Contents

1 HARDWARE AND SOFTWARE

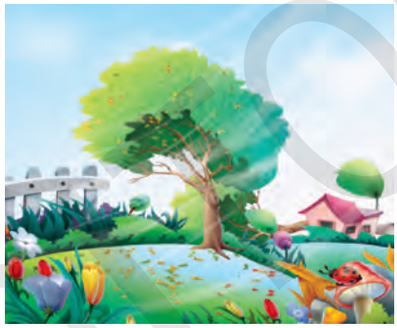
Learning Outcomes

At the end of this chapter, students will be able to:

- Differentiate between hardware and software.
- Define the main parts of the computer.
- Classify the computer parts into input, output and storage devices.
- Learn about the working of all parts of the computer in detail.

Warm-up

Identify and circle the name of the things you cannot see and touch.



Wind

Paper

Fan

Sound

Chair

Computer

Teacher's Note: *Apprise students that something which a person can see, feel or touch and have a physical existence are called tangible things, whereas the intangible is something which a person cannot see, feel or touch.*

Hello… we already know about the basics of computers. Now, we will learn about the functions of each part of the computer in detail.

Now, it is time to learn more about this wonderful machine.

KEY PARTS OF A COMPUTER

We already know that a computer is an electronic device that can do many tasks simultaneously. A computer system has different parts that together make it work. Based on processing, computer parts are divided into two groups:

- **Hardware**
- **Software**

HARDWARE

The parts of the computer that can be seen and touched are called hardware. Hardware refers to all electronic and mechanical parts of the computer system.

Further, computer hardware parts are classified as follows.

- Input devices
- Output devices
- Storage devices

Input Devices

A computer always needs a set of instructions to work. It cannot work on its own. The devices through which instructions are fed into the computer system are called Input devices. For example, keyboard is used to give instructions to the computer by typing.

Other input devices are a mouse, microphone, web camera, light pen and joystick.

KEYBOARD

Keyboard is the most common input device. Data and instructions are entered into the computer using its keys. There are different layouts of keyboards available like QWERTY, WASD and DVORAK. Amongst these layouts, QWERTY is the most commonly used layout.WASD keyboard is mostly used by gamers.

A keyboard has different types of keys. These keys are small buttons on the keyboard keys.

Some of the important keys are:

Alphabetical keys : A, B, C…..Z are alphabet keys. There are 26 alphabet keys.

Numerical keys : 0,1,2….9 are numerical keys. There are 10 numerical keys.

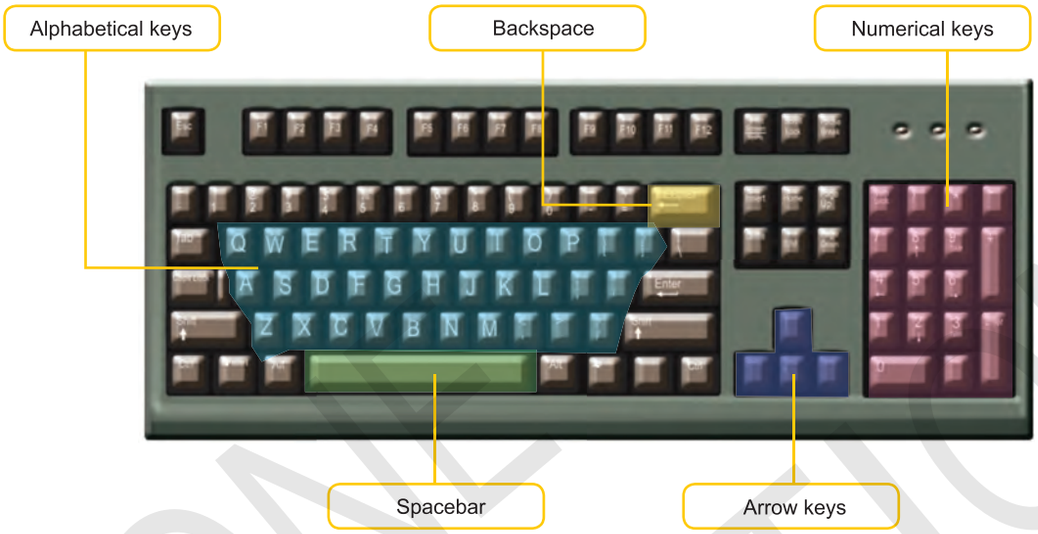
Do You Know?

On most keyboards, you type using all your fingers. There are some keyboards, however, that are designed specifically for thumb usage known as thumb-sized keyboards.

Spacebar : This key is used to insert spaces between the letters. It is the longest key on the keyboard.

Backspace : This key is used to delete any character before the current position of the cursor.

Arrow keys : These keys are used to move the cursor position in all directions.



MOUSE

A computer mouse is an input device that is used with a computer. It is a pointing device that can move the cursor to different items on the screen. Mouse has two buttons, the left button and the right button, with a scroll wheel. Today, many computers use wireless technology and have no wire.

Let me Answer

Differentiate between a real mouse and a computer's mouse.

There are three types of mouse namely wired, wireless and optical:

A wired mouse : A wired mouse is that type of mouse that has a wire. It is connected to a computer or a laptop directly. The transfer of information takes place through the wire.

Wireless mouse : It does not have any wire. It is not connected directly to any system. The transfer of information takes place in the form of radio signals.

Optical mouse : An optical mouse uses a light-emitting diode (LED). Movement is detected by sensing changes in reflected light.

MICROPHONE

Microphone is an input device that is used to record any sound or voice. It converts sound into an electrical signal.

WEB CAMERA

A webcam is a camera that connects to the computer and captures still pictures or motion videos.

Let me Answer

Can you do video calling on a PC using a web camera?

LIGHT PEN

A lightpen is a light-sensitive pointing input device that is used to draw things on the computer screen.

SCANNER

A scanner is an input device that is used to scan any document and print it on paper. We can also save the document on the computer.

Output Devices

MONITOR

A monitor is an output device that shows the work which we do on

a computer. It also displays the result and movement of the mouse pointer on the screen. It is also known as VDU(Visual Display Unit).

There are three types of monitors

1. CRT (Cathode Ray Tube)

These monitors are big in size and consume more power.

2. LCD (Liquid Crystal Display)

These are the monitors with flat screens which consume less power.

3. LED (Light Emitting Diode)

These monitors have a better display. They are thinner and lighter in weight. They consume 40 per cent less power than LCD.

CRT monitor

LCD monitor

LED monitor

PRINTER

It is a hardware output device that allows a user to print items on paper. Many printers can also work as photocopiers.

Laser printers

Laser Printers produce high-quality text and graphics. To print text and images onto the paper, it uses a focused beam of light.

Laser printer

Inkjet printer

Solid ink printer

Inkjet printers

These are also called bubble jet printers and print both text documents and high-quality coloured images, especially photos. These are cost-effective as compared to laser printers.

PROJECTOR

A projector is an output device that takes images generated by the computer and displays them on a big screen.

Storage Devices

HARD DRIVE

It is a storage device and has flat circular plates made of aluminium or glass that can store huge amount of data.

DVD

It stands for Digital Versatile Disk. It is used for data storage, recording, and playing audios and videos.

Pen Drive

It is also known as a USB stick that uses flash memory and can store a lot of data and applications. It is also used to copy and move data from one computer system to another.

Memory card

It is a small chip-like device that stores electronic data. It can also be inserted into a smartphone.

Processing Devices

CPU

CPU stands for Central Processing Unit. It is also called the Brain of the Computer as most of the functioning of the computer takes place in this part. It also controls all the other parts of the computer. CPU has three parts:

Arithmetic and Logic Unit (ALU)

This unit is responsible for all the arithmetic and logical operations of the computer.

Memory Unit (MU)

This unit is responsible for storing all the information on the computer. The memory can be volatile or non-volatile.

Control Unit (CU)

This unit controls the functioning of all the other units such as MU, ALU and devices.

REMEMBER IT!

The CPU sends signals to control the other parts of the computer, almost like how a brain controls a body.

Software

Softwares are the applications stored in the computer that we cannot see and touch. These are the set of instructions, data or programs that enables computers to work. Example of software are MS excel, MS Word, Tux Paint and many more.

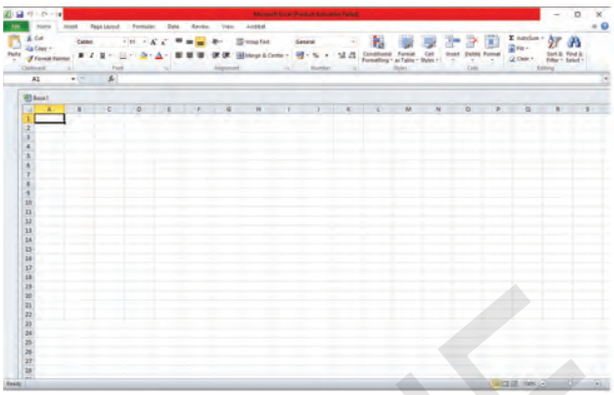
The software can be of two types:

SYSTEM SOFTWARE

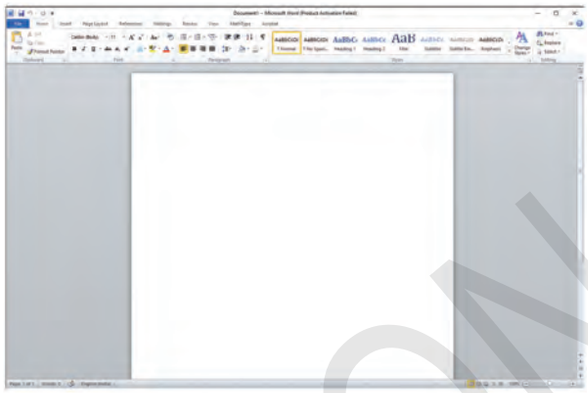
System software is designed to run a computer's hardware and provides a platform for applications to run. E.g. Operating System.

APPLICATION SOFTWARE

An application is a software that fulfils a specific need or performs tasks. Example: Paint, Excel, Games, Word etc.



Microsoft Excel



Microsoft Word

Kids' IQ

Write 'I' for input devices and 'O' for the output devices.

Keyboard ☐ Microphone ☐ Printer ☐

Let's Recall

- A computer system parts are divided into two groups namely: hardware and software.
- Hardware is the parts of the computer that we can see and touch.
- Software includes the applications of the computer that we cannot touch and see.
- Hardware is further classified into Input, Output and Storage devices.
- Software is classified as system software and application software.
- Monitor, printer, speaker and projector are output devices.
- Keyboard, mouse, microphone and web camera are input devices.
- Hard drives, DVDs and USB drives are storage devices.

Upskill Your Intelligence

A. Identify and name the following storage devices.




....

B. Fill in the blanks.

1. ..... software is designed to run computer's hardware and provides a platform for applications.
2. CPU stands for .....
3. ..... can also work as photocopiers.
4. ..... monitors consume 40 per cent less power than LCDs.
5. ..... captures still pictures and motion videos.

C. Answer the following questions.

1. What are output devices? Explain with examples.

   .....

   .....

2. Explain system software and application software in detail.

   .....

   .....

3. Why are LED monitors more economical than LCD monitors?

   .....

   .....

4. Explain any two storage devices.

.....

.....

5. How many types of printers are there? Explain.

.....

.....

D. Write down the full forms of the following abbreviations.

1. ALU – .....
2. DVD – .....
3. CRT – .....
4. LED – .....
5. LCD – .....

E. Write 'T' for True statements and 'F' for False statements.

1. ALU stands for arithmetic and logic units. ☐
2. There are 10 alphabet keys on a keyboard. ☐
3. Laser and inkjet are the type of printers. ☐
4. Mouse and microphone are output devices. ☐
5. CRT, LED and LCD are the types of monitors. ☐

F. Tick (✓) the correct answers.

1. Which is not hardware?

☐ a. Keyboard ☐ b. Mouse

☐ c. Monitor ☐ d. Microsoft Excel

2. Which is not a type of monitor screen?

☐ a. LED ☐ b. LCD ☐ c. CRT ☐ d. ALU

3. ..... takes images generated by a computer and displays them on a big screen.

☐ a. Projector ☐ b. Hard drive ☐ c. Monitor ☐ d. Light pen

4. Which is not a part of the CPU?

☐ a. ALU ☐ b. CU ☐ c. CRT ☐ d. MU

5. This software fulfils a specific need or performs tasks.

☐ a. Application ☐ b. System ☐ c. Speaker ☐ d. Hard Drive

Critical Thinking

A. Who am I?

1. I am the most commonly used layout of the keyboard. .....
2. I am responsible for all the arithmetic and logical operations of the computer. .....
3. CRT, LED and LCD are my types. .....
4. I can show images on the big screen. .....
5. ALU, CU and MU are my parts. .....

B. Identify the devices below and classify them as Input, Output and Storage devices.




....



....

Team Work

Assess which of the following devices are present in your computer lab. Use the lines below to write the names of the devices. Also, draw pictures of the same.

Type of Mouse : .....

Type of Printer : .....

Type of Monitor : .....

2 CLASSIFICATION OF COMPUTERS

Learning Outcomes

At the end of this chapter, students will be able to:

- Identify and explain the classification of computers based on size and power.
- Comprehend the use of different types of computers.

Warm-up

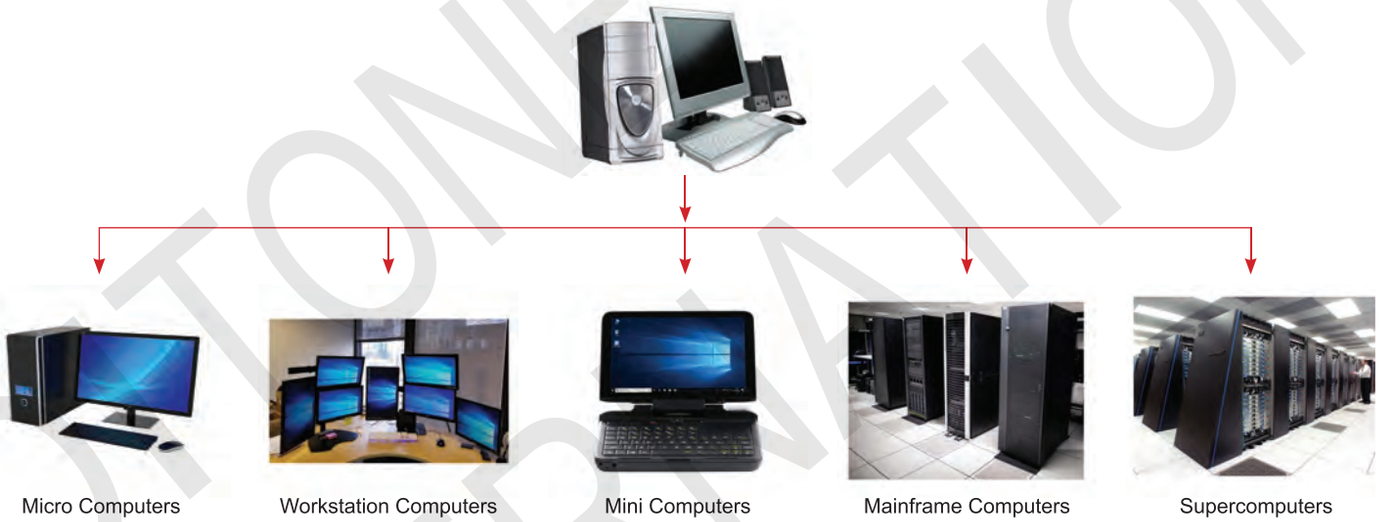
Look at the following pictures and number them out according to their sizes in ascending order.

Teacher's Note: *With the help of the above activity, inform students that the computers can be classified on the basis of the size and power.*

Hi! *I am Peter. I will introduce you to another classification of computers. We have already read about the hardware and software parts of the computer in the last chapter. Now, we will classify the computers on the basis of size and power.*

CLASSIFICATION OF COMPUTERS BASED ON SIZE AND POWER

On the basis of size and power, computers are classified into the following types:



MICRO COMPUTERS

These computers are minimal storage capacity computers. They are commonly used in offices, homes, shops etc. They are also referred to as Personal Computers. For e.g. HP PC.

Micro Computers are further divided into the following types:

Do You Know?

First mechanical computer was steam powered.

Desktop Computer

Desktop computer is a personal computer designed for regular use at a single location. It has a monitor, keyboard and a mouse attached with wires.

It also consists of UPS that helps us to work on the computer for some time even when electricity is cut off.

Laptop Computer

A Laptop computer or notebook computer is a highly portable computer that can be carried easily in a briefcase. Its size is smaller than a desktop computer and runs on a battery which can be recharged.

Tablet Computer

Let me Answer

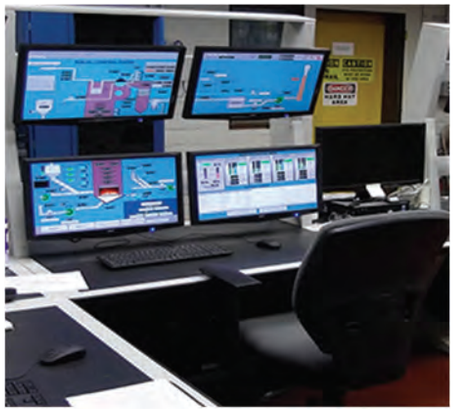
Which type of computers are there at your home?

A tablet computer is a small, flat computer that is operated by touching the screen. We can also write on it by using a pen called Stylus. It is smaller than a regular laptop and larger than a cell phone. It can be used for sending e-mails, watching movies, listening to music, etc.

REMEMBER IT!

UPS stands for Uninterrupted Power Supply.

WORKSTATION COMPUTER



Workstation computers, also known as desktop machines, are used for intensive graphical applications. They have more processor speed than personal computers.

MINI COMPUTERS

Mini computers are more expensive and more powerful than microcomputers but smaller, cheaper and less powerful than supercomputers. It is a multi-threaded system. Mini computers are used in industries and for scientific purposes. An example of a mini-computer is PDP-8.

SUPERCOMPUTER

Supercomputers are the most powerful digital computers. They are capable of handling huge amounts of calculations that are beyond human capabilities. They are usually thousands of times faster than any other computer. They are used for weather forecasting, space research and satellite control. An example of a supercomputer is PARAM Brahma.

CLASSIFICATION OF COMPUTERS ON DATA PROCESSING SPEED

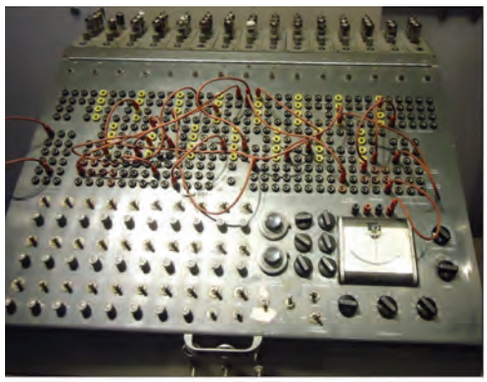
Let me Answer

What if we were governed by supercomputers?

DIGITAL COMPUTERS

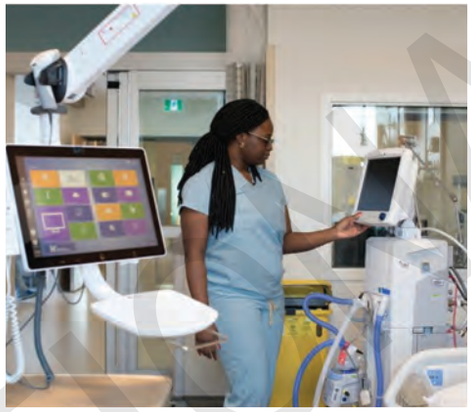
These computers are the most commonly used. It calculates the numbers and does logical operations. The main components of digital computers are input, process and output called the IPO cycle. They run on electronic signs and binary systems 0 and 1. Desktop, laptops and tablets are examples of digital computers.

ANALOG COMPUTERS



An analog computer is a computer which is used to process continuously changing data. They are used to measure and perform arithmetic calculations of numbers, the length of an object etc. They cannot store statistics. An example of an analog computer is IBM SYSTEM / 7.

HYBRID COMPUTERS



Hybrid computers are complex computer units built using both analog and digital properties and united by a single control system. These computers are used in scientific applications, aeroplanes, ships, and hospitals.

An example of a hybrid computer is HYDAC 2400.

Kids' IQ

Can you name the first Indian supercomputer?

Let's Recall

- Computers can be classified on the basis of size and power.
- On the basis of size and power, computers are classified as micro computers, mini computers, mainframe computers and supercomputers.
- On the basis of data processing speed, computers are classified as digital computers, analog computers and hybrid computers.
- An example of Analog Computer is IBM system / 7.
- Hybrid computers have the best features of Analog and Digital computers.

A. Number the following computers in descending order based on their sizes.

- Laptop computer ☐
- Mini computer ☐
- Supercomputer ☐
- Smartphone ☐
- Desktop computer ☐

B. Fill in the blanks.

1. ..... computer is minimal in size and storage.
2. ..... computers are used in scientific applications.
3. A ..... computer is a flat, small computer that has a small touchscreen display.
4. ..... computers run on electronic signs and binary data.
5. HYDAC 2400 is an example of ..... computer.

C. Answer the following questions.

1. Explain the classification of computers on the basis of size and power with the help of a diagram.

.....

.....

2. Explain Mini computers with examples.

.....

.....

3. Write a short note on supercomputers.

.....

.....

4. How is a Digital computer different from an Analog computer?

.....

.....

5. What are the features of Hybrid computers?

.....

.....

D. Write 'T' for True statements and 'F' for False statements.

1. Supercomputers can handle calculations that are beyond human capabilities. ☐
2. Analog computers can measure the length of an object. ☐
3. PDP-8 is a supercomputer. ☐
4. Hybrid computer systems have multiple control systems. ☐
5. Hybrid computers contain the best features of both analog and digital computers. ☐

E. Tick (✓) the correct answers.

1. Computers are classified on the basis of size and .....

☐ a. Speed ☐ b. Power ☐ c. Material

2. ..... computers can be carried easily in a briefcase.

☐ a. Workstation ☐ b. Super ☐ c. Laptop

3. Workstations are mostly used for .....

☐ a. Weather forecasting ☐ b. Intensive Graphical Applications

☐ c. Making a call

4. ..... computers are also referred to as personal computer.

☐ a. Micro ☐ b. Mini ☐ c. Super

5. Tablets and Laptops are the examples of ..... computer.

☐ a. Digital ☐ b. Analog ☐ c. Hybrid

F. Match the devices with their characteristics.

1.	UPS	a.	multi-threaded system.
2.	Tablet	b.	are used for weather forecasting.
3.	Workstations	c.	can make computer work without electricity.
4.	Supercomputers	d.	are also known as desktop machines.
5.	Mini computers	e.	works with a pen called stylus.

Critical Thinking

A. Mrs Peter owns a chain of schools. Now, she is thinking to open a school in a rural area. Also, she wants to install 15 computers in her school for the computer lab. Suggest to her the type of computer she should buy for the new school.

.....

.....

.....

B. Follow the instruction and colour the following computers on the basis of data processing speed.

Hybrid computer Digital Computer Analog Computer

Team Work

Find about the first mechanical computer and paste its picture below.