extra and useful information on the topics being covered
- **Inter-Disciplinary (English):** Helps the learners to relate the concept in easy way
- **Try Now:** Helps the learners to recall and recapitulate the topic discussed
- **Group Discussion:** Encourage learners to participate in order to obtain a deeper understanding of subject
- **Keyboard Shortcuts:** Provide keyboard shortcuts to improve computer skills
- **In a nutshell:** Gives a brief summary of the topics being taught in the chapter
- **Brain Exercises:** Includes a variety of questions to evaluate the knowledge of the learners
- **Case Study Based Questions:** Encourages the learners to explore some real life use of the topics being covered
- **Activity Time:** Encourages the learners to develop their imagination and creativity
- **In the Computer Lab:** Gives instructions to the learners to perform various tasks in the lab
- **Teacher's Note:** Gives suggestions to the teachers to make enhance teaching methods
- **Worksheets:** Comprehensive four test papers for thorough assessment
- **Project Work:** Challenging projects that apply learned concepts
- **Annexure:** A treasure trove of knowledge tidbits to inspire the learners

We believe that every learner should have the opportunity to become computer-savvy from a young age. This series is our contribution to making that goal a reality. We hope that learners will find it a valuable resource in their learning journey and it will inspire their curiosity and creativity. Any suggestions for improvement will be gratefully acknowledged.

With warm regards,
The Inventant Education Team

About the Series



1

Functions of Operating System

Chapter Objectives

- *Recapitulating the concept of operating system*
- *Discussing the need and functions of operating systems*
- *Knowing about various types of operating systems and their examples*
- *Listing the features, functions and advantages of GUI*
- *Introducing the term user interface*
- *Differentiating between command line and graphical user interfaces*

Chapter Objectives

The goals to be reached by the end of the chapter

Short & Crisp

Offers a concise description of the chapter's content

Short & Crisp

The OS provides a user interface (UI) that allows users to interact with the computer. It controls and communicates with hardware devices, manages the computer's memory, runs application programs, and manages files and folders.

Before We Start

Write the shortcut keys for the following actions in Excel 2019.

1. Create a new workbook _____
2. Save a workbook _____
3. Select the entire worksheet _____
4. Insert a new worksheet _____
5. Redo the last action performed _____

Before We Start

To exercise the powers of judgment, conception, or inference

Note

Provide relevant facts about the topic

Note

A function name is not case sensitive. That is, you can enter the function name either in the lowercase or uppercase.

Know More — Subject Enrichment

Examples of some valid and invalid identifiers in Java are given below.

Valid	Invalid	
myVariable	1variable	// Cannot start with a digit
firstName	My book	// spaces are not allowed
piValue	if	// A reserved keyword
myObject	my-variable	// Hyphens are not allowed

Know More

Some interesting pieces of knowledge related to the topic

Inter-Disciplinary (English)

Simplifies the concept to help learners make easy connections

Inter-Disciplinary (English)

- **Error-prone**: *Likely to make errors*
- **Manageable**: *Easy to deal with*
- **Extensively**: *To a large extent*
- **Logistics**: *Process of managing resources*

Keyboard Shortcuts

Subject Enrichment

- **Alt + F1** : *Create a default chart based on the data in the current range*
- **F11** : *Create a new chart in a new sheet*
- **Alt + Shift + F1** : *Insert a new chart sheet with a default chart based on the selected data*
- **Tab** : *Move between different elements of the chart*

Keyboard Shortcuts

Give a shortcut method of the topic being covered

Brain Exercises

Various kinds of questions to test the gained knowledge

Brain Exercises

As Per NEP 2020

1. Tick (✓) the correct option.

(a) Which of the following describes the subject or purpose of the chart?

(i) Chart title ☐ (ii) Data series ☐ (iii) Data points ☐

(b) Which of the following is a key that explains the colours or patterns used in the chart?

(i) Gridlines ☐ (ii) Data points ☐ (iii) Legend ☐

In a Nutshell

- In Microsoft Excel, a chart is a graphical representation of data that allows you to visualise and analy information more effectively than looking at raw numbers alone.
- A chart is composed of various elements that work together to convey data effectively.
- Some of the key elements of Excel charts are chart title, axis labels, data series, data points, legen gridlines, chart area, plot area, and data labels.
- Microsoft Excel supports various types of charts to present the data.
- Some of the commonly used chart types are column chart, line chart, pie chart, bar chart, area cha scatter chart, surface chart and radar chart.
- Once you have inserted a chart in a worksheet, you can change its type anytime you want.

In a nutshell

A summary of the concepts taught in the chapter

Teacher's Note

Guidance for educators to enhance teaching methods

Teacher's Note

- Revise the concept of operating system discussed in previous classes.
- Briefly explain the functions of operating systems.
- Discuss the different types of operating systems with examples.
- Explain the difference between GUI and CII operating systems.

WORKSHEET–1

(Based on Chapters 1 to 4)

1. Tick (✓) the correct option.

(a) Which of the following is an example of GUI operating system?

(i) Office 2010 ☐ (ii) Windows 7 ☐ (iii) DOS

(b) Which of the following is an arithmetic operator in Excel?

(i) + ☐ (ii) & ☐ (iii) >=

(c) Which of the following charts in Excel divide a data set into slices of a circle?

(i) Area chart ☐ (ii) Pie chart ☐ (iii) Bar chart

Worksheets

Evaluate the learner's knowledge in a subject

Project Work

EXCEL 2010

1. Open a blank workbook in MS Excel and enter the following data in it.

Student Name	Marks in Term I	Mark in Term II
Ria Gupta	279	266
Shilpa Sharma	256	288
Mitali Sen	280	277
Akshay Arora	260	232
Kamal Sinha	234	284

Project Work

Develops an inquisitive mind and become critical thinkers and problem-solvers

Cyber Olympiad Questions

1. Which is the smallest computer network intended for one person?

(a) PAN ☐ (b) WAN ☐

(c) LAN ☐ (d) MAN ☐

Cyber Olympiad Questions

A Competitive exam conducted by SOF for each class to schools and assesses the learners

Aligned with NEP 2020 and NCF 2023

Features of NEP 2020

21st Century Skills

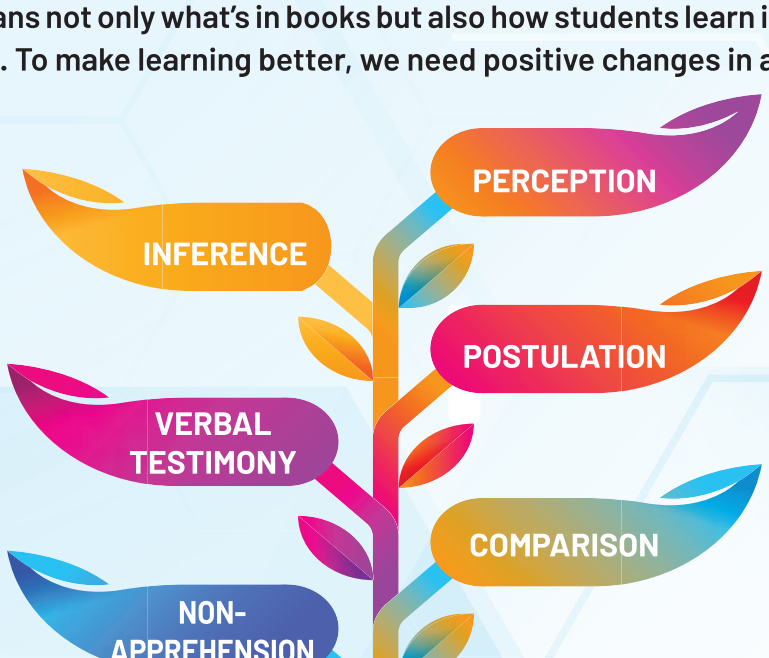
Learning Skills (4Cs)
- Critical Thinking
- Creativity
- Communication
- Collaboration

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

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

Based on NCF 2023

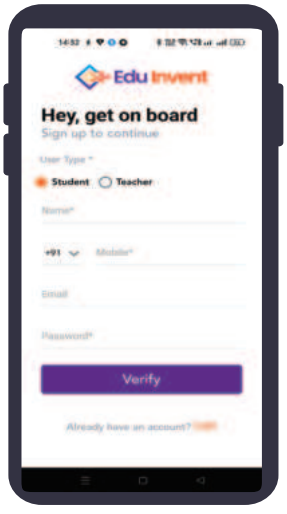
In NCF, 'curriculum' means not only what's in books but also how students learn in school, the school's environment, and more. To make learning better, we need positive changes in all these areas.

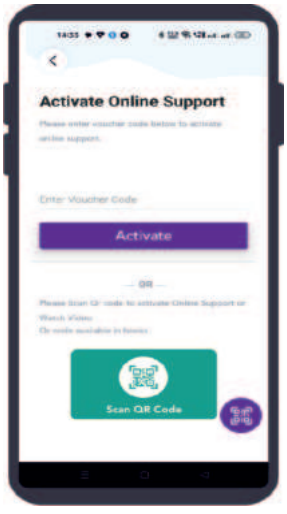


The Six Pramanas

HOW TO ACCESS DIGITAL CONTENT THROUGH QR CODE

1. For Mobile App Users Edu Invent





STEP 1 Download & Install

- 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.

STEP 2 Registration

- Open the application.
- Click 'New User, Register here.'
- Select 'Teacher/Student' in 'User Type.'
- Enter your name, email, mobile number and password.
- Click 'Verify' and Enter the OTP to register.

STEP 3 Access

- 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.

2. For Website Users

Step 1 (Registration)

- 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 number/email.

Step 2 (Access)

- Login on the website.
- Go to the "SCAN & LEARN" section available in the dashboard.
- Enter the Codes printed below the QR Codes to explore the learning content associated with the QR Code.

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CONTENTS

1 Functions of Operating System

Chapter Objectives

- *Recapitulating the concept of operating system*
- *Discussing the need and functions of operating systems*
- *Knowing about various types of operating systems and their examples*
- *Listing the features, functions and advantages of GUI*
- *Introducing the term user interface*
- *Differentiating between command line and graphical user interfaces*

Short & Crisp

The OS provides a user interface (UI) that allows users to interact with the computer. It controls and communicates with hardware devices, manages the computer's memory, runs application programs, and manages files and folders.

Before We Start

Write the names of any four operating systems currently available in the market.

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

WHAT IS AN OPERATING SYSTEM?

An operating system (OS) is system software that manages computer hardware, software resources, and provides various services for computer programs. It serves as an intermediary between the hardware and software, allowing users and applications to interact with the computer system.When the computer is switched on, the operating system is the first program that gets loaded into the memory of the computer.

Different operating systems are designed for various purposes and may have different strengths and weaknesses, making them suitable for specific applications. Microsoft Windows, Unix, Linux, macOS, iOS, and Android are the examples of operating system.

Know More

Subject Enrichment

The computer software is categorised into two types: application software and system software.

- *Application software, often referred to as applications or apps, is a category of computer software designed to perform specific tasks or functions for users. For example, Microsoft Office Suite, Adobe Photoshop, Google Chrome, etc.*
- *System software is a type of computer software that serves as the foundation for running and managing a computer's hardware and application software. It provides essential functions and services necessary for the operation of a computer system. Operating system and device drivers are examples of system software.*

Need and Functions of Operating System

The operating system is the most important software that runs on a computer, and it is indispensable. It acts as an intermediary between the user, software applications, and hardware components by providing a stable and efficient environment for computing. The OS manages resources, ensures security, and offers user-friendly interfaces, making it possible for computers to perform a wide range of tasks effectively and seamlessly. The operating system performs the following functions in a computer:

Inter-Disciplinary (English)

- **Indispensable**: *Vital*
- **Abstraction**: *To reduce complexity by removing unnecessary information*
- **Concurrently**: *Executing multiple instructions at the same time*

- **Hardware abstraction**: The OS abstracts the underlying hardware, providing a consistent and simplified interface for software applications to interact with various hardware components.
- **Resource management**: The OS manages hardware resources such as CPU, memory, storage devices, and input/output (I/O) devices.
- **Multitasking**: An OS enables multitasking, allowing multiple programs or processes to run concurrently on a single computer.
- **Process management**: The running instances of programs are called processes. OS ensures that processes run without interfering with one another and that they have access to the resources they need to execute.
- **Memory management**: OS manages memory allocation and deallocation, allowing applications to store and retrieve data from RAM. It also implements techniques like virtual memory to maximise available memory and provide the illusion of vast memory space.
- **File system management**: The OS provides file systems for organising and storing data on storage devices. It manages files, directories, and access permissions, making it possible for users to store, retrieve, and organise their data efficiently.
- **Device management**: The OS handles communication with various hardware devices of a computer. It uses device drivers to enable applications to interact with these devices.
- **Security**: OS implements security mechanisms to safeguard the system and user data. This

includes user authentication, access control, encryption, and protection against malware and unauthorised access.

- **Networking**: Modern operating systems allow computers to connect to networks, access the Internet, and communicate with other devices.
- **Software compatibility**: Operating systems ensure software compatibility by providing a standardised environment for applications to run.

Life Skills and Computer Literacy

Exploratory Learning

Companies which develop operating systems regularly release updates and patches to improve security, fix bugs, and introduce new features. Keeping the OS up-to-date is crucial for system stability and security. Search Internet and find the latest versions of the following operating systems.

- *Microsoft Windows*
- *Android*
- *iOS*

Types of Operating System

There are several types of operating systems, each designed for specific computing environments and needs. Let us read about some of the most common types of operating systems.

- **Single-tasking operating systems**: These are simple operating systems designed for personal computers or embedded systems.They can only handle one user and one task at a time. Examples include early versions of MS-DOS and some embedded systems.

Subject Enrichment and Exploratory Learning

Embedded systems are specialised computing systems designed to perform dedicated functions or tasks, often integrated into larger systems or products. They can be found in everyday devices like household appliances, such as washing machines and microwave ovens. Search Internet and find some more examples of embedded systems.

- **Multi-tasking operating systems**: These operating systems allow a single user to run multiple programs or tasks concurrently. They are commonly used on personal computers and workstations. Examples include Microsoft Windows, macOS, and various Linux distributions.
- **Multi-user operating systems**: Multi-user operating systems allow multiple users to access and use the computer simultaneously. They are often used on servers and mainframes. Examples include various Unix and Linux distributions, and Windows Server.
- **Real-Time Operating Systems (RTOS)**: RTOSs are designed for systems that require immediate and deterministic responses to events, which means they must respond to inputs or events within a specified time frame. They are commonly used in embedded systems, robotics, aerospace, and industrial control systems. Examples include VxWorks, RT Linux, Symbian OS, QNX, and FreeRTOS.

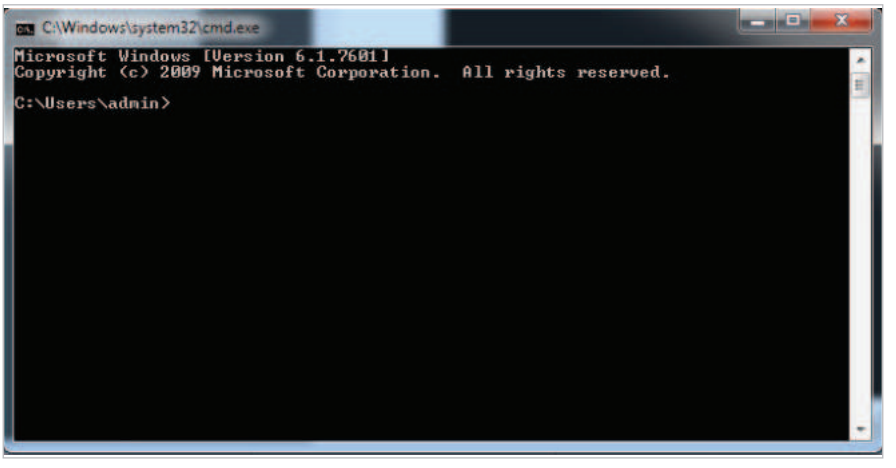
- **Distributed operating systems**: Distributed operating systems manage a group of networked computers as a single system.They are used to build distributed computing environments and cluster computing systems. Examples include Google's Android (for mobile devices) and distributed Unix variants like Plan 9.
- **Network Operating Systems (NOS)**: NOSs are specialised operating systems designed for managing and facilitating networked resources and services.They are often used in environments with shared file systems and centralised administration. Examples include Novell NetWare and Windows Server (with networking services).
- **Mobile operating systems**: These operating systems are designed for smartphones, tablets, and other mobile devices.They are optimised for touch interfaces and mobile hardware. Examples include Android, and iOS.

User Interface (UI)

A user interface (UI) is a means of interaction between a human user and a computer or any electronic device. It serves as the point of communication and exchange of information between the user and the system, allowing users to input commands, provide data, and receive feedback. Operating systems offer user interfaces that allow users to interact with their computers. These interfaces can be Command-Line Interfaces (CLI), Graphical User Interfaces (GUI), or a combination of both, making it easier for users to interact with the system.

Command Line Interface (CLI)

In a command-line interface, users interact with the system by typing text-based commands into a terminal or command prompt (the place where the user types the command and feeds to the system). CLIs can be less user-friendly for beginners because they require users to remember and type specific commands, options, and syntax. However, they can be efficient for experienced programmers, as they are commonly used in server administration, programming, and advanced system tasks. CLI interfaces consume fewer system resources because they do not require the graphical rendering and memory overhead of a GUI. Examples of CLIs include the Windows Command Prompt, Linux Terminal, and macOS Terminal.

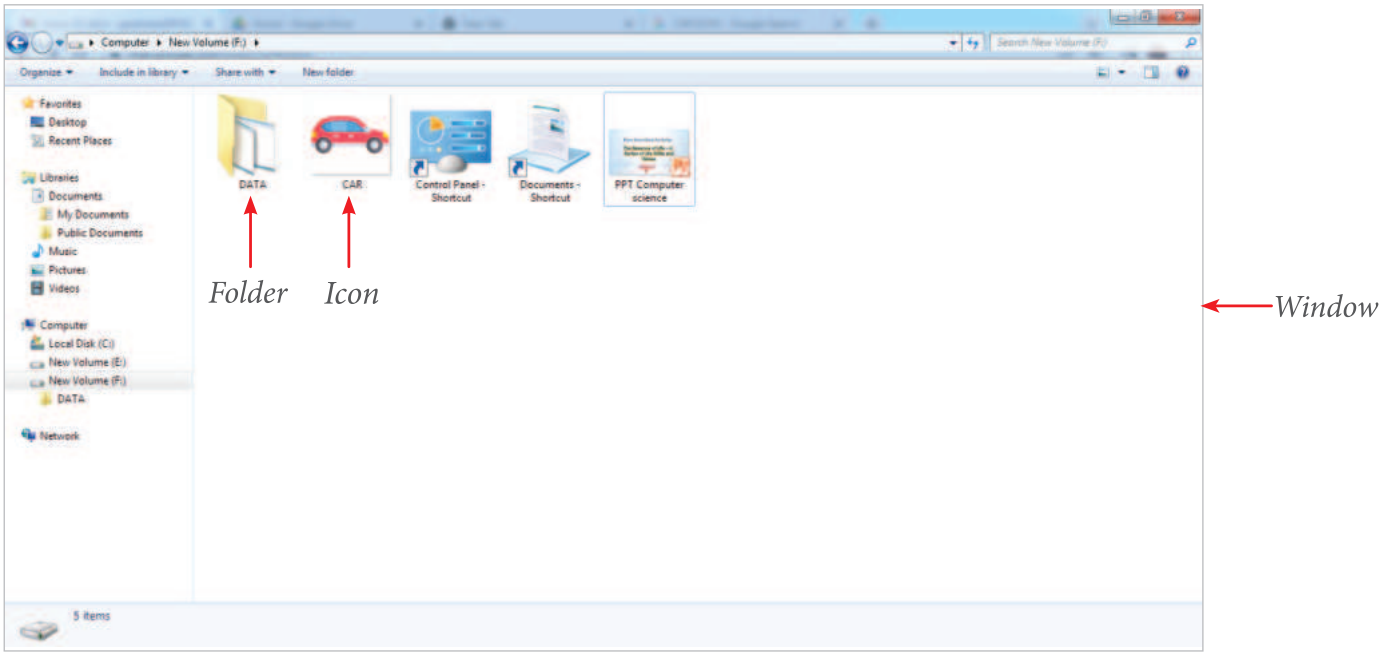


Command prompt window

Graphical User Interface (GUI)

Graphical user interfaces use graphical elements such as windows, icons, menus, and buttons to enable users to interact with the system. The users interact with the system by using a mouse, touchpad, or touchscreen to manipulate these graphical elements. They are visually intuitive and user-friendly, making them the most common user interface type for personal computers, smartphones, and most modern devices.

GUI interfaces consume more system resources due to their graphical elements. Popular GUI-based operating systems include Windows, macOS, Android, and various Linux distributions.



GUI of Windows 7

Advantages of GUI

Graphical user interfaces offer several advantages that make them widely used in modern computing environments. Some of the key advantages of GUIs are listed below:

- **User-friendly**: GUIs are designed to be user-friendly and intuitive, making them accessible to a broad range of users, including those with limited technical knowledge. Users can interact with the system by pointing, clicking, and dragging elements rather than typing complex commands.
- **Easy to learn**: New users can quickly grasp how to perform basic tasks without needing to memorise command syntax.
- **Visual representation**: GUIs provide a visual representation of files, folders, and applications, making it easier for users to understand the structure and organisation of their data and software.
- **Drag-and-drop**: GUIs allow users to drag and drop files, objects, and elements to perform various actions, such as moving, copying, or organising data.

- **Multitasking**: GUIs make it easy for users to multitask by allowing them to open multiple windows or applications simultaneously, switch between them, and perform tasks concurrently.
- **Accessibility**: GUIs can be designed to support accessibility features such as screen readers, voice commands, and text-to-speech, making computing accessible to individuals with disabilities.
- **Rich multimedia**: GUIs support the integration of rich multimedia elements, including images, videos, and animations, enhancing the user experience and enabling multimedia applications.
- **Customisation**: Many GUIs allow users to customise their desktop environments, such as changing wallpaper, themes, and desktop icons, to personalise their computing experience.
- **WYSIWYG Editing**: GUI-based applications often provide "What You See Is What You Get" (WYSIWYG) editing capabilities, allowing users to create and format documents, graphics, and designs without needing to understand underlying code.
- **Error handling**: GUIs can provide user-friendly error messages with visual cues (e.g., dialog boxes, warning icons) that help users understand and address issues.
- **Integration with hardware**: GUIs provide seamless integration with hardware devices, including printers, scanners, digital cameras, and input devices like mouse and keyboards.
- **Compatibility**: GUIs are supported on a wide range of computing platforms, including desktop computers, laptops, tablets, and smartphones, making them versatile and accessible.

DIFFERENCE BETWEEN GUI AND CLI

GUI-based operating system	CLI-based operating system
In GUI-based operating system, the user interacts with the system by clicking icons, pictures, menus and buttons using a mouse.	In CLI-based operating system, the user interacts with the system by typing text-based commands in the command prompt using the keyboard.
It provides visuals to interact with the operating system such as buttons, icons, images, etc.	The users need to type every command manually in order to perform the desired task.
GUI systems require both mouse and keyboard.	CLI systems just require a keyboard to work.
Windows, Linux and Mac OS are examples of GUI-based operating system.	MS-DOS (Microsoft Disk Operating System) and UNIX are examples of CLI-based operating system.

In a Nutshell

- An operating system (OS) is system software that manages computer hardware, software resources, and provides various services for computer programs.
- Modern operating systems allow computers to connect to networks, access the Internet, and communicate with other devices.
- There are several types of operating systems, each designed for specific computing environments and needs.
- Some of the common types of operating systems are: single-tasking operating systems, multi-tasking operating systems, multi-user operating system, real-time operating system, distributed operating system, network operating systems, and mobile operating systems.
- A user interface (UI) is a means of interaction between a human user and a computer or electronic device.
- Operating systems offer user interfaces that allow users to interact with their computers. These interfaces can be Command-Line Interfaces (CLI), Graphical User Interfaces (GUI), or a combination of both.
- In a command-line interface, users interact with the system by typing text-based commands into a terminal or command prompt.
- Graphical user interface uses graphical elements such as windows, icons, menus, and buttons to enable users to interact with the system.
- Graphical user interfaces offer several advantages that make them widely used in modern computing environments.

Brain Exercises

As Per NEP 2020

1. Tick (✔) the correct option.

(a) Which of the following manages the computer hardware and software?

(i) Operating system ☐ (ii) Utility software ☐

(iii) Language translator ☐

(b) Which of the following is an example of operating system?

(i) Android ☐ (ii) Unix ☐

(iii) Both (i) and (ii) ☐

(c) Which of the following tasks is not performed by the operating system?

(i) Hardware abstraction ☐ (ii) Creating documents ☐

(iii) Resource management ☐

(d) Which of the following is an example of real-time operating system?

(i) Microsoft Windows ☐ (ii) Plan 9 ☐

(iii) Symbian ☐

(e) Which of the following operating systems does not provide graphical user interface?

(i) Microsoft Windows ☐ (ii) MS – DOS ☐

(iii) Android ☐

2. Fill in the blanks with the correct words.

(a) When the computer is switched on, the _____ is the first program that gets loaded into the memory of the computer.

(b) The running instances of programs are called _____.

(c) Multiuser operating systems are often used on servers and _____.

(d) _____ user interfaces use graphical elements such as windows, icons, menus, and buttons to enable users to interact with the system.

(e) GUIs support the integration of rich _____ elements, including images, videos, and animation.

3. State true or false.

(a) Microsoft Windows and Android are examples of operating system. ☐

(b) Novell Netware is an example of distributed operating system. ☐

(c) An OS cannot allow multiple programs to run concurrently on a single computer. ☐

(d) GUIs allow users to drag and drop files, objects, and elements. ☐

(e) CLI systems require both mouse and keyboard to work. ☐

4. Define the following terms.

(a) Operating system

(b) Processes

(c) User interface

(d) Command prompt

5. Answer the following questions.

(a) What is the difference between application software and system software? Give examples also.

(b) Write any four functions performed by an operating system.

(c) How is single-tasking OS different from multitasking OS?

(d) Explain about real-time OS and distributed OS with examples.

(e) What is the difference between network operating system and mobile operating system?

(f) Briefly describe the two types of user interfaces provided by the operating systems.

(g) List any five advantages of GUI.

Case Study based questions

Critical Thinking

1. Kartik's father has a laptop on which he has installed Windows 7 operating system. Answer the following questions about Windows 7.
   (a) Is it a system software or application software?
   (b) Is it the latest version of Microsoft Windows?
   (c) What type of operating system is this?
   (d) What type of user interface does it provide?
2. Swati's elder brother has got a new iPhone on his 18th birthday. Which operating system is installed on an iPhone – Android, Microsoft Windows, or iOS?

Activity Time

Exploratory Learning

Given below are the logos of various operating systems. Identify and write the name of the operating system.

_____

_____

_____

_____

In the Computer Lab

Experiential Learning

1. **Search Internet and find information about the operating systems currently available in the market. Now, use this information to create a PowerPoint presentation on different operating systems. The presentation should have 8 to 10 slides. Use relevant pictures to make your presentation attractive.**
2. **Look at the interface of any three computers in your lab, and answer the following questions.**
   (a) Which operating system is installed in the computers?
   (b) Which version of the OS is it?
   (c) Does it provide CLI or GUI?

Teacher's Note

- Revise the concept of operating system discussed in previous classes.
- Briefly explain the functions of operating systems.
- Discuss the different types of operating systems with examples.
- Explain the difference between GUI and CLI operating systems.