

# Early Computers

After this part, students should be able to:

- List the names of famous computer inventors and describe what each inventor invented.

Computers have touched every part of our lives: the way we work, the way we learn, the way we live, even the way we play. It's almost impossible to go through a single day without seeing a computer, a device dependent on a computer, information produced by a computer, or a word that was introduced or whose meaning has changed with the arrival of computers. Because of the significance of computers in today's world, it is important to be computer literate. Being **computer literate** means you have knowledge and understanding of computers and their uses.

Here is a list of famous inventors (date born – date died) and their inventions. Some computers were also invented by a group of inventors working for companies.

## 1. Charles Babbage – United Kingdom (26 December 1791 - 18 October 1871)

Inventions	Description	Year
Difference Engine	First mechanical computer or an automatic computing engine capable of computing several sets of numbers and making hard copies of the results. The machine was NOT completed because of lack of funding.	1822
Analytical Engine	Babbage designed this first programmable mechanical computer but never built by him. His son completed a part of the machine to perform basic calculation in 1910.	1837

## 2. Tomas Harold Flowers – United Kingdom (22 December 1905 - 28 October 1998)

Inventions	Description	Year
Colossus	The world's first electronic computer – the first programmable and digital computer to help break German's code during world war II.	1943

## 3. John Adam Presper Eckert Jr. – USA (April 9, 1919 – June 3, 1995) & John William Mauchly – USA (August 30, 1907 – January 8, 1980)

Inventions	Description	Year
ENIAC	First general purpose electronic digital computer. It occupied about 1,800 square feet and used about 18,000 vacuum tubes, weighing almost 50 tons.	1946

## 4. Henry Edward "Ed" Roberts - USA (13 September 1941 – 1 April 2010)

Inventions	Description	Year
Altair 8800 - Personal Computer (PC)	First commercially successful personal computer. Ed was also known as the father of personal computer.	1974

## 5. International Business Machines corporation (IBM) - USA

Inventions	Description	Year
IBM 5100	First portable computer, weighed 55 pounds and had a five inch CRT display, tape drive, 1.9MHz PALM processor, and 64KB of RAM.	1975

6. **Steve Jobs - USA (24 February 1955 - October 5 2011)**

Inventions	Description	Year
Apple 1 & II 	First personal computer to have a graphical user interface and mouse rather than a command line interface. The apple 1 computer was designed by Steve Wozniak and Steve Jobs. 	1976

7. **Bill Gates - USA (28 October 1955)**

Inventions	Description	Year
MS-DOS and Microsoft Software	First successful operating system known and Microsoft windows and the office applications used by majority of people throughout the world. 	1981



**Activity 0.1**

**Famous names in Computing**

"Who invented the computer?" is not a question with a simple answer. The real answer is that many inventors contributed to the history of computers.

- List the names of famous computer inventors.

1		4	
2		5	
3		6	

- Pick five (5) individuals from the list of inventors and fill in the details and describe briefly their main inventions in the spaces provided.

<b>Inventor 1</b>	
Name: _____	Country: _____
Date of birth: _____	Date of death: _____
Description of invention:	
_____	
_____	
_____	

**Inventor 2**  
 Name: \_\_\_\_\_ Country: \_\_\_\_\_  
 Date of birth: \_\_\_\_\_ Date of death: \_\_\_\_\_  
 Description of invention:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Inventor 3**  
 Name: \_\_\_\_\_ Country: \_\_\_\_\_  
 Date of birth: \_\_\_\_\_ Date of death: \_\_\_\_\_  
 Description of invention:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Inventor 4**  
 Name: \_\_\_\_\_ Country: \_\_\_\_\_  
 Date of birth: \_\_\_\_\_ Date of death: \_\_\_\_\_  
 Description of invention:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Inventor 5**  
 Name: \_\_\_\_\_ Country: \_\_\_\_\_  
 Date of birth: \_\_\_\_\_ Date of death: \_\_\_\_\_  
 Description of invention:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## Computer Definition

After this part, students should be able to:

- (i) define a computer.
- (ii) describe the four major principal components of a computer (Input, Output, Processing and Storage).

### Definition

The word "computer" was first recorded as being used in 1613 and was originally used to describe a human who performed calculations or computations. The definition of a computer remained the same until the end of the 19th century when people began to realise machines never get tired and can perform calculations much faster and more accurately than any team of human computers ever could.

**Modern definition:** A **computer** is an electronic machine, operating under the control of instructions stored in its own memory, that can accept data, process the data according to specified rules, produce results, and store the results for future use.

**Data** is a collection of raw unprocessed facts such as alphabets, numbers and symbols.

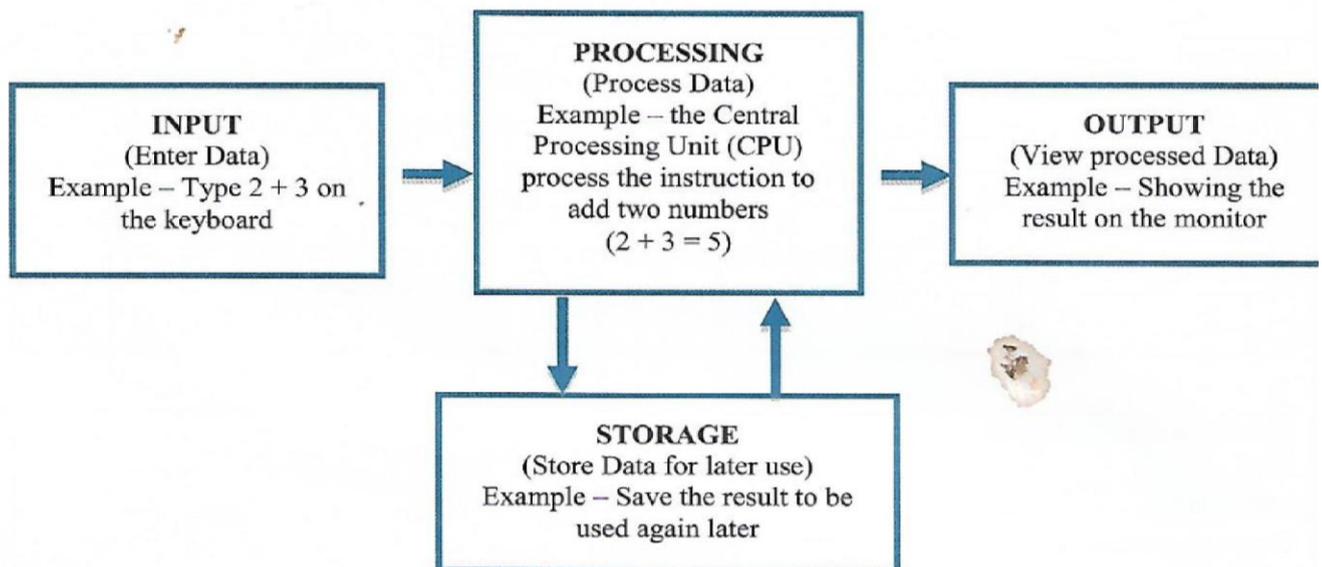
To process data, a computer uses hardware and software.

**Hardware** is the electric, electronic, and mechanical equipment that makes up a computer. **Software** is the series of instructions that tells the hardware how to perform tasks.

A computer performs four basic operations: **INPUT**, **PROCESSING**, **OUTPUT** and **STORAGE**.

#### The four basic operations of a computer

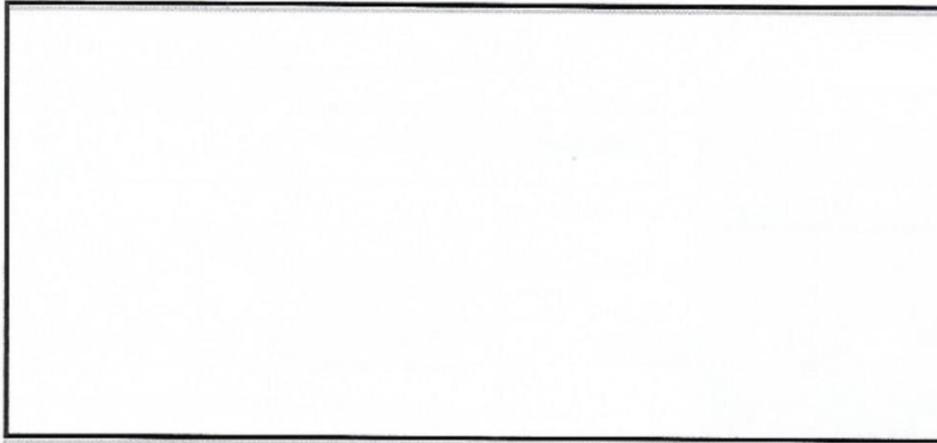
A computer receives data or instructions as input from the user, stores it for a period of time, process according to the instructions (known as a computer program) and provides the user with an output.



#### Activity 0.2

#### Computer definition

1. Provide a simple definition of a modern computer.
2. Draw a diagram to show how the four basic operations of a computer.



3. Fill the table below with the correct basic operation of a computer to match the correct definition.

	Basic Operation	Definition of the basic operation
1		Accepts data or instructions from the user
2		Keeps data for the user's later use
3		Can process data as required by the user
4		Shows to the user the results of the data being processed

## Computer System

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After this part, students should be able to:

- (i) Describe the major components of a computer system (user, application software, Operating system /software and Hardware)

### Definition

A computer system has two major components, these are

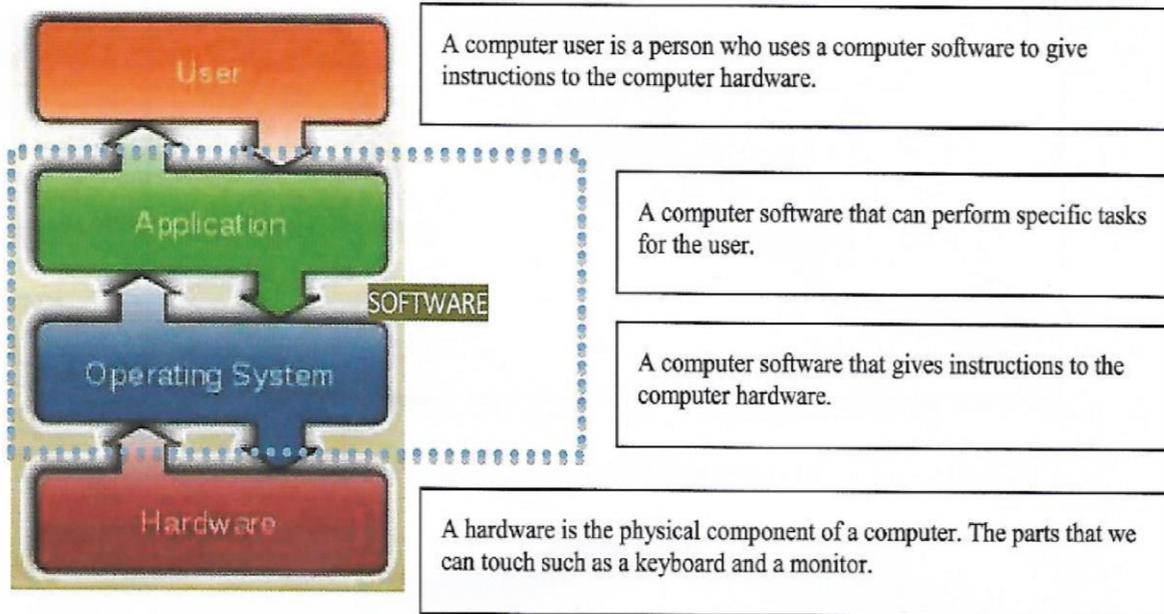
- Hardware
- Software

**H**ardware is the physical components that make up the computer system. Hardware is useless without software to run on it.

**S**oftware is the instructions that tell the computer hardware what to do. Software is useless unless there is hardware to run it on.

**Note:** For a computer system to be useful it has to consist of both hardware and software.

Most computer systems are divided into four different layers.



### Facts about computer systems

- A computer program is also known as a computer software.
- There are two main categories of computer software; a system or application software.
- A computer hardware can only be useful if it has an operating system and applications.
- A computer must have an operating system in order to perform user's tasks.



### Group work

*In groups of three, identify some examples in your school that you can use to explain the different layers of a computer system. Each group can present the result of their group work to the rest of the class using the table below.*

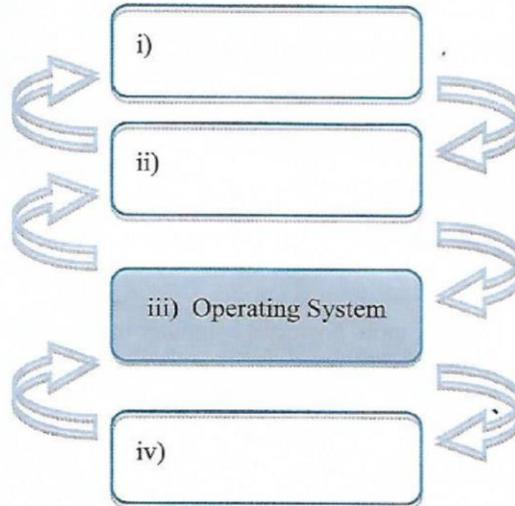
Computer Systems	Examples in school
Computer user	
Application	
Operating System	
Hardware	



**Computer system**

*A Questions*

1. A computer system is divided into four different layers. Fill the missing layers on the diagram below.



2. Complete the table by entering the correct layer that corresponds to the given descriptions.

Description	Computer system layer
The physical part of a computer that we can see and touch	
A computer program that control the hardware with specific instructions	
A computer program that is use by the user to perform specific tasks	
A person that uses a computer to perform various tasks	

## Types of computers

After this part, students should be able to:

- (i) Identify and describe the different categories of computers.

Computer systems can be categorised according to their sizes, processing speed, power and price.

There are four different categories of computers:

1. Microcomputer
2. Minicomputer
3. Mainframe
4. Super Computer

Things you should know about these different types of computers



## Microcomputers

**Description:** A microcomputer is a complete computer on a smaller scale and is not expensive to buy.

- ❖ Microcomputers are also called Personal Computers or PC
- ❖ Microcomputers include desktop computers, tower model computers, notebook or laptop computers, handheld computers, and Internet appliances.

## Minicomputer

**Description:** A minicomputer is a computer a bit more powerful than a microcomputer but not powerful than a mainframe computer.

- ❖ Minicomputers are also known today as **mid-range servers**, which can normally support up to several thousands users at the same time.



## Mainframe computer

**Description:** A mainframe is a larger, expensive, more powerful computer that can handle hundreds or thousands of connected users at the same time.

## Super computer



**Description:** A supercomputer is **the fastest, most powerful, and most expensive** type of computers.



Some useful information about the different types of computers.

Things to know.	Microcomputer	Minicomputer	Mainframe Computer	Supercomputer
Where you can find these computers?	homes, school, and offices	small companies and institutions	Big universities, big companies and large banks	Bigger Universities, and big research institutions
How big the computers are?	pocket size to half a draw	a cabinet draw of a filing cabinet	A mini cabinet to a full size cabinet	The size of a filing cabinet to a full room
How much you have to pay?	\$100 – 2,000	\$3,000 – 20,000	\$20,000 – 500,000	\$ millions



### Activity 0.4

#### Types of computers

1. Name the four different categories of computers.
  - i.
  - ii.
  - iii.
  - iv.

2. Fill the table below with the correct type of computer that matches the description.

Computer Description	Category of computers
A computer that is a bit more powerful than a PC but not a mainframe	
A small computer that can fit a pocket	
The most powerful and most expensive computer	
A computer bought by a big university for \$140,000	

3. Fill each space with the appropriate type of computer from the list inside the brackets.

My father bought a \_\_\_\_\_ (laptop, minicomputer, mainframe) as a gift for my birthday for \$1,800. He often allowed me to use his \_\_\_\_\_ (desktop, mini, mainframe) computer, which stands on his office desk. My father works with smart scientists in a very huge science research laboratory and they use a \_\_\_\_\_ (PC, mainframe, super) computer, which is one of the most expensive computer ever build in America. The computer is so huge that it can fill one room. He also uses another \_\_\_\_\_ (micro, mainframe, super) computer for smaller research work that requires not so much processing power as with a super computer but I was told that the computer is quite expensive.

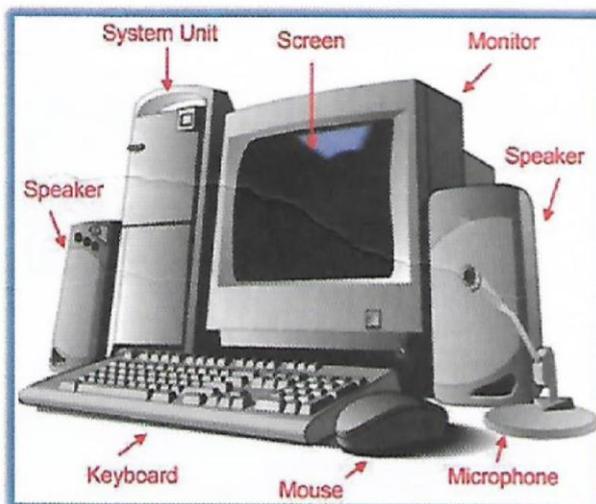
## Computer Hardware and peripherals

After this part, students should be able to:

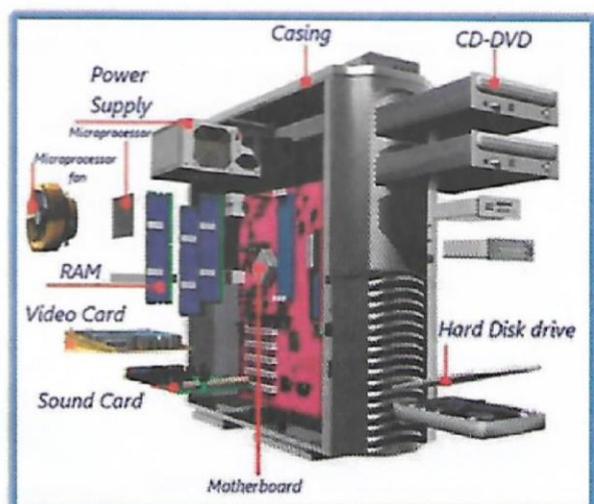
- Identify and label major hardware components of a PC including basic computer interfaces/ports.
- Describe the functions of major hardware components (CPU, storage, motherboard)
- Identify and compare the different categories of standard and peripheral devices (Input, Output, Communication, Processing and Storage).
- Describe the characteristics of key peripheral devices (keyboard, mouse, monitor, printer, multimedia devices).

### 1. Major Computer Hardware Component

Outside of a Computer



Inside of a Computer





### Group work

**Task 1:** Teacher to provide one full set of computer hardware similar to the pictures above; both the outside and inside components.

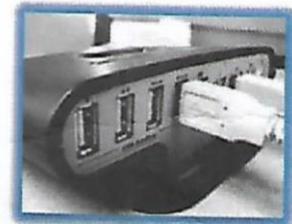
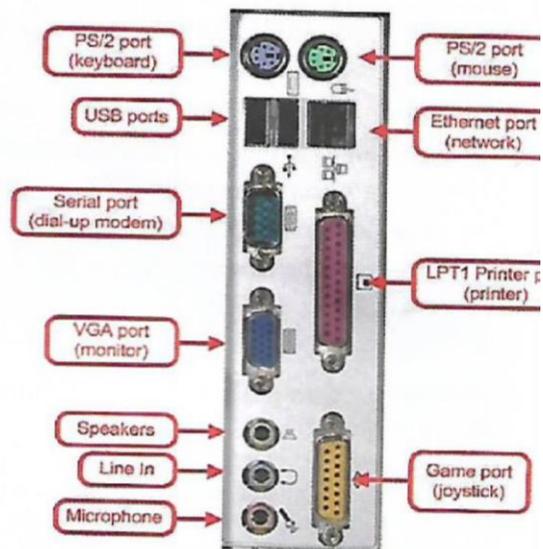
**Task 2:** Students to work in pairs and each student to quickly sketch a picture of the computer in front of them on a piece of paper. Each student is required to identify five different components on the picture and ask the other student to complete the table below..

Outside Component	Inside Component
i)	i)
ii)	ii)
iii)	iii)
iv)	iv)
v)	v)

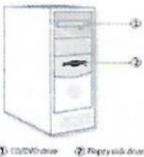
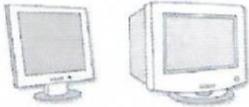
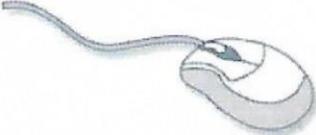
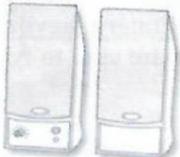
### Computer Ports

Ports are computer components designed to connect **peripheral devices** to the computer. There are three common ports used to connect other devices.

- Serial Ports** (COM & PS/2) are normally used by modems and communication devices.
- Parallel Ports** (LPT1) are used for devices that send and receive data in groups of bits like printers.
- Universal Serial Bus** (USB) is the most common connections used today. Almost every computer comes with one or more Universal Serial Bus connectors. These USB connectors let you attach mice, printers, flash drives, digital camera and other accessories to your computer quickly and easily.
- VGA port** is used for connecting a computer to a monitor.



## Main Functions of Hardware Components

INSIDE COMPONENTS	OUTSIDE COMPONENTS
<p><b>Motherboard:</b> The motherboard connects all of the parts of a computer together. The CPU, memory, hard drives, optical drives, video card, sound card and other ports and expansion cards all connect to the motherboard.</p> 	<p><b>System Unit:</b> The main computer box placed on or underneath a computer desk. Inside this box are many electronic components of the computer.</p> 
<p><b>Central Processing Unit (CPU):</b> The CPU or processor sometimes called the brain of the computer, and its job is to carry out commands. Whenever you press a key, click the mouse, or start an application, you're sending instructions to the CPU.</p> 	<p><b>Monitor:</b> The displays information in visual form, using text and graphics. There are two basic types of monitors: <b>CRT</b> (cathode ray tube) monitors and the newer <b>LCD</b> (liquid crystal display) monitors</p> 
<p><b>Power Supply Unit:</b> Converts the electrical power from the wall outlet to the type of power needed by the computer. It sends power through the cables to the motherboard and other components.</p> 	<p><b>Keyboard:</b> A keyboard is used mainly for typing text into your computer</p> 
<p><b>Random Access Memory (RAM):</b> RAM is the computer system's <b>short-term memory</b>. Whenever a CPU process instructions, the computer <b>temporarily stores</b> the data in the RAM until it is needed.</p> 	<p><b>Mouse:</b> A mouse is a small device used to point to and select items on your computer monitor.</p> 
<p><b>Hard Drive:</b> Is the data center of the computer. This is where the software is installed, and it's also where your documents and other files are stored.</p> 	<p><b>Speakers:</b> To play sound. They can be built into the system unit or connected with cables. Speakers allow you to listen to music and hear sound effects from your computer.</p> 
<p><b>Optical Drive:</b> Optical drives retrieve and/or store data on optical discs like CDs and DVDs.</p> 	<p><b>Printers:</b> A printer transfers data from a computer onto paper. You don't need a printer to use your computer, but having one allows you to print e-mail, cards, invitations, announcements, and other material.</p> 

### Common Input/Output (I/O), communication and processing devices.

INPUT (Data sent to the computer)	OUTPUT (Data displayed from the computer)	COMMUNICATION (Data being transmitted to other devices)	PROCESSING (Control storing and retrieving of data)
Keyboard	Monitor or TV	Computer modem	CPU

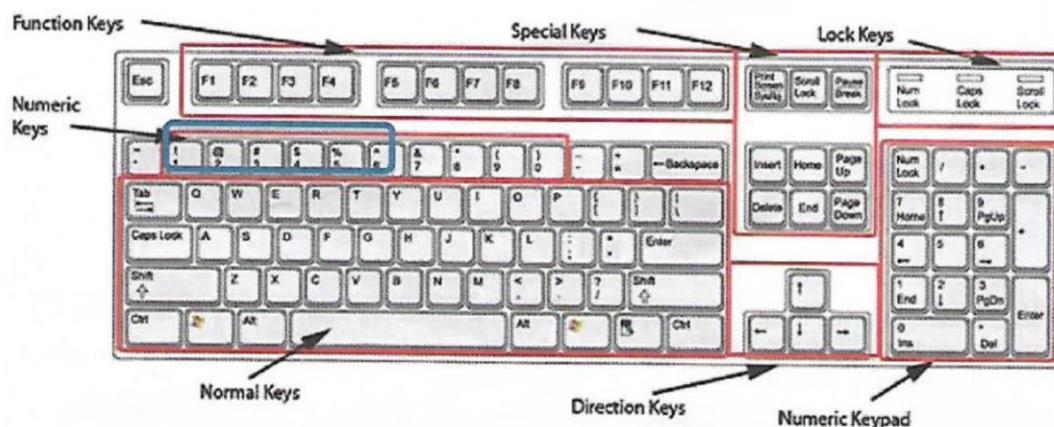
Mouse	Printers	Network Interface cards (NIC)	Graphics cards
Web Cam or Digital Camera	Headphones	WIFI or wireless access cards	Computer Memory
Scanner	Speaker	Bluetooth	Network cards
Microphone	Data Projector	Smart phones	Sound cards

### Basic characteristics of key hardware devices.

#### 1. Keyboard

One of the primary input devices used with a computer. Keyboards allow a computer user to input letters, numbers, and other symbols into a computer.

Today most users use the QWERTY style keyboards, as shown below.



The different types of keys on the keyboard are:

#### Function Keys (F1, F2, F3..F12):

Perform specific task when required by the computer program.

#### Number keys (Numeric keypad/keys):

The number keys are used to type numbers. 0,1,2,3,4,5,6,7,8,9.

#### Alphabet keys:

The letters are used to type text. The letters from A to Z are called as alphabet keys

#### Space bar key:

The longest key on the keyboard is the space bar. It is used to give spaces between characters

#### Arrow keys (Direction or navigation keys):

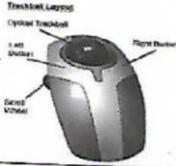
There are four arrow keys on the keyboard. Arrow keys are used to move in different directions and they are:

- Up arrow
- Down arrow
- Right arrow
- Left arrow

#### 2. Mouse

A mouse is an input device and very important part of a computer. A mouse is the part of the computer that you hold onto to move the mouse pointer around on the screen, and to click on the links and buttons on the computer monitor or screen.

There are four types of computer mice:

Type	Characteristic	Picture
Mechanical mouse	Holds a hard rubber ball that rolls as the mouse is moved. Sensors inside the mouse body detect the movement and translate it into information that the computer understands.	 Mechanical Mouse
Optical mouse	Uses a LED sensor to detect tabletop movement and then sends off that information to the computer.	 Optical Mouse
Laser mouse	The laser mouse uses an infrared laser diode instead of a LED to light up the surface beneath its sensor.	 Laser Mouse
Trackball- mouse.	Like an upside-down mouse. Rather than roll the mouse around, you use your thumb or index finger to roll a ball on top of the mouse.	 Trackball Mouse

### 3. Monitor (Computer Screen or Display)

Monitors are used to view data from a computer through the video graphic o display cards. The most important characteristics of a monitor depend on the following:

- i) **Size:** Computer screen sizes are measured in diagonal inches, the distance from one corner to another opposite corner diagonally.
- ii) **Resolution:** The quality of what is being displayed on the screen.
- iii) **Bandwidth:** The amount of data that can be transmitted to the monitor.

Monitors come in two major types - LCD or CRT. CRT monitors look much like old-fashioned televisions and are very deep in size. LCD monitors are much thinner, use less energy, and provide a greater graphics quality.



LCD monitor



CRT Monitor

### 4. Printers

A printer is any device that prints text or pictures on paper. There are three main types of printers;

1. **Dot-matrix:** Creates characters by **striking pins against an ink ribbon**. Each pin makes a dot, and combinations of dots form characters and illustrations.
2. **Ink-jet:** **Sprays ink at a sheet of paper**. Ink-jet printers produce high-quality text and graphics.



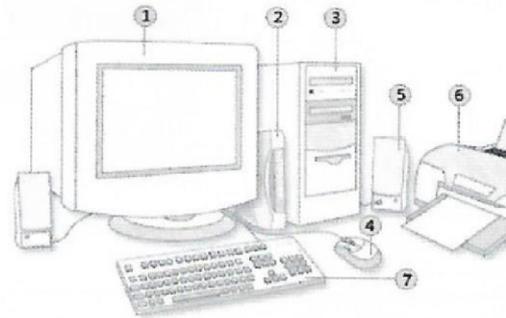


Activity 0.5

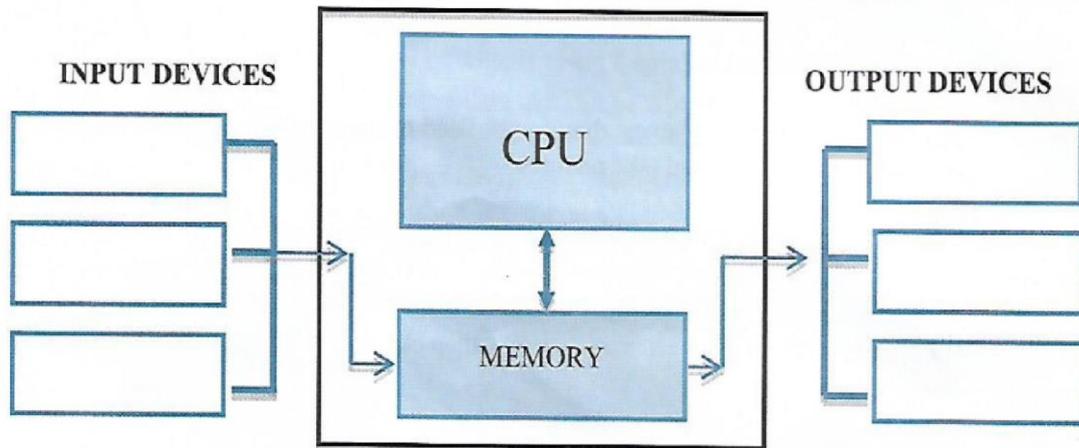
The computer hardware

1. Name the different computer hardware components labeled 1 – 7 on the diagram below.

- 1. \_\_\_\_\_
- 2. Modem
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_



2. Complete the diagram below by filling the boxes with the appropriate hardware components.



3. Pick the correct hardware component from the list to complete the statements below. These are hardware components inside a computer.

MOTHERBOARD, CPU, RAM,  
HARD DRIVE, POWER SUPPLY

- i) The \_\_\_\_\_ is sometimes called the brain of the computer.
- ii) To connect all the main components of the computer you will need a \_\_\_\_\_.

- iii) You need a \_\_\_\_\_ unit to provide the type of power for the computer.
- iv) It's known as the short-term memory so \_\_\_\_\_ can only hold data when the power is on.
- v) A \_\_\_\_\_ is used for storing software and other useful files.

4. These are pictures of peripheral devices. You can describe the characteristic of each device by answering the following.

- i) What is the common name for the device?
- ii) What is the main function of the device?

* Peripheral Device	Characteristics
	<ul style="list-style-type: none"> <li>i.</li> <li>ii.</li> </ul>
	<ul style="list-style-type: none"> <li>i.</li> <li>ii.</li> </ul>
	<ul style="list-style-type: none"> <li>i.</li> <li>ii.</li> </ul>
	<ul style="list-style-type: none"> <li>i.</li> <li>ii.</li> </ul>

5. Name a device that can be connected to these ports.

- i) Serial port \_\_\_\_\_
- ii) Parallel port \_\_\_\_\_
- iii) USB ports \_\_\_\_\_
- iv) VGA port \_\_\_\_\_