TOPIC 1: CONCEPT OF INFORMATION

Data: This is unprocessed piece of fact.

Information: This organized data which give meaning full sentence or statement.

RELATIONSHIP BETWEEN DATA AND INFORMATION

Data is like if i tell ETX 2005 , its data to you , and if I add on that saying it's your license number then its information for you, so data and information are interrelated to each other.

SIMILARITIES

i) Both can be presented in alphabets

ii) Both can be presented in number

iii) Both can be presented in symbols

DIFFERENCES

i) Data is a row fact which is unprocessed while information is data that has been processed.

ii) Data is the lower level of knowledge while information is the second level of knowledge.

iii) Observation and recording are done to obtain data while analysis is done to obtain information

SOURCES OF INFORMATION

Sources of information can be categorized in two groups.

PRIMARY SOURCES

Primary sources of information allow the learners to access original and unedited information. A primary source requires the learner to interact with the sources and extract information.

E.g; person interview   E-mail contact, Event, Discussion, Debate, Community meeting, Survery, Artifact, Observation of object canimate and inanimate.

SECONDARY SOURCES

Secondary sources are edited primary sources, second - hand versions.

They represent someone else's thinking

E.g. Book, CR- Rom, Encyclopedia, Magazine, Newspaper, Video tape, Audiotape, TV.

Primary or Secondary

- Internet website

- Graph, Chart , diagram , table

IMPORTANCE OF INFORMATION

i) Creating awareness.

ii) Educating people

iii) Alert people on danger

iv) Giving instructions

v) Help in decision making

vi) Used in advertising goods

QUALITIES OF INFORMATION

i) Information should be *RELEVANT.*   The information should be logical and fit to the level of recipients.

ii) The information should be *UNDERSTANDABLE*. Understandability of the information should be clear to the recipients.

iii) *TIME LINES,* every information should have a range of time that can be useful.

iv) *RELIABILITY ,* Information should be reliable to the receiver

INFORMATION DISSEMINATION

This is the process of spreading or distributing information using various ways from one individual to another.

The process of disseminating information can be grouped into three main parts.

1.Source ⟹ **2.Medium** ⟹ **3. Receiver**

SOURCES OF INFORMATION

- This is the origination of the message or the information to be disseminated.

- The sources can be directly or indirectly meaning that the information can be collected directly from the communication media.

MEDIUM

- This includes the means of spreading the information such as newspapers, signs, magazines, radio, television, telephone, computer (with internet) etc.

RECEIVER

- The people or audience intended to receive the information.

WAYS OF DISSEMINATING INFORMATION

i) Traditional ways

ii) Modern ways

TRADITIONAL WAYS

Uses traditional tools to spread information e.g.   Songs,drums,poems,whistle.

MODERN WAYS

Uses modern tools to spread information e.g. Internet, TV, radio station, magazine

DIFFERENCE BETWEEN TRADITIONAL AND MODERN WAYS

TRADITIONAL WAYS	MODERN WAYS
1) Slow in disseminating information	- Quick and faster to disseminate the information
2) Most of medium or equipment are manual operated	Equipment are electrically equipped
3) Messages can be sent with in short distance	Distance coverage is big
4) The cost of sending the messages is too high	The cost of sending message is very low e.g. E-mail
5) The information reach few people	Many people can get information at the same time

THE COMPUTER

This is the electronic device that receives data input and processed it into output.

OUTPUT: This is the processed data from a computer.

INPUT   :   This is the unprocessed data which enter a computer.

STORAGE: The computer holds data internally during and after processing.

PROCESSING: This is the convention of input data into output data.

INPUT $\Longrightarrow$ **PROCESSING** $\Longrightarrow$ **OUTPUT**

CHARACTERS OF COMPUTER

1) SPEED

Computer has a very high speed in working

2) ACCURACY

Computer never makes errors; normally errors are made by users.

3) STORAGE

Computer has memory for storing data.

4) TIRELESSNESS.

Computer never gets tired

5) VERSATILITY

Computer can perform jobs logically step by step.

COMPUTER APPLICATION

- **COMPUTER IN EDUCATION**

1) Gathering information from the internet
2) Develop science project

3) Teaching and learning process

COMPUTER IN HEALTH

In health computer are used for

1) Diagnosing illness

2) Modifying parents health development

3) Assisting surgeons

COMPUTER AT HOME

1) Writing letter

2) Listening music

3) Playing games

4) Watching movies

COMPUTER IN LAW ENFORCEMENT POLICE

In law enforcement police, computer is used as

1) Storage of information

2) Making documents and printing the documents

3) DNA finger printing

COMPUTER IN MUSIC INDUSTRY

1) Composing music

2) Editing sound

3) Editing video

INPUT:

This is unprocessed data which enter in a computer.

TYPES OF INPUT

1) DATA

Is the raw facts given to the computer.

2) PROGRAMS

Are the sets of instruction to direct the computer.

3) COMMANDS

Are special codes or key word that the user input to perform a task like RUN accounts

INPUT DEVICES: These are the devices used to enter data into a computer

⇒Examples of input devices:-

i)KEYBOARD: It is the most important input device

STANDARD KEYBOARD: Have approximately 101 to 106 keys

TYPES OF KEYS

a) Letter keys : A to Z

b) Number keys   : 0 to 9

c) Direction or cursor keys : (up , down , right , left keys)

d) Punctuation keys

e) Symbols keys.

f)Specials keys (Esc, Enter , Tab, DEL, Shift, Alt, Ctrl, Ins, Page up, Page down , Home, caps Lock, Scroll tack , Print , Screen end)

g) Function key. f1, f2, …… f12

ADVANTAGES

a) Reliable for data input and number

b) Usually supplied with computers so no additional cost

c) Specialized keys are available

ii)DIGITAL CAMERA

The input device which take photograph and convert into digital image.

HOW CAMERA WORKS

The light from the object pass through the lens to the light, Sensor and convert it into digital image then image is taken to the memory chips from the memory chips image.

iii)   MAGNETIC STRIPE READER

Magnetic stripe: These ate thin strips of magnetic tape which are usually found on the back of credit and debit cards.

ADVANTAGES OF STRIPE READER.

a)   Simple to use

b)   Data can be altered

c)   Cheap to produce magnetic stripe

iv)   JOYSTICK

Input device control the movement of a pointer on the screen just like mouse. Usually used for playing computer games.

v)   MICROPHONE

Used to in-put sound into a computer

vi)   VIDEO DIGITIZER

This device is used to convert analogue signals from a video camera or video cassette recorder into a digital format.

The digitized video data can be saved as a file or played on the screen interface used: Fire wire

vii)   MIDI INSTRUMENT

These are devices used to produce music.

They have Midi- port with specialized software digitized music into digital data so as a file.

a)Stored as a file

b)Edited

c)Displayed on screen

viii)   REMOTE CONTROL

It is a device which emits a beam of infra- red light carrying digital data to a TV.

ADVANTAGES

a) Simple to use

b) Each button has a specific function

ix) BAR CODE READER

Input device used to read bar codes and send data into a computer.

BAR CODES: Are patterns of printed lines of different thickness

 OUT PUT

This is the processed data from a computer.

TYPES OF OUTPUTS

1)   SOFT COPY OUTPUT

This is intangible / untouchable output.

2)   HARD COPY OUT PUT

This is the tangible / touchable output e.g. printed page

TOPIC 2: THE COMPUTER

What is computer studies?

-      A computer study is a subject which deals with features of computers and the ways and methods of using it.

Objectives: -

This unit is intended to enable students to understand:

- The basic definition of a computer
- The meaning/definitions of important (key) words
- The main (basic) functions/ processes of the computer
- How a computer works
- Characteristics/features of a computer
- Advantages of a computer
- Applications (uses) of computer in different areas of human life
- Different types of computers.

What is a computer?

- Is an electronic machine that accepts data from an input device performs arithmetic and logical operations according to predefined program and finally transfers the processed data to any output device.

- An electronic machine that processes raw data to generate (produce) information.

- Is an electronic machine that receives (accepts) input (raw data), processes it, and then produces output (information)

- Is an electronic machine that can be programmed to accept data (input) and process it into useful information (output)

- Is an electronic machine (device) that works under the control of stored programs, automatically accepting and processing data to produce information.

- Is an electronic machine that operates (works) under the control of instructions(programs) stored in its main memory, that can accept data (input), manipulate the data according to specified rules (process), produce results or information (output), and store the results for future use.

A good definition of computer contains the basic functions of a computer i.e. input, process, Storage, Output.

A COMPUTER BLOCK DIAGRAM
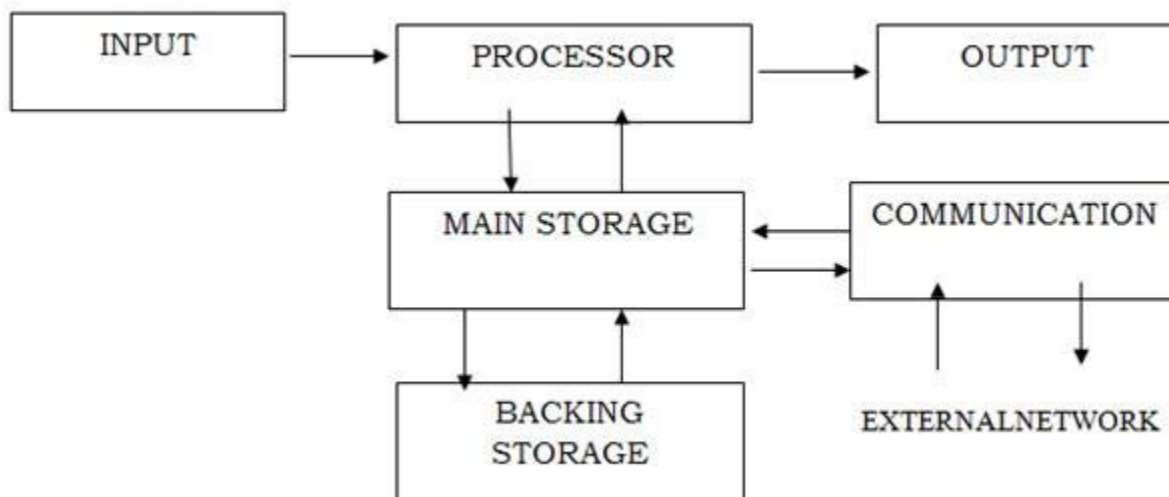
BASIC FUNCTIONS OF A COMPUTER

INPUT: Is any data or instructions entered into a computer.

There are four types of input which are: -

(i)   Data

(ii)   Programs

(iii)   Commands

(iv)   User responses

STORAGE: Is the ability of a computer or an area in a computer to hold data instructions and information for future use.

Two types of computer storage are:

(i)   Main storage (main memory),

(ii)   Backing storage

PROCESSING; in the activity of changing data into information.

OUTPUT: Is data that has been processed into a useful form called information.

Types of output:

The four common forms of output are:

- Text e.g. words, sentences, paragraphs.
- Graphics e.g. drawings, charts, photographs.

- Audio e.g. music, speech or any other sound.
- Video e.g. played back images.

COMMUNICATION: Is the sending and receiving of data and programs from one computer or secondary storage device to another.

HOW A COMPUTER WORKS

All digital computers work esentially the same way.

A human operator uses input equipment to enter data and instructions into the computer. The processor then performs manipulation on the data, while the memory stores information during

processing. The results then are sent to the output equipment, which presents them to the user. File storage devices enable information to be saved for future use.

CHARACTERISTICS (FEATURES) OF A COMPUTER

(i)   It is very fast,

(ii)   It is very accurate and reliable

(iii)   It can work continuously without getting tired or bored.

(iv)   It can work on and store large amounts of data items

(v)   It can solve any problem if a relevant set of instructions is input,

(vi)   It is able to access or recovers, retrieve large volumes of data.

(vii) It is able to communicate with other computer systems in a network.

ADVANTAGES AND DISADVANTAGES OF COMPUTER

(a) Advantages

- It works at a very high speed
- Its results are very accurate and reliable
- It can work continuously without getting tired or bored
- It can work on the stored large amounts of data items
- It can solve any problem if a relevant set of instructions is input, (computer never think, bad programs will also produce bad output GIGO –garbage in garbage out)
- It is flexible
- It reduces paper work significantly.
- It reduces number of employees in organizations.
- It uses a small office space
- It is automatic.
- It allows fast retrieval of information from a storage space.
- It can store information efficiently
- Computers can move information very quickly from one person to another.

(a) Disadvantage

- It is costly
- It becomes outdated very fast due rapid changes in computer technology, hence it leads to capital loss
- It causes loss of employment in certain fields.

- It can fail. Such failures can cause loss of life e.g in traffic control system.
- Too much work at the computer causes nerve injuries.
- Loss of employment
- Loss of secrets
- Eye damage
- Loss of data.

APPLICATIONS OF COMPUTER IN DIFFERENT AREAS OF HUMAN LIFE

IN EDUCATION

- To teach (give courses) in different subjects
- To give Computer Assisted Instructions (CAI)
- To give Computer Assisted Learning (CAL)
- To keep records
- As a reseach tool e.g. to analyse data from experiments
- To process records
- To assist in education management.
- To keep records of books and borrowers in a library.

MEDICINE (HEALTH)

- To assist in hospital administration
- To keep records of employee and patients
- To monitor conditions of patients e.g. temperature, heart-beats
- To help doctors to investigate illness (diagnosis) and prescribe treatments.
- To do medical research.

HOME

- For recreation e.g. playing games, listening to music
- As an education tool
- To store personal information
- To access to news when connected to the internet
- To access databases
- As a home accountant to keep a track of expenses and to balance a family budget
- To protect homes against crimes from burglary vandals by using electronics security systems.
- For alert emergence services automatically e.g fire brigade, police.

IN INDUSTRY AND ENGINEERING

- To design drawing for products using Computer Aided Design (CAD) programs e.g. airplanes, bridges, cars, buildings, electronic circuit boards.
- To manufacture products using Computer aided Manufacturing (CAM)
- To plan and control major projects.

- To simulate (predict what will happen in real-life situation from a model situation.) e.g. turning of traffic lights.
- To control some operations in automobiles e.g mixing of fuel and air entering the engine
- A branch of computer science called artificial intelligence, uses programs that help to solve problems by applying human knowledge and experience e.g. in medicine, law etc.

IN BANKING AND BUSINESS

- To allow bank clerks and customers to find out bank balances in an account
- To help bank clerks to record money paid in and out
- To check computer sensitive cheques, to do reservation system for airline travel by checking of there is a free seat on a flight.
- To help retailers to check out stock at a supermarket
- To control industrial robots
- To allow people to use Automatic Teller Machines (ATM) in cash withdraw and transfer funds between accounts.
- To keep track of current prices of market stocks, bonds currency.
- Creates an effective way of producing document e.g. reports, brochures, cards.

MILITARY

- It can be used for planing and decision – making
- It can used by planners to stimulate wars
- It can be used to guide modern weapons such as missiles and field artillery.

IN GOVERNMENT

- It can be used for internal revenue services e.g to provide reports for tax purposes.
- It can be used for planning, analysis, forecast, sampling, predictions etc.
- It can be used for weather forecasting ,
- It can be used for Law enforcement

IN TRANSPORTATION

- It can be used for a Traffic control
- It can be used in driving stimulator
- It can be used for reservation systems
- Are embedded in aircraft to provide efficiency in flying.
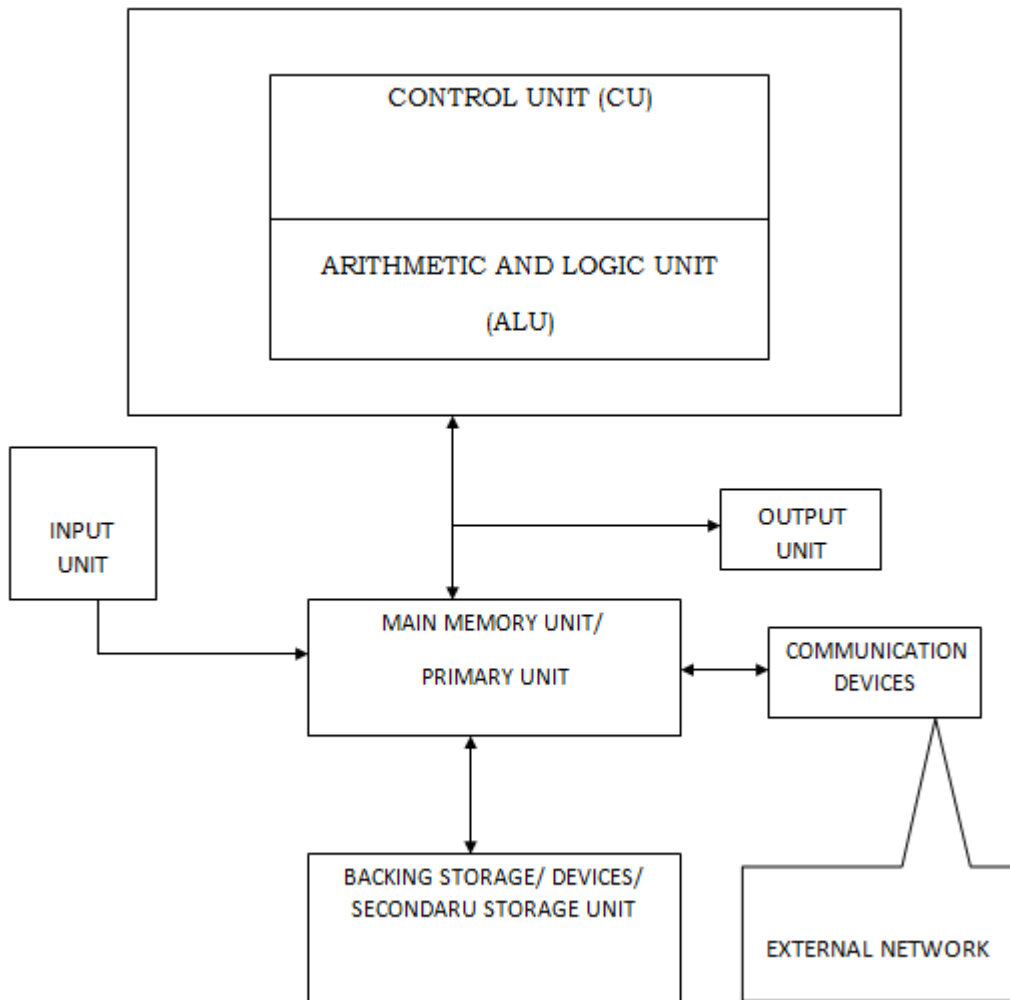
COMPUTER HARDWARE

- Is a collection of machines (physical components or elements) which form a complete computer system.
- Is the actual machinery that makes up the computer system.
- Is the collection all physical pieces of equipment (elements) that makes up a computer system.
- Is a set of devices that accept data, processes them and displays them.
- Is the set of all pyhsical parts of the computer.

TYPES OF COMPUTER HARDWARE

COMPUTER HARDWARE is a composed of the following components/elements according to the functions of the computer:

- Input devices or input hardware
- Central processing unit (CPU) or processing hardware
- Output devices or Output hardware
- Secondary storage devices or storage hardware
- Communication devices or Communication hardware

HARDWARE DEVICES	EXAMPLES
Input hardware (Input devices)	Keyboard,scanner
Processing hardware (Processing devices)	The control units,the main memory
Output hardware (Output devices)	Printer, Monitor and plotter
Storage hardware (secondary storage devices)	Hard disk,Floppy disk,CD,RAM,DVD-ROM
Computer communications hardware (Computer communications devices)	Modem,CRT and terminals

A BLOCK DIAGRAM FOR CLASSIFICATION OF COMPUTER HARDWARE COMPONENTS (DEVICES or ELEMENTS)

```
┌─────────────────────────────────────────────┐
│    ┌─────────────────────────────────────┐   │
│    │        CONTROL UNIT (CU)             │   │
│    │                                     │   │
│    ├─────────────────────────────────────┤   │
│    │     ARITHMETIC AND LOGIC UNIT        │   │
│    │              (ALU)                   │   │
│    └─────────────────────────────────────┘   │
└─────────────────────────────────────────────┘
```

| INPUT UNIT | | MAIN MEMORY UNIT/ PRIMARY UNIT | OUTPUT UNIT |

COMMUNICATION DEVICES

BACKING STORAGE/ DEVICES/ SECONDARU STORAGE UNIT

EXTERNAL NETWORK

PERIPHERALS (OR PERIPHERAL DEVICES or PERIPHERAL HARDWARE)

PERIPHERAL

- Is a device that is located outside the central processing unit (CPU) but controlled by it.
- Is an attachment to a computer used mainly to feed unprocessed data into the computer and receive the output of processed information.
- Is the totality of facilities or equipments connected to the computer to assist it in satisfying its users.

DEVICES

- Is any machine, but particularly a computer peripheral e.g. printer
- Is a computer peripheral

There are two types of devices
1. **AN ONLINE DEVICES** – is a peripheral devices that is in use
2. **AN OFFLINE DEVICES** – is a peripheral that is not in use

A MEDIUM – Is a material in which data is stored on or data is output to e.g. printed paper.

Types (categories) of peripherals

There are five main types or categories of peripherals (or peripheral devices). These are: -

(i)   Input devices

(ii)   Output devices

(iii)   Input/output devices (i.e. both input and output devices)

(iv)   Backing storage (secondary storage devices

(v)   Communication devices
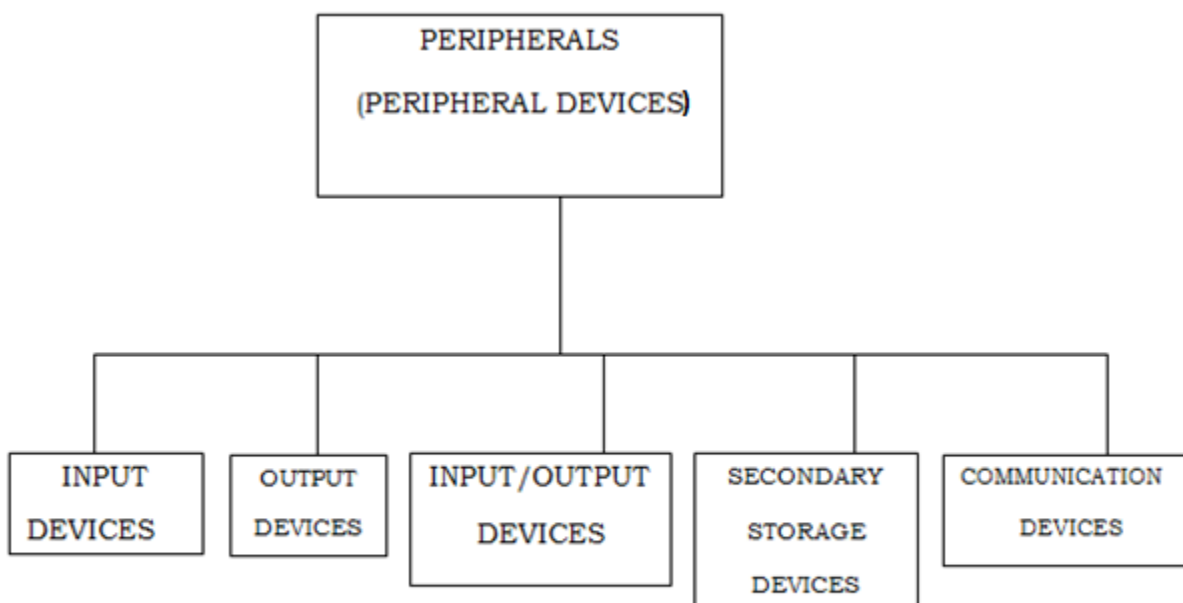
INPUT DEVICES (INPUT HARDWARE)

INPUT

- Is getting (to get) data into a computer system
- Is the data that is put into the computer system for processing

- Is any data or instructions which you enter into the memory of a computer.

TYPES OF INPUT

Four types of computer input are: -

    I. Data

    II. Programs

    III. Command,

    IV. User responses

- **DATA** is a collection of unorganized (meaningless) facts, e.g. words, numbers, pictures, sound and videos.

- Is raw material to be processes by the computer.

- **A PROGRAM** is a series of instructions that tells the computer how to perform tasks which are necessary to process data into information.
- **A COMMAND** is an instruction given to a computer program.
- **A USER RESPONSE** is an instruction you issue to the computer by replying to question posed by a computer program.

E.g Computer question: ***Do you want to save the changes you have made?***

Uses response: ***YES***

AN INPUT DEVICE

- Is any hardware component that allows you to enter data, programs, commands and user responses into a computer.

- Is a peripheral (peripheral device) which accepts data and send it into the corresponding processing unit (CPU)

- Is a peripheral (peripheral device) which accepts data in a form that a computer can use and sends the data to the central processing unit (CPU).

- Is a peripheral (peripheral device) which accept data from outside the computer system and transmits (sends) it to the central processing unit (CPU).

Examples of input devices;

Keyboard, mouse, Lightpen, Joystick, Scanner, Bar-code reader, PEWS terminal,Trackball, Touch pad, Pointing stick , pen(stylus)

CHARACTERISTICS OF INPUT DEVICES

The characteristics of input devices are as follows:-

(i)   They form an interface between the external environment and the computer

 An **interface** is a hardware (and sometimes a software) that is used to connect two devices or systems in order to enable them to communicate.e.g. A modem

(ii)   They're located next to or outside the CPU. In other words, they are attached to the computer.

(iii) They can be **off-line** or **on-line**

FUNCTIONS OF INPUT DEVICES

The functions of input devices are as follows: -

(i)   To accept data from the user into the computer system

(ii)   To accept instructions from the users.

(iii)   To accept commands for running or aborting or halting a program from the user.

OUTPUT DEVICE / OUTPUT HARDWARE

OUTPUT

-    Is data that has been processed into meaning form called information.

-    Is usable information

-    Is raw input data that has been processed of the computer into information.

 Some examples of output

-    Words, numbers, sentences, paragraphs

-    Drawings, charts and photographs

-    Music synthetic speech

-    Played back images

Types (categories or groups) of output

Two principal kinds of output are

(i)   Softcopy

(ii)   Hardcopy

Soft copy

Is a material (data) shown on the display **screen (monitor)** or data that is in audio or voice form.

This kind of output is not tangible; it cannot be touched.

Hardcopy

Is printed copy (printout) on paper.

Examples of printouts (hardcopy output)

(i) Text and graphics from printers

(ii) Film (including microfilm and microfiche)

Forms of output

Computers generate (produce) several forms of output. They are: -

(i)   Text e.g. words, sentences, charts and paragraphs

(ii)   Graphics e.g. drawing, charts and photographs

(iii)   Audio e.g. music speech etc

(iv)   Video e.g. played back images

COMMUNICATIONS DEVICES

COMMUNICATIONS HARDWARE

COMMUNICATIONS:

- Is the process of sending and receiving data and programs from one computer to another or secondary storage device to another.

- Is the process of transmitting (or sending) data from one person to another or from one device to another.

Examples of communications devices

(i) Modem

(ii) Multiplexor

A MODEM

-Is a device by which computers exchange information over telephone lines.

 -Is a piece of hardware that converts (changes) digital signals into analog signal and vice versa.

COMPUTER COMMUNICATION

Is the transfer of information between computers.

DATA COMMUNICATION

 Is the process of transmitting (or sending) data from one user to another or from one computer to another.

TELECOMMUNICATIONS

- Is data communication over large distances.

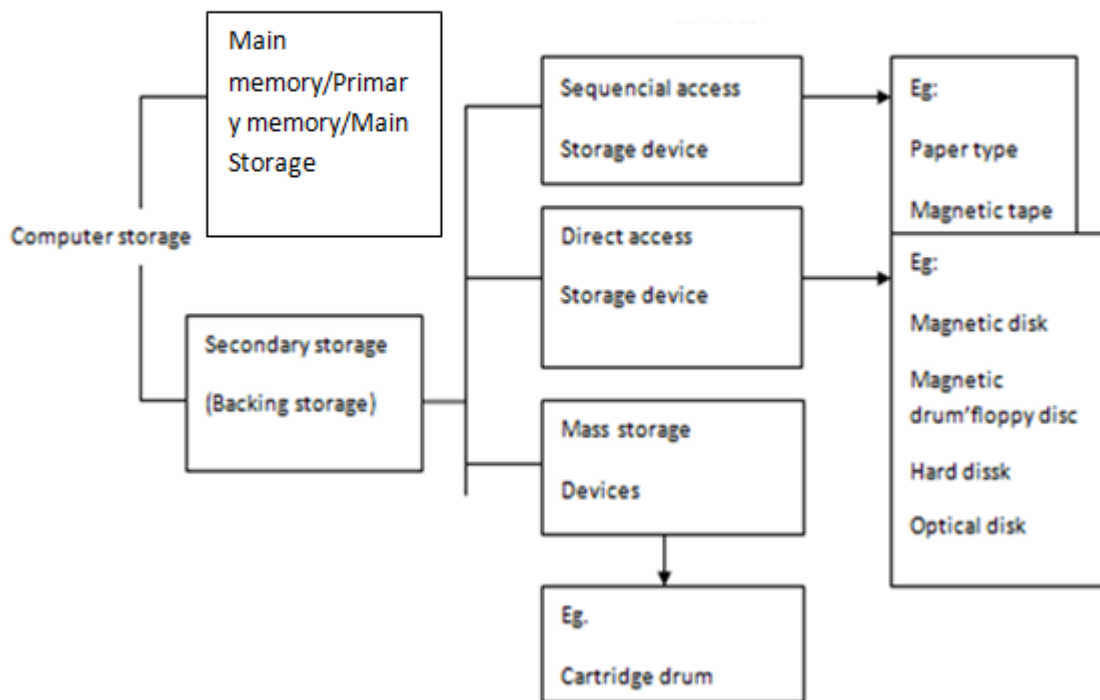## SECONDARY STORAGE DEVICES / SECONDARY STORAGE MEDIA

A STORAGE MEDIUM/STORAGE DEVICE – is a physical material on which items (data, Instructions and information) are kept for future use e.g. disks.

Examples of secondary storage devices/ secondary storage media

- Floppy disk (diskette), magnetic diskette.

- Magnetic disk or hard disk

- Magnetic tape

- Optical disks e.g. CD,CD-ROM WORM and DVD, DVD-ROM, DVD-RAM and rewritable optical disks (cailed floptical, magneto-optic)

Types of Primary storage and Secondary storage devices

CHARACTERISTICS OF SECONDARY STORAGE DEVICES

Secondary storage devices have a several common characteristics:

- It is less expensive (i.e. it is cheaper)
- They cost less per byte.
- It is slow (the access time of storage devices are measured in milliseconds i.e thousands of a second). It has low speed.
- It is not part of the CPU
- It has a higher/larger storage capacity.
- It is used to store large quantities of data.
- It is non-volatile (its contents are retained even when the power is switched off from the computer.
- It is permanent. (I.e. record storage is permanent). It is a permanent type of storage.
- It is used to store data that are not needed for immediate processing.
- It is made up of magnetic bubbles
- It is called backing storage
- It is used for mass storage needs
- It operates on the principle of magnetism.

Types of magnetic storage hardware

Two common types of magnetic storage hardware are: -

1. Disks (magnetic disks)
2. Tapes (magnetic tapes)

MAGNETIC DISK STORAGE

- The circular platters on each side of the magnetic disk are about 35cm in diameter.

- The circular platters on each side of the magnetic disk are very smooth.

- The circular platters on each side of the magnetic disk are coated with a metal oxide.

Characteristics of magnetic disk units

(i) Provide fast memory search

(ii) Have large storage capacity

(iii) Use random access method to retrieve data

(iv) It is fast and to read an index

DANGERS/THREATS TO DISK (DISK ENVIRONMENTAL PROBLEMS)

The great threats/dangers to disk are: - smoke, dust, lint and fingerprints. These items can jam under the "lightning fast" read/ write heads, causing permanent damage to the smooth surface and thereby destroying data files.

Two basic types of magnetic disk media are:

-    It is a type of magnetic media that stores items using magnetic patterns.

-    It consists of several inflexible, circular disks called PLATTERS (or PLATES).

A platter in a disk is made of aluminium, glass or ceramic and is coated with a magnetic substance i.e. iron oxide that allows items to be magnetically recorded on its surface. Often, several platters are stacked together to create a disk park. A disk pack is easy to handle.

Example

One type of disk pack consists of 11 to 14 – each-wide disks. It is about 6 inches high, weighs about 9 kilograms, and can store over 500 million characters.

-    A **disk park is easy to handle**

On hard disks, the platters (or plates), the red/write heads, and the mechanism for moving the heads across the surface of the disk are enclosed (sealed) in an airlight case/ module that protects platters from contamination.

-    It is also a read/write storage media; that is you can both read from and write on a hard disk any number of times).

- It can be non removable (i.e. permanent) or removable.

- On microcomputer, hard disks are permanently mounted/housed inside the computer chassis (system unit).

- The capacity of a fixed disk in modern desktop personal computers ranges from 20 MB to 50 GB.

- On minicomputers and mainframes, hard disks can be permanent (non-removable or removable.

THE HARD DISK DRIVE – SUB- DIVISIONS OF THE HARD DISK

The hard disk is further sub-divided into two types:

(a) Fixed disk or inflexible disk: It is not portable

(b) Removable disk.

FIXED DISK (FIXED HARD DISK)

- It is a type of magnetic media that stores items using magnetic patterns.

- It also a read/write storage media; (that is you can both read from and write on a hard disk any number of times)

- This is non removable magnetic disk assemblages used in magnetic disk units.

- On microcomputer, fixed disks are permanently mounted/housed inside the computer chassis (system unit)

- The capacity of a fixed disk in modern desktop personal computers ranges from 20 MB to 1 GB.

- On microcomputers and mainframes, fixed disks can be permanent or removable

- It is not portable.

- It allows higher speeds greater data recording densities, and closer tolerances within a sealed, more stable environment.

- Fixed disks can be stacked together. The result is called a disk pack.

 A disk pack is easy to handle.

FLEXIBLE DISK, (FLOPPY DISK), FLOPPY OR DISKETTE

OR MAGNETIC DISKETTE

-    It is a disk that consists of polyester film coated with an iron oxide compound.

-    It is a thin, circular, flexible, plastic disk with a magnetic coating enclosed in square-shaped plastic shell.

Characteristics of diskettes

(i) It is portable

(ii) It is not expensive

(iii) It is square shape

(iv) It is reusable

(v) It is easy to store

A floppy disk drive –is a device that can read from and write to a floppy disk.

Standard types of diskettes

There are two standard types of diskettes

1.   The 5 ¼ inches diskettes

- This is an old type of diskettes and it is being phased out.
- It is in a soft (flexible) housing (jacket)
- Its capacity ranges from 356 KB to over 1 MG of data.

2.   The 3 ½ inches diskettes type.

- It is a new type and is still in use

- It is mounted in a hard plastic cover (housing)
- It is has a larger/ higher storage capacity
- It weighs less
- It consumes less power
- It is smaller, studier and easier to store. It lifts into a T- shirt pocket or purse.

DISK CAPACITIES

TYPE	SIZE	MEMORY CAPACITY
Diskette	5 ¼ inches	1.2
Diskette	3 ½ inches	1.4
Stacked Disk (for microcomputers)	5 ¼ inches	100-1000MB
Stacked Disk (for microcomputer and main frame computers)	10 – 15 inches	0.1 to 100 + GB

USES OF DISKETTES

Diskettes are used:

1.   To move data and programs from one computer to another

2.   To back up critical data on the fixed disk.

THE MAIN FORCES THAT ARE HOSTILE TO THE DISKETTE (FLOPPY DISK OR FLOPPIES)

Floppies are endangered by several factors (things, or forces)

The main forces (things) that are hostile (dangerous) to floppies are

(i)   Dust

(ii)   Magnetic fields

(iii)   Liquids

(iv) Temperature extremes

(v) Vapours

HOW TO HANDLE DISKETTES:

RULES FOR TAKING CARE OF FLOPPIES

1. Do not touch the disk surface.it is easily contaminated, which causes errors.

2. Do not use alcohol thinners or freon to clean the disk

3. Do not use magnetic or magnetized objects near the disk. Data can lost from a disk exposed to a magnetic field

4. Do not bend or fold the disk

5. Do not place heavy objects on the disk

6. Do not use rubber band or paper clips on the disk

7. Do not use erasers on the disk

8. Do not expose the disk to excessive heat or sunlight

9. Apply the index label to the right of the manufacture

10. Write on the index label with left-tip pen only

11. Insert carefully by grasping upper edge

THE ARITHMETIC – LOGIC UNIT (ALU)

- Is a component of the CPU (central processing unit) that performs arithmetic operations and logical operations and controls the speed of those operations.
- Is the calculating device for the computer.

PARTS OF THE ALU

The ALU is made up of two sections or parts:

1. **THE ARITHMETIC SECTION (OR ARITHMETIC PART)**

This is a part of the ALU, which deals with the arithmetic operations.

Some **examples** of arithmetic operations performed by the arithmetic section (or arithmetic part) of the ALU are: addition, substraction, multiplication and division.

2. **THE LOGIC SECTION (OR THE LOGIC PART)**

This is a part of the ALU, which handles or deals with the logical operations (or decision making operations)

Some examples of logical operations performed by the logical section (or logical part) of the ALU are: comparing, selecting, matching, sorting and merging.

FUNCTIONS OF THE ALU

The Arithmentic – logical Unit has two main functions:

1. **To do (carry out) arithmetic operations** e.g. addition, subtraction, multiplication and division.

2. **To do (perform) logic operations** e.g. comparing, selecting, matching, sorting and merging.

The ALU does not store data. It merely performs the necessary manipulations. For example; if a program tells the computer to add or subtract two or more numbers; the control unit has those numbers copied into special memory areas called **registers** or **accumulators**. The ALU then manipulates these memory areas and returns the result to the appropriate memory location as directed by the control unit.

CHARACTERISTICS OF THE ALU

1. It receives commands from the control unit (CU)

2. It contains additional storage locations called REGISTERS

The ALU does not store data. It merely perfoms the necessary manipulation

TYPES (CLASSIFICATION) OF COMPUTERS

- **MICROCOMPUTERS:**

Are the most widely used and the fastest growing type computers
They run easy – to – use application. There are two categories of microcomputers

- **Desk-tops:** - They fit on desk top, and are used by a wide range of people. Personal computers (PC) and Workstations are types of desktop computers.
- **Portables:** - Small and light, easy to move from one place to another.

Examples are: Laptops, Notebooks, and Sub notebooks

- **MINICOMPUTERS: -**

They fall between Mainframe and Microcomputer in their processing speed and data-storing capabilities. They are used for special purposes e.g. in researches or monitoring a particular manufacturing process.
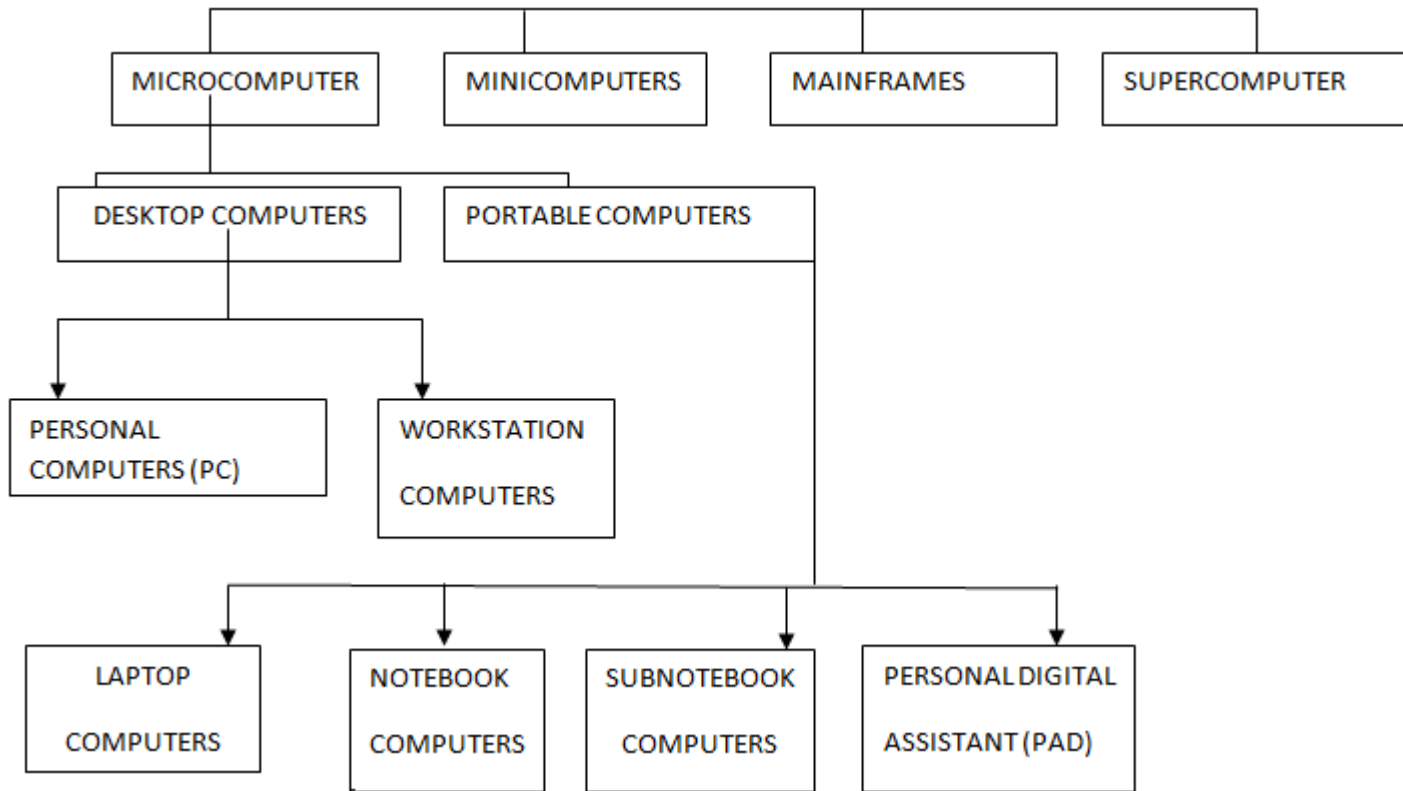
- **SUPERCOMPUTERS:**

Are the most powered high capacity computers used by very large organizations, e.g. NASA for tracking space explorations.

- **MAINFRAMES:**

Are large computers occupying specially wired, air conditioned rooms. They have great processing speed and data storage. Are used by banks, government agencies insurance companies, Airline reservation systems etc.

TYPES OR CLASSIFICATION OF COMPUTERS

COMPUTERS

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                    ┌──────────────┬──────────────┬──────────────┐
              ┌─────┴──────┐ ┌─────┴──────┐ ┌────┴──────┐ ┌──────┴────────┐
              │MICROCOMPUTER│ │MINICOMPUTERS│ │MAINFRAMES │ │ SUPERCOMPUTER │
              └─────────────┘ └────────────┘ └───────────┘ └───────────────┘
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```
        ┌──────────────────┐    ┌──────────────────┐
        │DESKTOP COMPUTERS │    │PORTABLE COMPUTERS│
        └──────────────────┘    └──────────────────┘

   ┌────────────┐   ┌────────────┐
   │ PERSONAL   │   │ WORKSTATION│
   │COMPUTERS(PC)│  │ COMPUTERS  │
   └────────────┘   └────────────┘
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  ┌──────────┐  ┌──────────┐  ┌────────────┐  ┌──────────────────┐
  │ LAPTOP   │  │ NOTEBOOK │  │SUBNOTEBOOK │  │PERSONAL DIGITAL  │
  │COMPUTERS │  │COMPUTERS │  │ COMPUTERS  │  │ASSISTANT (PAD)   │
  └──────────┘  └──────────┘  └────────────┘  └──────────────────┘
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THE PROCESSOR OR CENTRAL PROCESSING UNIT (CPU)

Objectives

This unit is intended to enable students to understand:

- The meaning of CPU
- Parts of CPU
- Functions of the CPU
- Block diagram to Data and Command flow
- Meaning of main memory

- Major divisions of the main memory
- The RAM
- Functions of RAM
- The ROM
- Function of ROM
- Differences between RAM and ROM

THE PROCESSOR or CENTRAL PROCESSING UNIT (CPU)

THE CENTRAL PROCESSING UNIT (CPU)

A CPU is the central processing unit,Basically its the brain of computer.Also called a processor.

- Is the part of the computer system that runs the program instructions.

- Is the part of the computer system that follows the instructions to manipulate (or change) data into information.

COMPONENTS (PARTS) OF THE CPU (PROCESSOR)

The CPU is made up (or consists) of two main parts.These are: -

1. The Arithmetic – Logic unit (ALU)
2. The Control Unit (CU)
   The Arithmetic Logic Unit

Main functions
(i)Performs mathematical Operations(+,-,×,÷)
(ii)Performs Logic operations(=,>,< ,(≠),=<,>=)
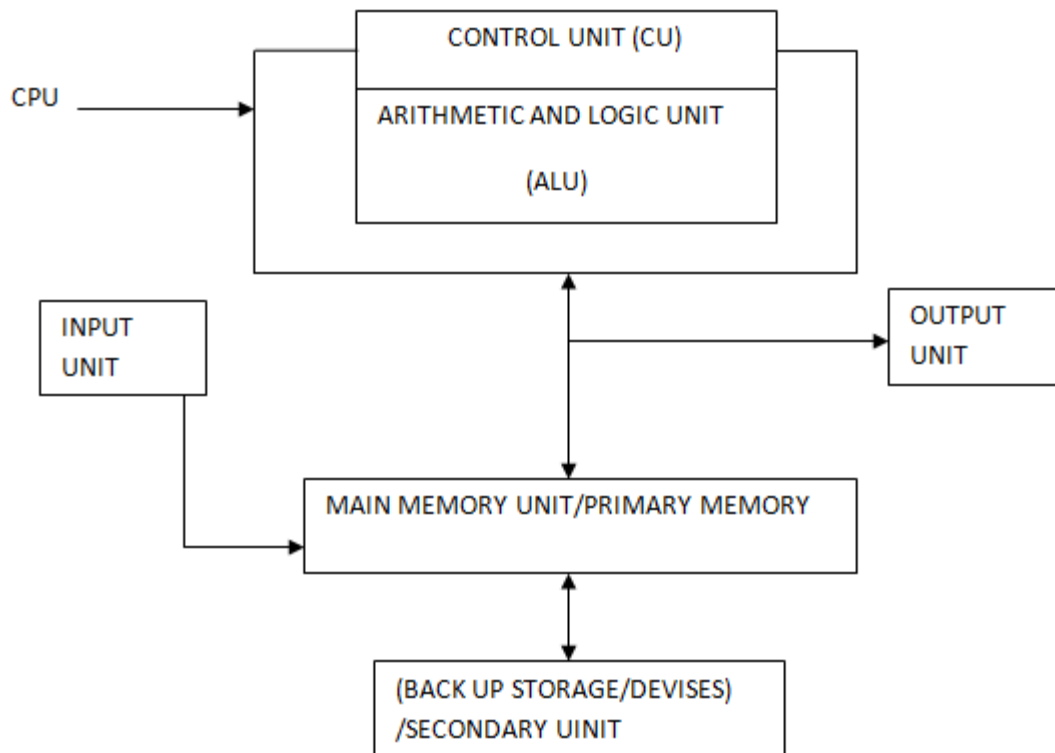   **Control Unit**
Main functions
(i)Control all functions of computer
(ii)Control ALU

BLOCK DIAGRAM

There are FEW AUTHORS who say that the CPU is made up (or consists) of THREE main parts. These are: -

1. The control unit (CU)
2. The Arithmetic- Logic Unit (AlU)
3. The main memory unit (MMU)

It should be noted here that this view is a misconception.

FUNCTIONS OF THE CPU OR PROCESSOR

The basic functions of the CPU are following: -

(i)   To control the sequence of operations according to instructions

(ii)   To give commands to all other parts of the computer system

(iii)   To carry out processing (i.e. to process data into information)

(iv)   To send processed results to the output

(v)   To store data and all the instructions.

OUTPUT DEVICES

These are devices that give result from a computer.

E.g: Printers, Plotters, Speaker, Fax- machine, Monitors, Projectors, Smart card.

TYPES OF OUT PUT DEVICES

i) SOFT COPY OUT PUT DEVICES

ii) HARD COPY OUTPUT DEVICES

SOFT COPY OUT PUT DEVICES

1) MONITORS

Output devices used to display images and text.

ADVANTAGES

- Relatively cheap

- Reliable

- They are quite

- Do not want paper

2) SPEAKERS

Output device which produce sound from the computer.

3) Light – Emitting diode (LED)

These are small power device which emit light.

Uses

Are used to indicate various events

E.g.:

- Power is on

- Hard disk is in operation

- Monitor is working

HARD COPY OUTPUT DEVICES

Produces hard copy out-put.

E.g:

- Printers

- Fax machines

- plotters

- Some photocopy machine can print

PRINTERS

Produce images or text on a paper.

TYPES OF PRINTERS

1) Impact printer

2) Non- impact printer

1. IMPACT PRINTER

Produce characters object by using hammers or pun shield on a print head

E.g; Dot- matrix printer

HOW IT WORKS

Printer head has a set of pins which hit an ink ribbon to form characters on paper.

Uses:-Used to print multiple copies black and white text.

ADVANTAGES

- Low running cost

- Purchase cost is low

DISADVANTAGES

- Wet the paper

- Make noise

- Low quality
-Difficult to edit

2. **NON – IMPACT PRINTER**

These are printers which produce characters without striking the paper. No direct contact between paper and print head.

E.g:

1. Ink jet printer
2. Laser printer
3. Thermal transfer printer

INK JET PRINTER

This is the non- impact printer which uses tiny nuzzles to form the character or graphic image.

Uses

- Used commonly at home and schools

- Can be used in offices

ADVANTAGES

- Produce high quality copies

- Produce colored copies

- Relative less expensive
- Easy to edit.

LASER PRINTER

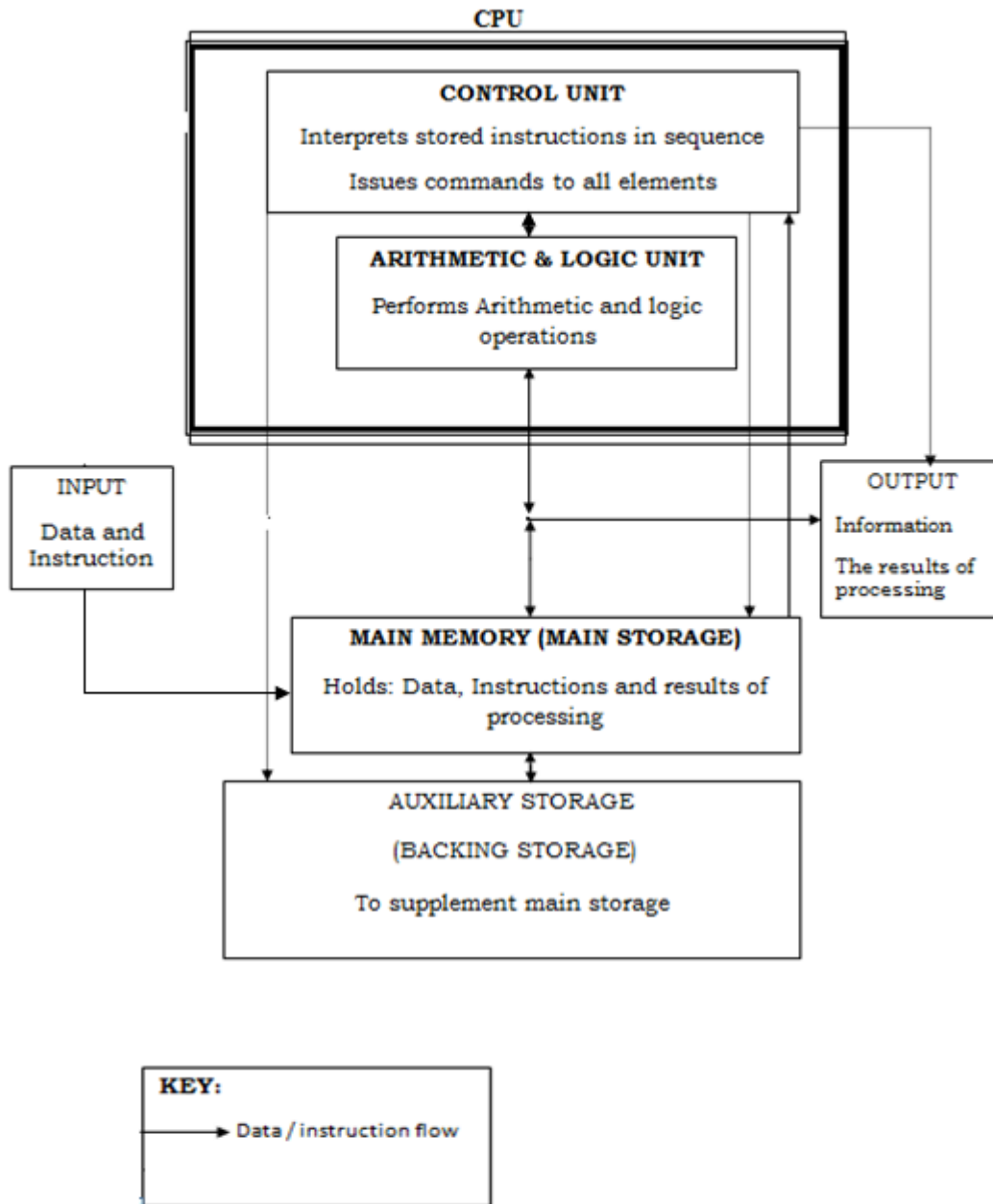The toners is transferred to the paper and then fixed by heat and pressure.

Uses

- Office

- School

- Home

ADVANTAGES

- Are quite

- Are fast

- Produce high quality copies

- Running cost is less

BLOCK DIAGRAM FOR DATA AND COMMAND FLOW IN A COMPUTER

CPU

CONTROL UNIT

Interprets stored instructions in sequence

Issues commands to all elements

ARITHMETIC & LOGIC UNIT

Performs Arithmetic and logic operations

INPUT

Data and Instruction

OUTPUT

Information

The results of processing

MAIN MEMORY (MAIN STORAGE)

Holds: Data, Instructions and results of processing

AUXILIARY STORAGE

(BACKING STORAGE)

To supplement main storage

KEY:

→ Data / instruction flow

COMPUTER MEMORY

- **MEMORY (PHYSICAL MEMORY)** is the actual chip that is capable to hold (store) data and programs (instructions) in use by the CPU.

- **A MEMORY UNIT** is the internal storage (main memory) area in a computer system.

TYPES OF MEMORY
(i)Primary memory/Main memory
(ii)Secondary memory/Backup memory

MAIN MEMORY

1.   Is a small electronic part of the CPU (or computer) which stores all data and instructions (programs) before they can be used in processing (i.e   between the processing steps, and after   processing is completed but before output).

2.   Is the memory that holds (stores) all data and instructions (programs) that will be needed shortly by the CPU.

3.   Is a microelectronic semiconductor storage circuitry.

CLASSIFICATION OF THE MAIN MEMORY

THE MAIN MEMORY of the computer can be classified into two main memory sections.

1.   The Random Access Memory (RAM)
2.   The Read – Only memory (ROM)

CHARACTERISTICS OF RAM

(i)   It is limited in size

(ii)   It is expensive

(iii)   It is fast

(iv) It is used to hold data and programs that are actively being processed.
(v)   It contains application programs developed by computer users in order to solve specific problems.

(vi) It is designed to serve the computer user.

FUNCTIONS (USES OR TASKS) OF RAM

The main functions of RAM are:

(i)   It holds (stores) data for processing.

(ii)   It holds (stores) instructions (application programs) for processing data

(iii)   It holds (stores) processed data (that is information) waiting to be sent to an output device or secondary storage device.

FUNCTIONS (USES OR TASKS) OF ROM

The main functions of ROM are:

(i)   To store the data and instructions (programes) that the necessary for the normal functioning of the computer system hardware (i.e. it stores operating system data and instructions)

(ii) To store control programs that are necessary for the initial activation of the hardware when power is switched on.

CHARACTERISTICS OF ROM

(i)   It is used to hold initialization instructions for the computer to start itself and for certain other repetitive, specialized functions.

(ii)   It contains control programs built-in or installed by the manufacturer of the computer system at the factory.

(iii)   It is designed to serve the hardware of the computer system.

(iv)   Contents of ROM are inserted (built in) at the factory by the manufacture; buyers have little to do with it.

(v)   The contents of Rom cannot be changed

(vi)   It is permanent

USES OF THE MAIN MEMORY

Some uses of the main memory are:

(i)   To store instructions waiting to be obeyed

(ii)   To store instructions being obeyed

(iii)   To store awaiting processing

(iv)   To store data currently being processed

(v) To store data waiting output.

DISADVANTAGES OF THE MAIN MEMORY

The main memory has the following disadvantages:

(i) It is **limited**. There is a capacity beyond which it cannot be extended.

(ii) It is **expensive.** The technology involved and the elements used in making them are expensive

(iii) It is **volatile**. (i.e. it loses its contents immediately when power is switched off)

DIFFERENCES BETWEEN RAM AND ROM

ROM (READ –ONLY MEMORY)	RAM (RANDOM –ACCESS MEMORY)
i. Its contents can only be read. Nothing can be written on to it.	i. It is possible to read and write.
ii. It is non –volatile (i.e. the contents of the **ROM** are not lost when power is cut off)	ii. It is volatile (its contents are lost when power is cut off). It requires a steady flow of electricity to maintain its contents.
iii. The amount of ROM in a computer is usually small. It makes about 30% of the main memory.	iii. The amount of RAM in a computer varies from computer to computer. However, it make about 70% of the main memory.
iv. The contents of ROM are inserted (built in) at the factory by the manufacturer; buyers have little to do with it.	iv. Its contents are developed by computer users in order to solve specific problems.
v. The contents of ROM cannot be changed.	v. The components of **RAM** can be changed.
vi. It is permanent.	vi. It is temporary It is limited in size It is expensive It is fast.
vii. It is used to hold initialization instructions for the computer to start itself and for certain other repetitive specialized functions.	vii. It is used to hold data and programs that are actively being processed.
viii. It contains control programs built-in or installed by the manufacturer of the computer system at the factory.	viii. It contains application programs developed by the computer users in order to solve specific problems.
ix. It is designed to serve the hardware of the computer system.	ix. It is designed to serve the computer users.

SECONDARY MEMORY

This is the memory which found inside and outside computer system unit.

E.g: Hard disk, DVD (Digital Versatile Disk), VCD (Video Compact Disk) CD (Compact Disk) Flash Disk, Memory card etc.

NOTE: CD are inserted into a CD ROM (COMPACT DISK READ ONLY MEMORY)

DVD (*DIGITAL VERSATILE DISK*)

A number of slightly difference technologies make recordable DVDs available. These include.

- **DVD –ROM :** Read only memory which is typically stamped in a DVD press , not burnt, and can only be read from Any mass produces DVD title is on a DVD –ROM disk.
- **DVD -⁺Recordable**, which can usually be written to once in a long, continuous write in a DVD burner.
- **DVD -⁺ RW:** Re- writable which is disk that is rate to be burned up to 100 times.
- **DVD – RAM** : Rand Access Memory , which can be used almost like a portable hard disk, with any one spot on the disk surface rated to be written to up to 1000,000 times.

DIFFERENT BETWEEN PRIMARY AND SECONDARY MEMORY

PRIMARY MEMORY	SECONDARY MEMORY
1) Store data temporary	- Store data permanently
2) Volatile	- Non- volatile
3) Low storage capacity	- Large storage capacity
4) High speed than secondary memory	- Low speed

VGA (*Video Graphics Array*)

(Video Graphics Array) Is widely used analyzing interface between a computer and monitor that uses a 15 –pin plug and socket Order CRTS used VGA and flat LCD panels typically have both analog and digital DVI. However, newer PCs may have only DVI or display.

SOUND CARD

A sound card (also known as an audio card) is an internal card that facilitates the input and output programs.

GRAPHIC CARD

Is an expansion card where function is to generate output images.

COMPUTER STORAGE

A computer system has two main types of storage/storage areas: -

1. Main storage (also called primary memory, internal memory
2. Secondary storage(also called auxiliary storage, backing storage

MAIN MEMORY	SECONDARY MEMORY
It is expensive. (This is because it is usually made up of materials such as magnetic cores, semiconductor, circuits, or magnetic bubble that are highly expensive). They cost less per byte.	It is less expensive They cost less per byte.
It is fast (the access time of memory devices is measured in nanoseconds i.e. billionths of a second). It has high speed.	It is slow (the access time of storage devices of measured in milliseconds i.e. thousandth of a second) it has low speed.
It is part of the CPU	It is not part of CPU

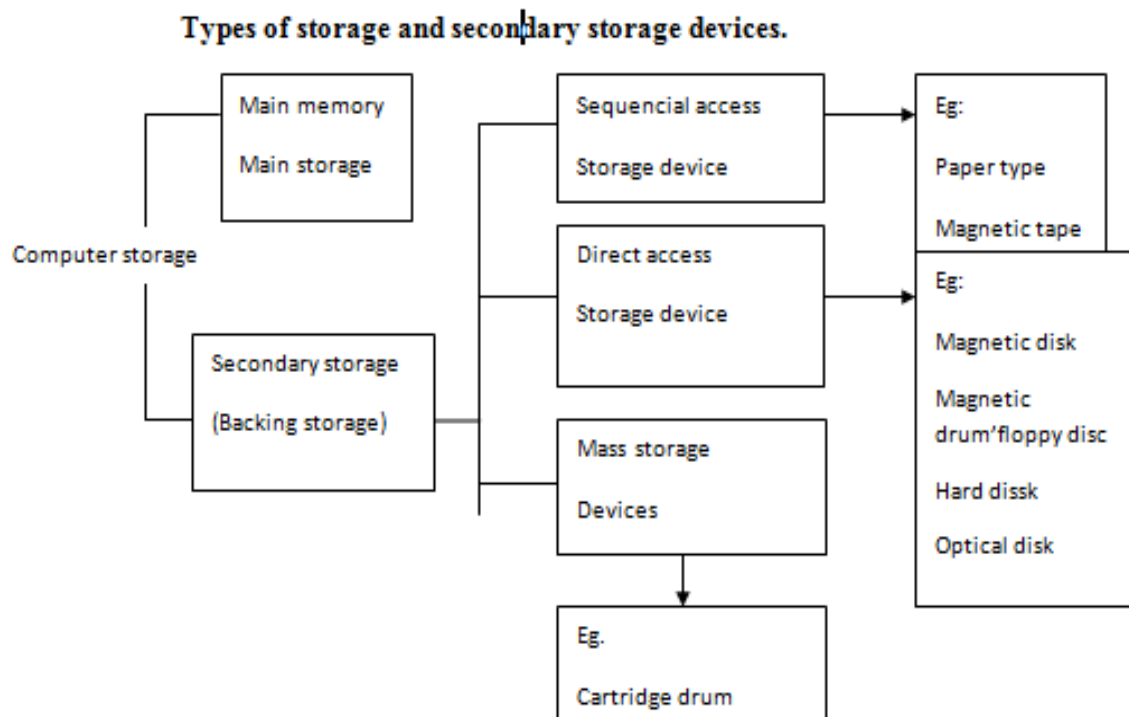|	
It is temporary. (i.e. there is no permanent record storage) it is a temporary type of storage	It is permanent (i.e. record storage is permanent). It is permanent type of storage.
It is used to store data and instructions which are needed between processing steps and supplies them to the control unit and ALU during processing.	It is used to store data that are not needed for immediate processing.
It is made of microelectronic semiconducctor storage circuitry (i.e. semiconductor memory chips on the circuit boards in the main systerm unit.	It is made up of magnetic bubbles.
It is called the working memory of the computer	It is called backing storage
It is used for immediate access requirements	It is used for mass storage needs

SECONDARY STORAGE DEVICES AND SECONDARY STORAGE MEDIA

A STORAGE MEDIUM – is a physical material on which items (data, Instructions and information) are kept e.g. disk

A STORAGE DEVICE – is the mechanism used to record and retrieve items to and from a storage medium.

Examples of secondary storage devices/ secondary storage media

-       Floppy disk (diskette), magnetic diskette.

-       Magnetic disk or hard disk

-       Magnetic tape

-       Optical disks e.g. CD,CD-ROM WORM and DVD, DVD-ROM, DVD-RAM and rewritable optical disks (cailed floptical, magneto-optic)

Types of storage and secondary storage devices.

CHARACTERISTICS OF SECONDARY STORAGE DEVICES

Secondary storage devices have a several common characteristics:

- It is less expensive (i.e. it is cheaper)
- They cost less per byte.
- It is slow (the access time of storage devices are measured in milliseconds i.e thousands of a second). It has low speed.
- It is not part of the CPU
- It has a higher/larger storage capacity.
- It is used to store large quantities of data.
- It is nonvolatile (its contents are retained even when the power is switched off from the computer.
- It is permanent. (I.e. record storage is permanent). It is a permanent type of storage.
- It is used to store data that are not needed for immediate processing.
- It is made up of magnetic bubbles
- It is called backing storage
- It is used for mass storage needs
- It is operates on the principle of magnetism.

Secondary storage devices operate on the principal of magnetism.

Types of magnetic storage hardware

Two common types of magnetic storage hardware are: -

1. Disks (magnetic disks)
2. Tapes (magnetic tapes)

MAGNETIC DISK STORAGE

- The circular platters on each side of the magnetic disk are about 35cm in diameter.

- The circular platters on each side of the magnetic disk are very smooth.

- The circular platters on each side of the magnetic disk are coated with a metal oxide.

Characteristics of magnetic disk units

(i) Provide fast memory search

(ii) Have large storage capacity

(iii) Use random access method to retrieve data

(iv) It is fast and to read an index

DANGERS/THREATS TO DISK (DISK ENVIRONMENTAL PROBLEMS)

The great threats/dangers to disk are: - smoke, dust, lint and fingerprints. These items can jam under the "lightning fast" read/ write heads, causing permanent damage to the smooth surface and thereby destroying data files.

Two basic types of magnetic disk media are:

- It is a type of magnetic media that stores items using magnetic patterns.

- It consists of several inflexible, circular disks called PLATTERS (or PLATES).

A platter in a disk is made of aluminium, glass or ceramic and is coated with a magnetic substance i.e. iron oxide that allows items to be magnetically recorded on its surface. Often, several platters are stacked together to create a disk park. A disk pack is easy to handle.

Example

One type of disk pack consists of 11 to 14 – each-wide disks. It is about 6 inches high, weighs about 9 kilograms, and can store over 500 million characters.

- A **disk park is easy to handle**

On hard disks, the platters (or plates), the red/write heads, and the mechanism for moving the heads across the surface of the disk are enclosed (sealed) in an airlight case/ module that protects platters from contamination.

- It is also a read/write storage media; that is you can both read from and write on a hard disk any number of times).

- It can be non removable (i.e. permanent) or removable.

- On microcomputer, hard disks are permanently mounted/housed inside the computer chassis (system unit).

- The capacity of a fixed disk in modern desktop personal computers ranges from 20 MB to 50 GB.

- On minicomputers and mainframes, hard disks can be permanent (non-removable or removable.

THE HARD DISK DRIVE – SUB- DIVISIONS OF THE HARD DISK

The hard disk is further sub-divided into two types:

(a) Fixed disk or inflexible disk: It is not portable

(b) Removable disk.

FIXED DISK (FIXED HARD DISK)

- It is a type of magnetic media that stores items using magnetic patterns.

- It also a read/write storage media; that is you can both read from and write on a hard disk any number of times)

- This is non removable magnetic disk assemblages used in magnetic disk units.

- On microcomputer, fixed disks are permanently mounted/housed inside the computer chassis (system unit)

- The capacity of a fixed disk in modern desktop personal computers ranges from 20 MB to 1 GB.

- On microcomputers and mainframes, fixed disks can be permanent or removable

- It is not portable.

- It allows higher speeds greater data recording densities, and closer tolerances within a sealed, more stable environment.

- Fixed disks can be stacked together. The result is called a disk pack.

 A disk pal is easy to handle.

FLEXIBLE DISK, (FLOPPY DISK), FLOPPY OR DISKETTE

OR MAGNETIC DISKETTE

- It is a disk that consists of polyester film coated with an iron oxide compound.

- It is a thin, circular, flexible, plastic disk with a magnetic coating enclosed in square-shaped plastic shell.

Characteristics of diskettes

(i) It is portable

(ii) It is not expensive

(iii) It is square shape

(iv) It is reusable

(v) It is easy to store

A floppy disk drive –is a device that can read from and write to a floppy disk.

Standard types of diskettes

There are two standard types of diskettes

1. The 5 ¼ inches diskettes

- This is an old type of diskettes and it is being phased out.
- It is in a soft (flexible) housing (jacket)

- Its capacity ranges from 356 KB to over 1 MG of data.

2. The 3 ½ inches diskettes type.

- It is a new type and is still in use
- It is mounted in a hard plastic cover (housing)
- It is has a larger/ higher storage capacity
- It weighs less
- It consumes less power
- It is smaller, studier and easier to store. It lifts into a T- shirt pocket or purse.

DISK CAPACITIES

TYPE	SIZE	MEMORY CAPACITY
Diskette	5 ¼ inches	1.2
Diskette	3 ½ inches	1.4
Stacked Disk (for microcomputers)	5 ¼ inches	100-1000MB
Stacked Disk (for microcomputer and main frame computers)	10 – 15 inches	0.1 to 100 + GB

USES OF DISKETTES

Diskettes are used:

1. To move data and programs from one computer to another

2. To back up critical data on the fixed disk.

THE MAIN FORCES THAT ARE HOSTILE TO THE DISKETTE (FLOPPY DISK OR FLOPPIES

Floppies are endangered by several factors (things, or forces)

The main forces (things) that are hostile (dangerous) to floppies are

(i) Dust

(ii) Magnetic fields

(iii) Liquid

(iv) Temperature extremes

(v) Vapours

HOW TO HANDLE DISKETTES:

RULES FOR TAKING CARE OF FLOPPIES

1. Do not touch the disk surface.it is easily contaminated, which causes errors.

2. Do not use alcohol thinners or freon to clean the disk

3. Do not use magnetic or magnetized objects near the disk. Data can lost from a disk exposed to a magnetic field

4. Do not bend or fold the disk

5. Do not place heavy objects on the disk

6. Do not use rubber band or paper clips on the disk

7. Do not use erasers on the disk

8. Do not expose the disk to excessive heat or sunlight

9. Apply the index label to the right of the manufacture

10. Write on the index label with left-tip pen only

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- Is the calculating device for the computer.

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This is a part of the ALU, which deals with the arithmetic operations.

Some **examples** of arithmetic operations performed by the arithmetic section (or arithmetic part) of the ALU are: addition, substraction, multiplication and division.

2.   **THE LOGIC SECTION (OR THE LOGIC PART)**

This is a part of the ALU, which handles or deals with the logical operations (or decision making operations)

Some examples of logical operations performed by the logical section (or logical part) of the ALU are: comparing, selecting, matching, sorting and merging.

FUNCTIONS OF THE ALU

The Arithmentic – logical Unit has two main functions:

1.   **To do (carry out) arithmetic operations** e.g. addition, subtraction, multiplication and division.

2.   **To do (perform) logic operations** e.g. comparing, selecting, matching, sorting and merging.

The ALU does not store data. It merely performs the necessary manipulations. For example; if a program tells the computer to add or subtract two or more numbers; the control unit has those numbers copied into special memory areas called **registers** or **accumulators**. The ALU then manipulates these memory areas and returns the result to the appropriate memory location as directed by the control unit.

CHARACTERISTICS OF THE ALU

1.   It receives commands from the control unit (CU)

2.   It contains additional storage locations called REGISTERS

The ALU does not store data. It merely perfoms the necessarymanipulation

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TOPIC 3: THE COMPUTER SOFTWARE

Software:

This refers to the programs that control the operation of a computer.   This is a program plus its documentation.

For example, when you will be given programs in a storage device like CD- Compact Disc and its reference manuals that is Documentation.

Therefore, the term software describes the programs that are used to operate the computer system.

Program:

Is a set of instructions which tells the computer what to do. These instructions are usually written in special computer languages such as C++, COBOL, Visual Basic, Turbo Pascal etc.

TYPES OF COMPUTER SOFT WARE

There are two types of computer software

i) **Application software**, Are programs designed to do a specific job

Examples of application program are word processors, database programs, spread sheet, web browsers, web development tools and graphic design tools.

APPLICATION SOFTWARE

 This is a type of software to perform specific function

 CHARACTERISTICS

1) They cannot work without system software

2) They are specific in function

3) They are very cheap compared to system software

Example:

Excel, Microsoft word, Power point, Data base, Games, Adobe Photo shop, Adobe page maker

FUNCTIONS

1) Used to perform specific function

2) Operating system interface

ii)   System software; these are programs designed to make the computer function properly. It can also help the user to apply applications software.

Examples of system software include

1.   Operating system
2.   Utility programs e.g. Ant- viruses and drives

FUNCTIONS

1) To control all the computer operation

2) Coordinates software and hardware

3) To display error message

CHARACTERISTICS

1) They are loaded in the system before any software

2) They are divided according to their functions

TYPES

i) SINGLE USER SINGLE TASK OPERATING SYSTEM

Is the system software which is used by a single user and it can perform a single task at a time

ii) SINGLE USER MULTI TASK OPERATING SYSTEM

This is used by a single but it can perform many functions at a time

iii) MULTI USER MULTI TASK OPERATING SYSTEM

Can be used by many users also can perform functions at a time.

iv) MULTI PROCESSING OPERATING SYSTEM

This is operating system that supports more than one processor.

E.g.: Linux, Microsoft window 1998, window XP professional, RT- Linux, RED. Linux

v) REAL TIME OPERATING SYSTEM

Often used as a control device in a dedicated application such as controlling scientific experiments, medical, imaging system, industrial control system and some display system.

E.g.: Chorls , RT- Linux, RED – Linux

UTILITY SOFTWARE

This is the software that enables user to manage files.

E.g. : Anti – virus , Disk cleanup , disk De fragmentation, system restore , task schedule , task manager.

FUNCTION

1) Display error message.

2) Detect malicious files

3) Delete all infected files

4) Protect computer from being harmed

5) Recovery damaged files of the system

OPERATING SYSTEM (OS)

What is an Operating System?

It has many definitions.

1. A program that acts as an intermediary between a user of a computer and computer hardware.
2. Is the part of the computing system that manages all the hardware and all of the software such as:-
3. Allows for the usage of various applications

- Surf the internet
- Play games
- Write software code

4. The Operating System is the recourse allocator

- Allows the proper use to resources

5. The Operating System is a control program

- Control the execution of programs to prevent errors

6. Is a program that manages all the other programs in a computer.

Operating system performs basic tasks like input from the mouse or keyboard sending output to the video screen or printer. Keeping track of files on the drivers and controlling peripherals such as printers and modems.

NB: Your computer device, application software and utility programs cannot work, if it does not have an operating system (OS) because

- Operating system controls files you can save in a computer

- Operating system control different task that a computer can do at a time

- Operating system arrange the order of executing tasks in your computer

FUNCTIONS OF OPERATING SYSTEM

1. Processor management
2. Memory management
3. Virtual storage
4. Device management
5. Information management

Examples of operating system (OS) include:

-       Disc operating system (DOS)   - IBM   OS/400

-       Windows 98   - SOL ARLS

-       Windows 2000   - UNIX

-       Windows millennium   - Windows XP, Vista <, 7 and 8

-       Linux

-       Mac   (OS) X

-       DEC VMS

USING OPERATING SYSTEM

INTRODUCTION TO WINDOWS BASICS

WINDOWS - Is a Graphical user Interface (GUI) kind of operating system like Ms - DOS, Macintosh, Linux, UNIX etc. Windows allows you to do more with your computer those other operating systems

A Windows - This is a bordered rectangular screen display, through which a user uses an opened programs to perform a task.

1. **Switching on a computer**

On starting a computer the figure shows you the first screen / windows. The screen is called Desktop. The desktop is composed of task bar on which the start button is located. The other items appearing on the desk top are called icons.

2. **Switching off a computer**

There are procedures that has to be followed when shutting down the computer

- Close all opened programs
- Click on the start menu on the task bar
- Click on shut down or turn off the computer
- From the dialog box that appears , select shut down or turn off the computer
- Then click OK (OKAY)

3. **Window screen**

Desktop – This is a first screen of windows

Desktop- This is a strap appearing at the bottom of a window which consist of the following.

- The start menu bottom

- Current application buttons

- The quick launch toolbar

The start menu - This is used to access the list of programs found in the computer

Current application buttons – This contains the currently minimized application

Quick launch tool bar – This is used to quickly access the most common used application.

4. **Working with a window**

Minimizing - This puts the current window temporary in the taskbar located at the bottom of the desktop. You can return to where you left off by clicking the program's name on the taskbar.

Maximizing - This makes the current window to fill the whole screen. The window cannot be resized and it gives you a maximum working areas.

Restoring - This is the size of a window before being maximized or minimized

5. **Understanding windows menus**

   • **Start menu**

Contains all access menus in the computer e.g. Run, helps, search, documents, setting, programs etc.

   • **Shutdown**

Contains option for shutting down, restart, and standby

   • **Run**

Enables the user to type the program for running

   • **Help**

This menu assists the user to facilitate him on anything regarding windows functions

   • **Settings**

This menu helps the user to make various setting like background screen saver, date and time program and hardware installation etc

   • **Documents**

This hosts the most recently used files, it can contain up to 20 or 50 files depending on the settings.

   • **Programs**

This menu contains all the programs installed in the computer.

6. **Setting screen background**

- Right click on the desktop and select properties

- Click on the desktop tab or background

- Select the background and click OK button

   - If you want to set your photo as a background you can click on browse and pick your photo from C ; drive or any drive

   7. **Setting screen server**

- Right click the desktop

- Select properties

- Select screen saver tab

- Under screen saver type, select e.g. Marque

- Click on settings

- Type the screen saver e.g. AZANIA SEC. SCHOOL.

- Select speed and position

- Click Ok

- Under wait – select time e.g. 1 minute

- Select apply then Ok

   - **Increase you want to apply 3D**

- Right click on the desktop again

- Select screen saver tab

- Select 3D text for three dimension from screen saver types

- Select setting, type the text e.g. ICT under custom text.

- Under rotation type ; Select the type you prefer e.g. wobble

- Click OK, apply then OK.

   8. **Working with my computer**

My computer is one of the standard icons it comes with windows operating system. It's there to organize all drivers' network resources, folders and files for easy access.

How to view its contents

- Double click the icon

- Yellow icons are folders

- All grey icons are drivers

- All other colored icons are files

- Double click local disk C, see its contents

9. **WORKING WITH WINDOWS EXPLORER**

Window explorer is used to organize, name, rename, and view files, folders and drivers within a computer.

Accessing the windows explorer

- Click the start bottom
- Select programs
- Under the program menu, select accessories

Windows explorer environment is divided into two sections

i) Left hand side section

ii) Contains a list of standard icons , drive folders and files

Note: A plus (+) sign indicated that there are more contents. A negative (-) sign indicated that there no more files.

By selecting anything in this column. It contents are displayed in right hand side. Now you may double click folder you want to open.

1. **Changing views**

At anytime you may decide to view either small or large icons

Steps:

i) Open the folder or drive

ii) Right click on an empty space inside that window.

In the menu, choose either to view large icons or to view small icons.

1. **Arranging icons**

For easy access of your files and folders you may decide to arrange them in a specific order. You many arrange them either by name, by type, by size or by date etc.

Steps:

i) Right click on a blank spot in the window

ii) Select arrange icons from the menu

iii) Specify arrange criteria

2. **Creating folder**

A folder is a tool used to collect related files or folders

Steps:

i)   Open the area you want to create a folder

ii)   Press the right hand side button on your mouse on a blank space.

iii) Select NEW option from the drop down

iv) From the sub-menu choose FOLDER.

3. **Renaming folders**

Steps:

i) Point on the folder you want to rename

ii) Click the right hand side bottom of your mouse

iii) From the list choose rename

iv) You will be allowed to re-type new name

4. **information about Hard disk capacity**

Steps:

i) OPEN MY COMPUTER from the desk top

ii) Right click disk (C) you will find in the my computer window

iii) Then in the menu that will appear click properties with the left button once

5. **Information about type of CPU speed of C.P.U. R.A.M capacity and version of windows operating systems used**

Steps:

i) Click start button the point control panel and left click on it.

ii) In some computer will find performance and maintained icon click that icon using left mouse. In the following window you will find a system icon.

In other computers, on clicking the control panel you will find the system icon

iii) Double click the system icon

iv) On the system windows that will appear. Click the general button

v) Get all the information required

6. **To delete a file / folder**

Steps:

i) Point to the folder to be deleted

ii) Right click it then in the menu that will point to delete and finally click the left button once.

7. **Copying and pasting a file or folder**

Steps:

i) Point to the file to be copied or Ctrl+C

ii) Right click it and select copy with left mouse button

iii) Go to the area the folder to be pasted

iv) Right click (mouse button) and select paste , or ctrl + V

TOPIC 4: COMPUTER HANDLING

Computer handling is sometimes called computer maintenance, is the process of caring the computer and its accessories so that it can perform its work properly.

POWER MANAGEMENT.

The process of dealing with power disturbances.

Power disturbances include

- Surge
- Sags/ brownout
- Sparks
- Liquid
- Dust
- Heat
- Magnetism
- Spikes

1) **SURGE :** This is the voltage increase above 110% of the normal voltage

2) **SAGS/BROWNOUT**: This is the power brownout which last just less than a second. It's caused by power overload.

3) **SPIKES:** This is the power overload which last for fractions of a second. It's caused starting and stopping of heavy welding and lightening equipments.

4) **LIQUIDS :** liquid tends to cause short- circuiting

5) **DUST**: Dust tends to block flow of electrical signals in a computer system.

6) **HEAT:** Chips in a computer system cannot pass high voltage at very low temperature nor high temperature

7) **MAGNETISM**: Magnet can delete all information in a magnetic disks.

DISK DE FRAGMENTATION: The process of re-arranging files in a disk.

DATA BACKUP: The process of making a copy of your files on other disks.

IMPORTANCE OF DATA BACKUP

1) Transferring purpose

2) Sharing purpose

3) Replacement in case of data loss

DEVICES USED IN DATA BACKUP

- DVD
- CD
- FLASH DISK
- HARD DISK
- FLOPPY DISK
- MEMORY CHIP
- EXTERNAL HARD DISK

DISK FORMATTING: The process of preparing a disk for future use.

COMPUTER SECURITY

- The process of preventing computer data loss

Security measure for protecting computer data

- Use of password
- Installing Anti – Virus
- Updating software
- Avoiding downloading free games
- Avoid sharing password
- Shopping on safe website

MALICIOUS PROGRAMS

A VIRUS: Is a program that infect an executable file

EFFECT OF VIRUS

1) File function is different way than before

2) Maybe only displaying a began massage on the monitor

3) Maybe deleting some or all file on the user's hard drive

4) Maybe altering data files.**There are two key features of a computer virus.**

1) The ability to propagate by attaching itself to executable files.

2) The virus causes harm only after it has infected an executable file and the executable file is urn.

A WORM: Is a malicious program that copies itself

DIFFERENT BETWEEN WORM AND VIRUS

VIRUS	WORM

1) Never copies itself requires human action to propagate	-	Copies itself automatically
2) Infects an executable file	-	Stand- alone program

TROJAN HORSE: Is a deceptively labeled program that contains at and that harms the user.

DIFFERENT BETWEEN TROJAN HORSE AND VIRUS

A Trojan horse does not replicate, which distinguishes it from viruses and worms.

EFFECT OF TROJAN HORSE

1)   Trojan horses allow a hacker to remotely control the victim's computer.

2)   Perhaps to collect passwords and credit card number and send them to the hacker.

3)   Perhaps to launch dervial of service attacks on websites

A LOGIC BOMB:

 Is a program that "*detonates*" when some event occurs. The detonated program might stop working (e.g: go into an infinite loop) crash the computer, release a virus, and delete data files or any of many other harmful possibilities.

A TIME BOMB:

 Is a type of logic bomb in which the program detonates when the computer clock reaches some target date.

Some function about the destruction between a virus and a worm is caused by two distinctly different criteria.

1)   A virus infects an executable file while a worms is a stand – alone program

2)   Virus requires human action to propagate, while worm propagate automatically.

SPYWARE: This is malicious software that hides on computer without user knowledge.

AD-WARE: This is malicious software that installed onto your computer by internet advertising that allow them to inundate you with pop up messages.

TOPIC 5:COMPUTER EVOLUTION

Objectives

This unit is intended to enable students to understand:

- The historical evolution of computers
- The contributions of important people in the history of computers
- Computer generation
- Characteristic features of computers in different computer generations,
- The contributions of important people in the development of computer generations.
- The defferences between computers and calculators.

HISTORY OF COMPUTER

Calculating machine: The first calculating device called abacus was discovered by Egyptian and Chinese people.

Napier's bones (1617s):

This is the calculating device invented by John Napier for calculating Products and quotients of numbers.

Slide rule (1970s):   This is the first analogy computer.

Pascal's adding and subtraction machine: At age of 19, Pascal invented machine that they can add and subtract large numbers.

Leibniz multiplication and division machine: The first mechanical calculator capable of dividing and multiplying invented by Leibniz.

Babbage's analytical engine: analytical engine invented by Charles's Babbage's he is known as father of computer

Mechanical Electrical calculator: In 1960s electrical calculator that uses vacuum tubes to perform arithmetic operation was discovered later on vacuum tubes replaced by transistors as a result the size of calculator become very small.

Early Start

Computers have been around for quite a few years. Some of your parents were probably around in 1951 when the first computer was bought by a business firm. Computers have changed so rapidly many people cannot keep up with changes.

One newspaper tried to relate how the fast changes in computer technology would look to a similar pace in the out industry.

"Had the automobile developed at a pace (equal) to that of the computer during the past twenty years, today a Rolls Royce was cost less than $ 3.00, get 3 million miles to the gallon, deliver enough power to drive (the ship) the Queen Elizabeth II and six of them would fit on the head of a pin"

These changes have occurred so rapidly that many people do not know how our modern computer got its start.

The first Computing machines "Computers"

Since ancient times, people have had ways to deal with data and numbers. Early people tied knots in rope and carved marks on clay tablets to keep track of livestock and trade.

Some people considered the 5000- year-old **ABACUS** – a frame with beads strung on wires to be the first true computing aid.

As trade and tax system grow in complexity, people saw that faster, more reliable and exact tools were needed for doing math and keeping records.

In the mid-1600's **Blaine Pascal** and his father, who was a tax officer himself, were working on taxes for the French government in Paris. The two spent hours figuring and prefiguring taxes that each citizen owed. Young blase decided in 1642 to build an adding and subtraction machine that could aide in such a tedious and time consuming process.

The machine Blaine made had a set of eight gears that worked together much like an odometer keeps track of a car's mileage. His machine encountered many of problems. For one, it was always breaking down.

Second, the machine was slow and extremely costly. And third, people were afraid to use the machine thinking it might replace their jobs. Pascal later became famous for math and philosophy, but he is still remembered for his role in computer technology. In his honor, there is a computer language named Paschal.

The next big step for computer arrived in the 1830's when Charles Babbage decided to build a machine to help him complete and print mathematical tables. Babbage was a mathematician who taught at Cambridge University in England. He began planning his calculating machine calling it the Analytical Engine. The idea for this machine was amazingly like the computer we know today. It was to read a program from punched cards, figure and store the answers to different problems, and print the answer on paper. Babbage died before he could complete the machine. However because of his remarkable ideas and work, Babbage is known as the Father of Computers.

The next huge step for computers comes when Herman Hollerith entered a contest given by the U.S. Census Bureau. The contest was to see who could build a machine that would count and record information faster. Hollerith, a young man working for the Bureau built a machine called the Tabulating Machine that read and sorted data from punched cards. The holes punched in the cards matched each person's answers to questions. For example, married, single and divorces were answers on the card. The Tabulator read the punched cards as they passed over tiny brushes. Each time a brush found a hole, it completed an electrical circuit. This caused special counting dials to increase the data for that answer.

Thanks to Hollerith's machine, instead of talking seven and a half years to count the census information it only took three years, even with 13 million more people since the last census. Happy with his success, Hollerith formed the Tabulating Machine Company in 1896. The Company later was sold in 1911 and in 12 his company become the International Business Machines Corporation, better known today as IBM.

The first Electric Powered Computer

What is considered to be the first computer was made in 1944 by Harvard's Professor Howard Aiken. The Mark I computer was very much like the design of Charles Babbage having mainly mechanical parts, but with some electronic parts. His machine was designed to be programmed to do many computer jobs. This all- purpose machine is what we now know as the PC or personal computer. The Mark I was the first computer financed by IBM and was about 50 feet long and 8 feet tall. It used mechanical switches to open and close its electric circuits. It contained over 500 miles of wire and 750,000 parts.

The first all Electronic Computer

The first all electronic computer was the **ENIAC (Electronic Numerical Intregrator and computen). ENIAC** was a general purpose digital computer built in 1946 by J. Presper Eckert and John Mauchly. The ENIAC contained over 18,000 vacuum tubes (used instead of the mechanical switches of the Mark I) and was 1000 times faster than the Mark I. In twenty seconds, ENIAC could do a math problem that would have taken 40 hours for one person to finish. The ENIAC was built the time of World War II had as its first job to calculate the feasibility of a design for the hydrogen bomb. The ENIAC was 100 feet long and 10 feet tall.

More Modern Computers

A more modern type computer began with John Von Neumann's development of software written in binary code. It was Von Neumann who began the practice of storing data and instructions in binary code and initiated the use of memory to store data, as well as programs. A computer called the EDVAC (electronic Discrete Variable Computer) was built using binary code in 1950. Before the EDVAC, computers like the ENIAC could do only one task then they had to be rewired to perform a different task or program. The EDVAC's concept of storing different programs on punched cards instead of rewiring computers led to the computers that we know today.

While the modem computer is far better and faster than the EDVAC of its time, computers of today would not have been possible with the knowledge and work of many great inventors and pioneers.

COMPUTER GENERATIONS

A generation refers to the state of improvement in the development of a product.

This term is also used in the different advancements of computer technology. With each new generation, the circuitry has gotten smaller and more advanced than the previous generation before it. As a result of the miniaturization, speed power and memory of computers has proportionally increased. New discoveries are constantly being developed that affect the way we live, work and play.

The first generation: 1946 – 1958 (the Vacuum Tube Years)

The first generation computer was huge, slow, expensive, and often undependable. In 1946 two Americans, Presper Eckert, and John Mauchly built the ENIAC electronic computer which used vacuum tubes instead of the mechanical switches of the Mark I. The ENIAC used thousands of vacuum tubes, which took up a lot of space and gave off great deal of heat just like light bulbs do. The ENIAC led to other vacuum tube type computers like the EDVAC (electronic Discrete Variable Automatic Computer) and the UNIVACI (Universal Automatic Computer)The vacuum tube was an extremely important step in the advancement of computers. Vacuum tubes were invented the same time the light bulb was invented by Thomas Edison and worked very similar to light bulbs. It's purpose was to act like an *amplifier* and a *switch.* Without any moving parts vacuum tubes could take very weak signals and make the signal stronger (*amplify it*). Vacuum tubes could also stop and start the flow of electricity instantly (*switch*). These two properties made the ENIAC computer possible.The ENIAC gave off so much heat that they had to be cooled by gigantic air conditioners. However even with these huge coolers, vacuum tubes still overheated regularly. It was time for something new.

The Second Generation: 1959 – 1964 (The Era of the Transistor)

The transistor computer did not last as long as the vacuum tube computer lasted, but it was no less important in the advancement of computer technology. In 1947 three scientists, John Bardeen, William Shockley and Walter Brattain working at AT & T's Bell Labs invested what would replace the vacuum tube in that it can used to relay and switch electronic signals.

There were obvious differences between the transistor and the vacuum tube. The transistor was faster, more reliable, smaller, and much cheaper to build than a vacuum tube. One transistor replaced the equivalent of 40 vacuum tubes. These transistors were made of solid material, some of which is silicon, an abundant element (second only to oxygen) found in beach sand and glass. Therefore they were very cheap to produce.

Transistors were found to conduct electricity faster and better than vacuum tubes.

They were also much smaller and give off virtually no heat compared to vacuum tubes. Their use marked a new beginning for the computer. Without this invention, space travel in the 1960's would not have been possible. However, a new invention would even futher advance our ability to use computers.

The third Generation: 1964 – 1970 (Intergrated Circuits – Maniaturizing the Computer)

Transistors were a tremendous breakthrough in advancing the computer. However no one could predict that thousands even now millions of transistors **(circuits)** could be compacted in such a small space.the intergrated circuit, or as it is sometimes referred to as semiconductor chip, packs a huge number of transistors onto a single wafer of silicon. Robert Noyce of Fairchild Corporation and Jack Kilby of Texas Instruments independently discovered the amazing attributes of integrated circuits. Placing such large number of transistors on a single chip vastly increased the power of a single computer and lowered its cost considerably.

Since the invention of intergrated circuits, the number of transistor that can be placed on a single chip has doubled every two years, shrinking both the size and cost of computers even further enhancing its power. Most electronic devices of bakelite of **Fiberglass** that have electrical connections etched onto them - - sometimes called a **mother board.**These third generation computers could carry out instructions in billionths of a second. The size of these machines dropped to the size of small file cabinets.yet, the single biggest advancement in the computer era was yet to be discovered.

The Fourth Generation: 1971 – Today (The Microprocessor)

This Generation can be characterized by both the jump to monolithic integrated circuits (millions of transistors put onto one intergrated circuit chip) and the invention of the microprocessor (a single chip that could do all the processing of a full-scale computer). By putting millions of transistors onto one single chip more calculation and faster speeds could be reached by computers. Because electricity travels about a foot in a billionth of a second, the smaller the distance the greater the speed of computers.However what really triggered the tremendous growth of computers and its significant impact on our lives is the invention of the microprocessor. Ted Hoff, employed by Intel (Robert Noyce's new company) invented a chip the size of a pencil eraser that could do all the computing and logic work of a computer. The microprocessor was made to be used in calculators, not computers. It led, however, to the invention of personal computers, or microcomputers.It wasn't until the 1970's that people began buying computer for personal use. One of the earliest personal computers was the Altair 8800 computer kit. In 1975 you could purchase this kit and put it together to make your own personal computer.

SUMMARY OF THE COMPUTER GENERATION
1st GENERATION
The first computer used vacuum tubes for circuity and magnetic drums for memory and was often enormous taking up the entire room and relied on machine language to perform operation. Eg:

1) UNIVAC (Universal Automatic Computer) first commercial computer

2) ENIAC(Electronic Automatic Computer)

3) EDVAC (Electronic Discrete Variable Automatic Computer

- It uses vacuum tubes
- Used magnetic drums for memory
- Were very large taking up entire room (big and dummy)
- Computer relied on machine language to perform operation
- Were very expensive to operate
- Input was based on punished card
- Output was displayed on printouts
- Large AC needed
- High electricity consumption.

2nd GENERATION

- Transistors replaced vacuum tubes
- Computer size reduced due to use of transistors
- Computer were relative cheaper compared to that of first generation
- Core memory was developed
- Magnetic tapes and disk were used
- First operating system was developed

3rd GENERATION:

- Integrated circuit replaced transistors
- Capacity of computer increased
- Size of computer continued to be small
- Power consumption was low
- SSI and MSI technology was used
- High level language was used

4th GENERATION (1971 -   Present: Micro Processor)

- Development of micro processor
- Development of the internet
- Development of GUI'S
- LSI and VLSI Technology used
- RAID technology of data storage
- Computer started in the use of data commission
- Used in virtual reality a multimedia stimulator
- Different types of memories with very high accessing speed of storage capacity

5th GENERATIONS (Present to beyond – artificial intelligence)

Fifth generation computing device based on artificial intelligence are still in development, through there are some application such as voice recognition, that are being used today.

- Used in parallel processing
- Used super conductors
- Used in speech recognition
- Used in intelligent robot

TYPES OF COMPUTERS

Depending on the processing and size of computer, they have been classified under various types.

TYPES OF COMPUTER BASED ON THE OPERATIONAL PRINCIPLE OF COMPUTER

- Analogue computer
- Digital computer
- Hybrid computer

ANALOG COMPUTER

These are computers that use analogy signals only. These are different from a digital computer because an analog computer can perform several mathematical operations simultaneously.

Arithmetic and logical operations are done by measuring physical changes i.e. Temperatures or pressure

DIGITAL COMPUTER

These are computers that use digital signals only. Digital computers recognized data by counting discrete of O'S and 1'S.

HYBRID COMPUTER

These computers are combination of both digital and analog computers. In this type of computer, the digital segments perform process control by conversion of analog signals to digital ones.

B: TYPES OF COMPUTER BASED ON THE SIZE OF COMPUTER

MICROCOMPUTER

A computer with a microprocessor and its central processing unit is known as microcomputer. They don't occupy space as much as mainframes. When supplemented with a keyboard and a mouse, microcomputer can be called as personal computers.

Desktop, laptop, personal digital assistant (PDA's)

MINICOMPUTERS

A minicomputers a term no longer much used , is a computer of a size intermediate between a microcomputer and a main frame , Typically microcomputers have been stand – alone computer

MAIN FRAME COMPUTER

Large organizations use mainframes for highly critical applications such as bulk data processing and ERP. Most of the mainframe computer has the capacities to host multiple operating systems and operate as a number of virtual machines and can this substitute for several small servers.

SUPER COMPUTERS

The highly calculation - intensive tasks can be effectively performed by means of super computer.

E.g.: Quant ion physics, Mechanics, Weather forecasting and molecular theory is best studied by means super computers.

STORAGES UNIT.

Bit = Smallest unit of computer data

Byte = Collection of 8 bits

1 bit = 2 characters (0 or 1)

1 byte = 8 bits

1 kb = 1000 bytes

1mb = 1000kb

1 GB = 1000 mb

1 terabyte (tb) = 1000 GB

Example: 1

40 GB hard disk contains 8 files @ with 3kb.

Calculate

a) Free space
b) Space occupied by 8 files in a hard disk

Solution

Given = 40 GB hard disk (HDD)

Step 1 = 8 files @ 3kb

Space occupied

1file   = 3kb

8 files = x

8fils x 3kb   = 24 kb

Total space occupied or needed by 8 files = 24kb

If 1 GB = 1000 mb

40 GB   =   a

          = 40000mb

   1mb   =   1000 kb

 40000mb =   x

       x   =   40000000kb

- 40gb   =   40000000kb

Free space   = hard disk - total files

= 40,000,000   - 24

= 39,999,976kb

b) Space occupied by 8 files in a hard disk is 24kb

Example 2:

Calculate number of bits, bytes and kb required to present the following words.

a)Said katinga.

Solution

i)   1 bit   =   2 character

x   =   12 characters

$$x = \frac{12 \times 1}{2} = 6 \; bits$$

ii)   1 byte = 8 bits

x   = 6 bits

(1x 6)/8 =   8x/8

= 3/4

= 0.75 bytes

iii) 1 kb = 1000 bytes

       x = 0. 75 byte

     x = (0.75 bytes x 1kb)/1000

      x = 0.00075 kb

b)   Isha ghandhi = 12 characters

i)   1 bit   = 2 characters

    x   =   12 characters

(2x character)/2   = (1 bit x 12 character)/2

           = 6 bits

ii) 1 byte = 8 bits

    x? = 6bits

    = 6/8

   $\therefore$ x = 0.75

iii) 1kb =1000 bytes

  ? = 0.75 bytes

(1kb x 0.75 bytes)/100 =   (1000x bytes)/1000

             = 0.00075kb

HARD DISK STRUCTURE

- Physically, the hard disk consists of several metallic platters that are permanently sealed into a disk drive container.

- Binary data on a hard disk is recorded magnetically on invisible closed concentric circles called "Tracks"

- Each track on the disk is further divided into smaller, more manageable units called "sectors". A sector is the smallest addressable unit on a disk and is exactly 512 bytes in size.

CLUSTER SIZE AND PERFORMANCE

The performance of a hard disk is directly related to the cluster size in general smaller cluster sizes result in a more efficient use of hard disk space , but can also lead to fragmentation in large files if the cluster are not stored continuously (side by side) on the hard disk.

PARTITIONS

A hard disk may be split into several smaller logical called partitions. Each partition on a hard disk is treated like a separate disk.

For example: A hard disk could be divided up into partitions as shown on the right.
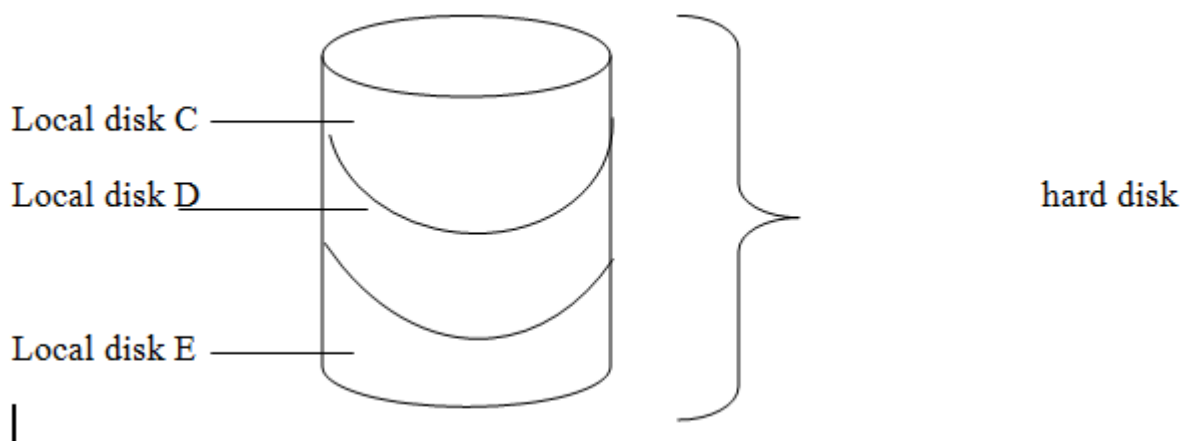
ACCESS TIME

Seek time is a measure of how long it takes the head assembly to travel to track of the disk that contain data.

Access time can be improved by increasing rotational speed (thus reducing latency) and reducing the time spent seeking.

DATA TRANSFER RATE

HDD data transfer rate depend up on the rotational speed of the platers and the recording density.