

# 1



# About a Computer

## We will learn about

- How a computer works
- Memory – primary and secondary
- Peripheral devices
- Wireless technologies

## How a computer works

The computer is a tool built around microprocessor or the CPU (Central Processor Unit). It has some basic parts.

### 1. The CPU which comprises

- Buses
- Ports and controllers
- ROM (Read Only Memory)
- RAM (Random Access Memory)

### 2. Input devices like the mouse and the keyboard

### 3. Output devices like the monitor and the printer

### 4. Secondary storage devices like CD-ROM, hard disk, pen drive, and zip drive

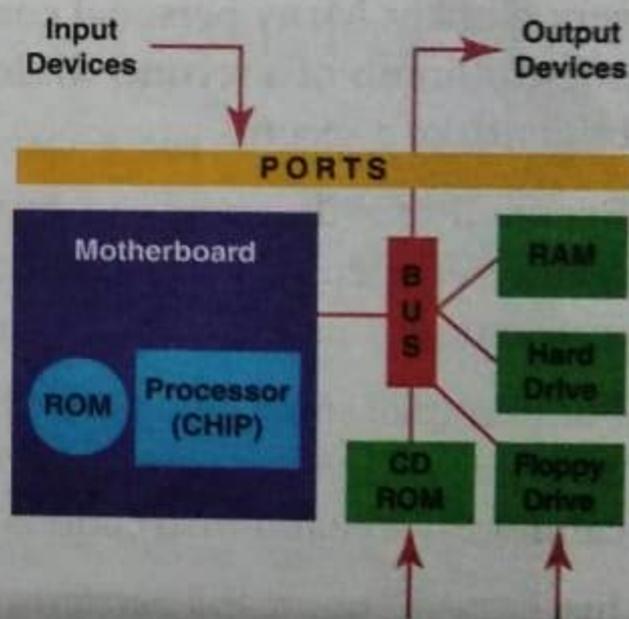


Fig 1.1 Inside the computer

The main work inside the computer is done in the CPU.

The inside of the CPU is like a complex circuit. This circuit consists of instructions for executing programs.

All computers have a CPU, which is where the processing takes place.

A CPU has two main parts—the Control Unit (CU) and the Arithmetic/Logic Unit (ALU).

Let us examine how the CPU and the memory work together to execute a program.

1. The instruction is given through an input device or a secondary storage device like a CD-ROM.

2. The program instruction and data are placed in the working memory or RAM.

- The data may take a stop in one of the registers.
- Then the control unit of the CPU takes instructions from the memory and decodes them.
- The required data is then transferred to the ALU.

The steps 4 and 5 are together known as instruction time or I-time.

- The ALU then takes control of the data and performs the arithmetical or logical operation.
- The result of the operation on the data is stored either in the ALU for sometime, or in a register.

The steps 6 and 7 are known as execution time or E-time.

- Finally, the control unit gives direction to the ALU to display the result of the operation on the output or the secondary storage device.

Most of the modern computers are able to process more than one instruction at a time, and very quickly. Many personal computers (PCs) can process instructions in almost less than one-millionth of a second while supercomputers can execute programs in even less than one-billionth of a second.

Every CPU is designed in a manner that enables it to understand specific instructions. Just as different people understand different languages, different CPUs have different sets of instructions that they can understand.

For example, some computers have Windows as their main operating software, while some others may have Macintosh. Therefore, a CPU that has Windows as its operating software cannot understand instructions from a Macintosh-based CPU and vice-versa.

Just like each house has a systematic address that helps to locate it, each instruction and data piece has an address inside the computer memory. Like a mailbox, the address numbers of the locations remain the same, but the contents (instructions and data) of the locations may keep changing. Re instructions or new set of data may replace the old content that is no longer needed to be stored in memory. However, a memory location can hold only a fixed amount of data depending on its size.

## Memory and storage

There are two main types of storage in a computer:

- Primary storage:** A computer stores data for a very short time in its primary storage. It is stored temporarily while a program is being executed.
- Secondary storage:** This is the place where data is held permanently or for a longer period of time.

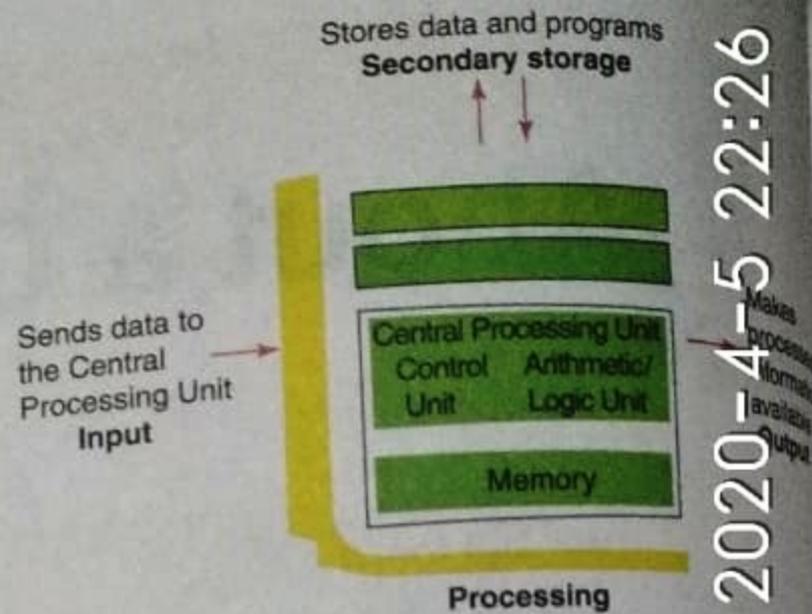


Fig 1.2 Working of a computer

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Primary storage, primary memory, main storage, main memory, internal storage, and RAM (Random Access Memory) are all referred to as memory in our everyday work.

Therefore, memory can be defined as that part of the computer where data and instructions currently needed for processing are held.

Memory stores program instructions or data for only as long as the program that is being currently used needs it. It allows very fast access to instructions and data, no matter where the items are located inside it.

The following table gives an overview of the different kinds of memory storage.

Storage	Speed of access	Data Storage Capacity	Relative Cost	Whether the data stored is permanent
Registers	Fastest	Lowest	Highest	No
RAM	Very fast	Low/Moderate	High	No
Hard disk	Moderate	Very high	Very low	Yes

Removable disks like DVDs or CDs are a good means to physically transfer huge amounts of data into the computer. However, today the Internet has become a major means of transferring data. Floppy disks and zip drives have become less popular and may soon disappear.

**Did You Know?**

**Registers: Temporary Storage Areas**

Registers are temporary storage areas for instructions or data. They are not a part of memory; but are special locations for storing data. They make storage very fast. The control unit directs registers to accept, hold, and transfer pieces of data or instruction so that ALU can perform operations at high speed. The control unit uses a data storage register in the same manner as a shopkeeper uses a cash register, to note down daily transactions, temporarily. This makes it a convenient place to store what is used in transactions.



**Peripheral devices**

Peripheral devices are those that are connected internally or externally to a computer and are used in the transfer of data.

Computer + Peripheral devices = Computing system

A computer processes data, which needs to be put inside the computer. We use peripheral devices to add or extract data into or from the computer. All input and output devices are known as computer peripherals. While peripherals like a keyboard and a mouse are input devices, some like a printer and monitor are output peripherals. There are others that are both input as well as output devices.

Let's take a look at the various peripheral devices of a computer.

**Monitor** It displays images generated by a computer program. It consists of a cathode-ray tube (CRT), somewhat similar to a television. Many computers today have monitors with a flat screen. The flat-panel uses liquid-crystal displays (LCDs) to produce the image.



**Keyboard** This is based on a common typewriter keyboard. It has keys for entering letters, numbers, and punctuation. It also has function keys, that can be used to perform different tasks depending on the program being used.

**Mouse** It is a pointing device that, when moved on a surface, moves the cursor on the screen. There are sensors inside a mouse which get initiated when the mouse ball is moved. This, in turn, sends the instruction to the computer through the port at which it is connected.



**Joystick** It is another pointing device which is mainly used while playing games on the computer.

**Light pen** It performs the same functions as the mouse, except that it needs to be held to the monitor screen. The sensors on the pen are able to detect the pixels (picture elements) present, which are then sent as a signal to the CPU through a cable.

**Stylus** It is a pointed device, something like a ball pen, which is mainly used with palmtop computers and mobile phones. Stylus is used in touch screen monitors to give the input.



**Hard disk drive** This is the most common type of storage device in a computer. It is used as an input as well as a storage device. It can be imagined as a stack of magnetized platters on which information is stored. It spins at a speed of about 3600 revolutions or more per minute, within a sealed case. It can store a huge amount of data.



**Optical disk** Have you ever seen a CD or a DVD? CD-ROMs and DVDs are optical disks, where data can be stored and retrieved with light. When the light of a laser beam falls on a pattern of pits drawn on an optical disk, data is read. The most common kinds of optical disks are:

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- CD-ROM (Compact Disk-Read Only Memory)
- DVD (Digital Versatile Disk or Digital Video Disk) is a commonly used optical disk storage media which is mainly used for video and data storage. It looks like a CD-ROM but can store more than six times the data than a CD-ROM.
- WORM (Write Once Read Many)

**Scanner** This is a device that is used to convert a picture, drawing, photograph, or just about anything into a digital image that can be read by the computer and processed by it. The image that a scanner translates becomes a graphical image and cannot be modified by a text program. Editing it is possible only by using a graphic program like Photoshop.



**Printer** This is a commonly used output device, through which we can place text and images from the computer on to paper or other surfaces.

There are many types of printers depending on the printing speed and quality. Some of them are:

- Dot matrix printers: these printers produce images with the help of dots arranged to form the letter, number, line, or any other character.
- Inkjet printers: these printers have ink in a well-like container, which they spray through tiny holes to form the pattern of the character on paper.
- Laser printers: these are the fastest and best quality printers that resemble a photocopying machine.



Fig 1.3 Different types of printers

**Modem (Modulator-demodulator)** This is a device needed to connect one computer to another, through a basic telephone line for exchanging information on the Internet.

## Wireless technologies

Technology has enabled devices to get connected to each other wirelessly (without wires). Have you ever wondered how the television gets controlled with a remote? Are there any wires connecting the two? No. They are connected to each other through a wireless technology.

Some of the popular wireless technologies used are:



**Infrared communication** In this technology, data is transferred and communication takes place with the help of infrared ports. Remotes of various appliances like the television, music systems, air conditioners, etc. use infrared transmission system.

**Bluetooth** Nowadays, devices like mobile phones, laptops, digital cameras, music systems, etc. have a special wireless connection system called the bluetooth. This enables transfer of data wirelessly from one bluetooth-enabled device to the other. However both devices need to have a bluetooth connection.



**WiFi technology** WiFi is a high-speed wireless technology that connects WiFi equipped devices with the help of radio waves to each other, to a LAN, or the Internet without wires. WiFi connections usually have a long range. We can even have access to them in public places like airports, hotels, office complexes, malls, etc.

**GPS** This stands for Global Positioning System. A GPS system involves a receiver that receives and transmits signals through a satellite. It is used primarily for locating the position or location of the user. The GPS system is used in many fields of study like vehicle tracking system, navigation, mapping, and survey.

Did You Know?

Home networks can be connected by a wireless technology to your handset so that you can operate appliances like air conditioners, music systems, televisions, etc.

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## Wordbank

<b>CPU</b>	The Central Processing Unit, which is known as the control centre of a computer
<b>Primary storage</b>	Place where a computer stores data temporarily for a very short time, while a program is being executed
<b>Secondary storage</b>	Place where data is held permanently or for a longer period of time
<b>Peripheral devices</b>	Devices that are connected internally or externally to a computer
<b>CD-ROM</b>	Referred to as Compact Disk-Read Only Memory
<b>DVD</b>	Referred to as Digital Versatile Disk or Digital Video Disk, an optical disk storage media which is mainly used for video and data storage
<b>WORM</b>	Referred to as Write Once Read Many
<b>Scanner</b>	A device that is used to convert an image of something, like a picture, drawing, photograph, or just about anything into a digital image that can be read by the computer
<b>Printer</b>	An output device, through which we can place text and images from the computer onto paper or other surfaces
<b>Modem</b>	Modulator demodulator, a device needed to connect one computer to another, through a basic telephone line, for exchanging information on the Internet

## We have learned

- The Control Unit and the Arithmetic/Logic Unit are two main parts of the CPU and help in processing data.
- There are two main types of storage in a computer—primary storage and secondary storage.
- Primary storage, primary memory, main storage, main memory, internal storage, and RAM, are all referred to as memory.
- Peripheral devices are those that are connected internally or externally to a computer and are used in the transfer of data.
- The monitor consists of a cathode-ray tube (CRT), somewhat similar to a television.
- A joystick is a pointing device, which is mainly used for games.
- The light pen needs to be held up to the monitor screen to perform.
- The stylus is a pointed device, like a ball pen, which is mainly used with a palmtop.
- Optical disks store data that can be retrieved with light. The most common kinds of optical disks are CD-ROM, DVD, and WORM.



# **UNACCO SCHOOL**

Excellence in Education

STUDY MATERIAL

SUBJECT- COMPUTER SCIENCE

CLASS-VIII

## CHAPTER -1 ABOUT A COMPUTER

Q1. a) Make a flowchart to show how a computer works.

Ans:

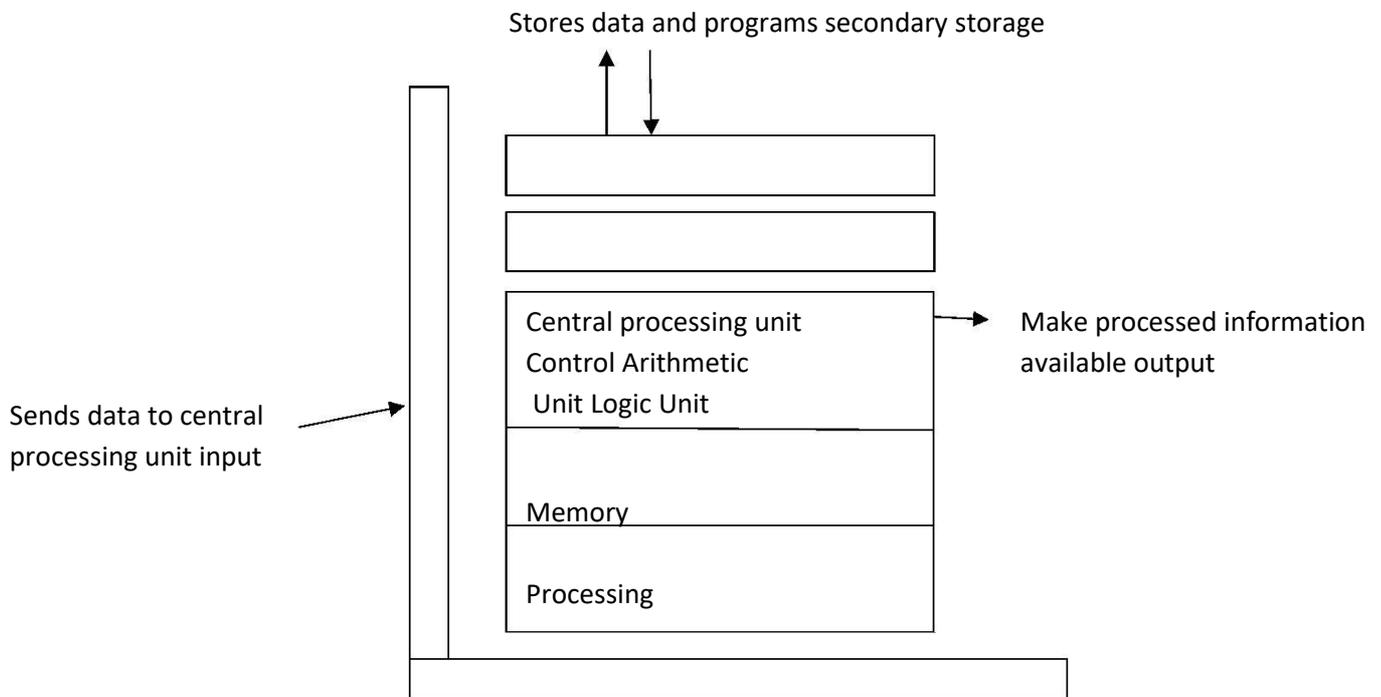


Fig: working of a computer (page - 8)

b) What is CPU? Name Its Parts.

Ans: CPU is the place where processing of any task takes place. It is read as Central Processing Unit.

A CPU has two main parts

- 1) The Control Unit
- 2) Arithmetic Logic Unit (ALU).

c) How is program executed in the CPU? Mention the steps.

Ans : 1) The instruction is given through an input device or a secondary storage device.  
2) The program instruction and data are placed in the working memory or RAM  
3) The data takes a stop in one of the registers.

- 4) The control unit of the CPU takes the instruction from the memory and decodes them.
- 5) The required data is then transferred to the ALU.
- 6) The ALU then takes control of the data and performs the arithmetical or logical operation.
- 7) The result of the operation on the data is stored either in ALU for sometime or in a register.
- 8) Finally the control unit gives direction to the ALU to display the result of the operation.

d) What are main types of storage in a Computer?

Ans: The main types of storage in a Computer are:-

- i) Primary storage.
- ii) Secondary storage.

e) What is memory? What are its types?

Ans: Memory is the place where programs instructions or data are stored in temporarily or permanently.

Types of memory are:

- 1) Primary
- 2) Secondary

f) What are peripheral devices?

Ans : Peripheral devices are those electronic devices that are connected internally or externally to a computer and are used in the transfer of data.

Eg. Keyboard, Mouse, Printer etc

g) Write a short note on wireless technologies.

Ans : In wireless technologies all the enable device get connected to each other without wire.

Some of the popular wireless technologies are :-

- i) Infrared communication: Data is communicated with the help of infrared ports.
- ii) Bluetooth: Transfer of the data takes places through one Bluetooth enable device to the other.
- iii) Wi-Fi technology: it is the high speed wireless technology that connects with the help of radio waves.
- iv) GPS: it involves a receiver that receives and transmit signal through a satellite.

### **Extra Question**

Q1. Differentiate between instruction time and execution time.

Ans : Instruction time is the time taken when the control unit of the CPU takes instruction from the memory and decodes them. The decoded data is transferred to the ALU. Whereas an execution time (E-time) is the time taken when ALU performs the arithmetical or logical operation and the result of the operation on the data is stored either in ALU or in a register.

Q2. Differentiate between primary memory and secondary memory .

Ans: Primary memory is the place where data can be stored temporarily while a program is being executed.

Eg: ROM, RAM

Whereas secondary memory is the place where the data is stored permanently.

Eg: Hard Disk, Pen drive etc

Q3. Name some common types of printer.

Ans : i) dot matrix printer

ii) inkjet printer

iii) laser printer

Q4. What is a modem?

Ans: A modem is a device that needs to connect one computer to another through a basic telephone line for exchanging information on the internet.

Q5. Write a short note on optical disk.

Ans : Optical disks store data that can be retrieved with light. The most common kinds of optical disks are CD-ROM, DVD and WORM.

### **HOME ASSIGNMENT**

Q1. Explain the following devices:

a) Keyboard. b) Mouse. c) Printer. d) Monitor e) light pen

Q2. Log on to the internet and find out information on different types of storage devices of a computer. Prepare it in MS Word.

Q3. Write the uses and advantages of Bluetooth. Make a list of few Bluetooth devices.