

CATEGORIES OF COMPUTERS

Computers can be categorized according to the process they use to represent data. People communicate through speech by combining words into sentences. Human speech is analog because it uses continuous (wave form) signals that vary in strength and quality. Most computers are digital.

Computer categories are basically three:

1. Digital computers
2. Analog computers
3. Hybrid computers

Analog computers

An Analog Computer is a computing device that uses continuously changing values to represent information.

It generally deals with physical variables such as temperature, weight, voltage, pressure, speed, etc.

The results given by the analog computers are approximate since they deal with quantities that vary continuously.

Almost all of the measuring devices are “Analog computers”.

Examples of Analog computers

- Thermometers,
- Voltmeters, and Ammeters
- Speedometers, Barometers
- Traditional automatic watches
- The slide rule is a hand-operated analog computer for doing multiplication and division, square roots, cubes and cube roots etc.

Digital Computers

These are computers that use discrete (discontinuous) values, especially binary digits (0, 1) to represent data.

The binary digits simply mean the presence or absence of an electric pulse/ voltage.

The state of being on is represented by 1 and off is represented by 0.

Although digital representations are discrete, the information represented can be either discontinuous, such as numbers, and letters, or continuous, such as sounds, images, and other measurements of continuous systems.

Digital computers are more accurate and work at a very fast rate.

Examples of Digital Computers

- All Personal computers (PCs)
- Laptops,
- Digital Watches

Hybrid Computers

A hybrid computer combines the desirable features of analog and digital computers. A hybrid computer accepts analog signals and converts them to digital for processing.

It is mostly used for automatic operations of complicated physical processes and machines.

Now-a-days analog-to-digital and digital-to-analog converters are used for transforming the data into suitable form for either type of computation.

Hybrid computers are mainly used for specialized tasks

Examples of Hybrid computers

- Digital petrol pumps are an example of hybrid computers.
- They measure physical quantities and represent its values in digital form.
- In Hospitals' Intensive care units, analog devices measure the patients temperature, blood pressure and other vital signs.
- These measurements which are in analog are then converted into numbers and supplied to digital components in the system.

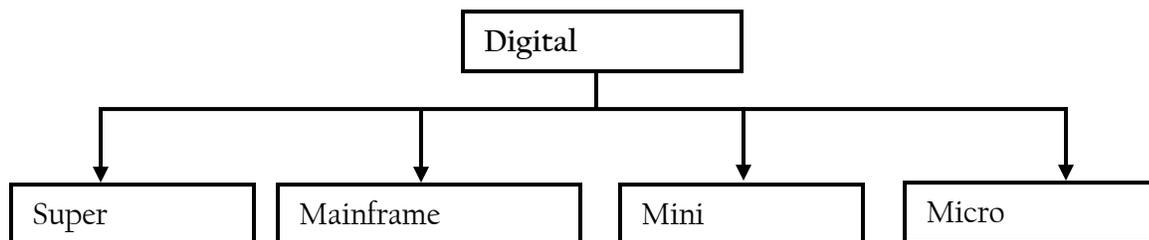
CLASSIFICATION OF COMPUTERS

- a) Classify computers by size
 - i. Super Computers
 - ii. Mainframes
 - iii. Mini Computers
 - iv. Micro Computers
- b) Classify computers by purpose
- c) Classify computers by the functions they perform
 - i. Stand-alone
 - ii. Networked
 - iii. Real-time Systems
 - iv. Integrated Systems
- d) Classify computers by processing power

CLASSIFICATION BY SIZE

According to size or capacity, we base on the physical size and the number of people the computers can accommodate at the same time.

Digital computers can be grouped into four classes as follows:



Super Computers

Super Computers are the best in terms of processing capacity and also the most expensive ones.

These computers can process billions of instructions per second.

They are used for applications which require intensive numerical computations such as weather forecasting.

They have a high storage capacity and are huge in size.

They generate large amounts of heat and therefore need complex cooling systems.

A supercomputer channels all its power into executing a few programs as fast as possible.

Mainframe Computers (also known as big iron)

These are powerful computers used mainly by large organizations for bulk data processing such as census, and financial transaction processing.

They are also called central processors because they process data centrally.

These computers are used in places where processing needs to be done in bulk such as banks.

They can store a lot of information

They support a wide range of peripheral devices

They can support many users at ago (have many users connected via dumb terminals).

What are Dumb Terminals?

Dumb terminals are display and input devices which don't process data, instead they transmit input to a computer to which it is connected and display the resulting output.

Dumb terminals have no 'intelligence' (data processing power) and depend entirely on the (intelligent) computer to which they are connected for computations, data storage, and retrieval.

Mini Computers (a.k.a. midrange computers)

A minicomputer is a class of multi-user computers that lies in the middle range between mainframe computers and the smallest single-user systems (microcomputers or personal computers).

They are similar to main frames but they are smaller in size, support a limited number of peripheral devices connected to them, Have a lower speed, have lesser storage capacity, and support fewer number of users at the same time than as compared to main frames.

Micro Computers (a.k.a. Personal Computers –PCs)

A microcomputer is a computer with a microprocessor as its central processing unit.

When equipped with a keyboard and screen for input and output, they are also personal computers.

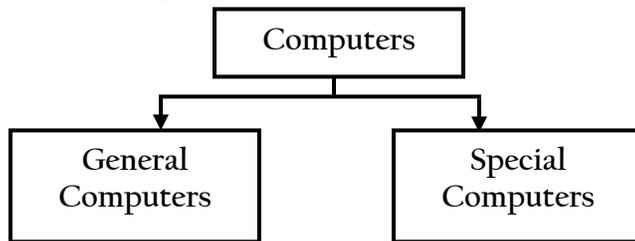
They are single user and are the most widely used computers in our everyday life. Micro computers are relatively cheap, smaller in size and support fewer peripheral devices. Micro computers are further classified into:

- a) Desktop computers: Designed to be stationed in one place probably on top of a desk.
- b) Laptop computers: These are more portable and suitable for mobile computing.
- c) Palmtops/Personal Digital Assistants (PDAs): These are handheld digital computers.

CLASSIFICATION OF COMPUTERS BY PURPOSE

According to Purpose, we base on the variety of problems that a computer can help to solve.

Computers can be grouped into two classes as follows:



SPECIAL PURPOSE COMPUTERS

A special purpose computer is designed to operate on a restricted type of problems. They have instructions permanently stored in them to perform the given task quickly and efficiently.

Most special purpose computers have the capability of performing just one task. They are commonly referred to as "dedicated computers,"

Examples of Special Purpose Computers

- Automatic Teller Machines (ATM),
- Pocket calculators,
- Computers that operate lifts.

NB: .Most analog computers are special purpose computers

GENERAL PURPOSE COMPUTERS

General-Purpose Computers are designed to solve a wide range of problems. They are also able to act in response to new programs created to meet different needs. A general-purpose computer is one that has the ability to store different programs of instruction and thus to perform a variety of operations.

Most PCs (Desktops, laptops and palmtops) are general purpose.

CLASSIFICATION OF COMPUTERS BY FUNCTION

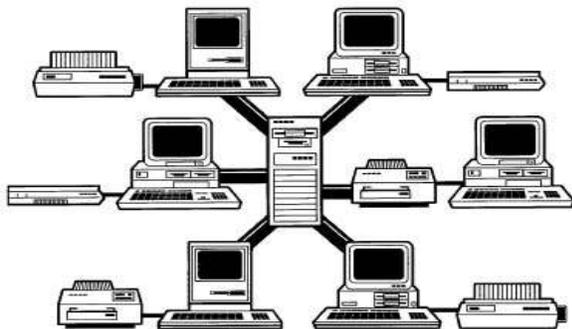
According to Function, we base on what computers do and how they do it.

We have four classifications of computers by function:

- i. Networked
- ii. Stand-alone
- iii. Real-time Systems
- iv. Integrated Systems

Networked computers

These are computers connected by channels to other computers so that they can communicate with each other and share resources like data, internet connection, printers, etc.



Stand-alone computers

This is a computer that operates and does everything independently.

Stand-alone computers do not have any internet connection, a connection to other computers, or a connection to the outside world.

A fax machine is a stand-alone device because it does not require a computer, printer, modem, or other device.

A printer, on the other hand, is not a stand-alone device because it requires a computer to feed it data.

Real-time systems

These are systems that respond to an event that has occurred within a certain specified time frame.

Real-time means that after an event has occurred, a system or application has to react to that event within a certain time period or deadline.

For example, computers for a banking system are real time systems.

Integrated system

An integrated system is a group of interconnected units that form a functioning computer system.

An integrated system has separate programs that perform separate functions but they all contribute to the same output.

CLASSIFICATION OF COMPUTERS BY PROCESSING POWER

Micro Computers can be classified by their microprocessor model name or model number. The leading processor chip manufacturers for personal computers are Intel, AMD, IBM, and Motorola.

Due to the rapid changes in technology, processor power is also rapidly increasing. Computers are getting faster and faster each time a new micro processor chip is introduced.

Examples of Microprocessors

The most common types of processors are:-

- 80286,
- 80386, 80486
- Pentium I,
- Pentium II,
- Pentium III,
- Pentium IV,
- Pentium Duo core,
- Core 2 Quad,
- Celeron,
- Celeron D,
- Xeon,
- Opteron,
- Athlon,
- Itanium

The unit for measuring the processing power is the Hertz.

For example, Celeron processors' speed ranges from 266MHz – 2.8 GHz.

GENERAL CATEGORIES/DIVISIONS OF THE COMPUTER SYSTEM

- Computer hardware,
- Computer software,
- Computer human ware,
- Computer data and,
- Computer communication

A computer system comprises of hardware, software, user, data and communication. With examples, describe each of the components.

Hardware	
Definition	<ul style="list-style-type: none"> ➤ Hardware devices are the physical and tangible components of a computer. ➤ Hardware comprises the electronic and the electromechanical parts of the computer.
Categories	Input hardware Processing hardware Storage hardware Output hardware Communications hardware
Examples	Monitor keyboard, mouse,

	CPU Printer
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Software	
Definition	<ul style="list-style-type: none"> ➤ Software is a term for electronic instructions that tell the computer how to perform a task. ➤ These are a series of programs (instructions) that tell the computer what and how to work.
Categories	<pre> graph TD S[SOFTWARE] --> SS[SYSTEM SOFTWARE] S --> AS[APPLICATION SOFTWARE] SS --> UP[UTILITY PROGRAMS] SS --> OS[OPERATING SYSTEMS] SS --> PL[PROGRAMMING LANGUAGES] AS --> CS[CUSTOMIZED SOFTWARE] AS --> OS2[OFF SHELF SOFTWARE] </pre> <p>System software manages the computer resources e Utility software Utility software is a kind of system software designed to help analyze, configure, optimize and maintain the computer. Application software solves the particular needs of the end user.</p>
Examples	<p>System software – □Operating systems - Windows XP, Vista, Windows 95 Programming languages – C+, Java Script, SQL □Utilities – Antivirus software, disk defragmenters, data recovery screensaver, etc. Application software; Off the shelf (packed software) – MSOffice suite; Custom (tailor made) – school management system SMS</p>

User	
Definition	<p>User – the most important component of a computer system – used to design and develop computer systems, operate the computer hardware, create the software, and establish procedures for carrying out tasks. User/human ware refers to the people who operate and initialize instructions to the computer system</p>
Categories	<p>Ordinary user - is someone without much technical knowledge of computers but uses computers to produce information for professional or personal tasks, enhance</p>

	<p>learning, or have fun.</p> <p>Professional user -is a person in a profession involving computers who has had formal education in the technical aspects of computers; an example is:</p>
Examples	<ul style="list-style-type: none"> ➤ Computer programmer ➤ □System analyst ➤ □System administrator ➤ □Database administrator ➤ Network administrator. ➤ Secretary ➤ Computer Students

Data	
Definition	<p>Data refers to raw facts and figures that are processed into information.</p> <p>□Data data is anything in a form suitable for input into a computer for processing.</p>
Categories	<p>Unprocessed data Like Letters, digits and symbols (e.g., a, b, c, &, ...)</p> <p>Information (Processed data) Like a document, a mathematical formula, grades a piece of music, a song etc.</p>
Examples	<p>Letters and symbols (e.g., a, b, c, &, ...)</p> <p>words</p> <p>Numbers/digits</p> <p>Dates</p> <p>Musical notes</p> <p>Audio (sound), graphics, Video, etc.</p>

Communication	
Definition	<p>□This is the process of transferring data between computer systems or devices.</p> <p>Linking up computer devices and computers</p> <p>Enabling the flow of data</p> <p>Enabling the flow of information</p> <p>□Enabling the flow of instructions</p>

	Networking of computers
Categories	Communication through computer networks: Internet Intranets LAN WAN MAN PAN, etc.
Examples	(communication media) Modems Cables Computer fax modems routers gateways

Computer Hardware Components:

This refers to the **physical** components of a computer system. They are components which can be seen, touched or felt.

They can be generally categorized as:

- Input Devices.
- The System Unit
- Back-up Storage devices
- Output Devices.

(a) INPUT DEVICES:

Are hardware components used to feed data (information) and instructions into the computer.

Keyboard.

Is a primary input device with a number of special keys which can initiate programmed routines.

Types of keyboard:

104 - Key enhanced windows keyboard. (Six pin)

108 - Key enhanced keyboard.

Parts of a keyboard

Mention any three of the sections that make up a keyboard.

- Alphanumeric keys (Typewriter Keyboard)
- Numeric keypad
- Navigation keys /& Arrow keys

- The function keys
- Indicator lights

What is the difference between the function of the backspace key and the delete key on a keyboard?

- Backspace removes the character before the cursor (on the left of the insertion point), While Delete key removes the character after the cursor (on the right of the insertion point)

State the practical importance of the following keys on your keyboard

(i). Num Lock key:

Activates and Deactivates using the Numerical keypad for entering numbers

(ii). Esc key:

Used to cancel the current task.

Keyboard special keys

(a) Alt key:-

The Alt-key combines with other keys to perform specific functions.

In most window programs, the main menu Tabs have got underscored letters e.g. File, Edit, View, Format, Tool, Table, Window and Help.

Pressing Alt with the underlined letter will activate that menu.

Alt + F4 = Exits a program.

(b) Control (ctrl) key.

Used with other keys to perform specific functions/operations e.g.

Ctrl + F2 = Print preview

Ctrl + Alt - Adds a new page (Page Beak)

Ctrl + Alt + F2 = gives 'Open file dialogue box'.

Ctrl + Alt + Del = Initiates a reboot (warm boot)

Ctrl + P = initiate print dialog box

Ctrl + B = bolds a selection

Ctrl + S = saves a file

Ctrl + V = Paste.

Ctrl + W = New file

Ctrl + X = Cut.

Ctrl + Esc = Activates the startup menu.

Etc

(c) Shift Key.

Makes one alternate between lower and upper case characters during routine typesetting operations. It is also used for other short cut operations e.g.

SHT + F3 = Alternates between lower and upper case characters, title case and sentence case.

Shift + Arrows = used to select text.
Shift while inserting a CD-ROM to deactivate the auto-run.

d) **Windows key:** Activates the start-up menu for the computer user to run shutdown, Run, Help, Search, Settings, Documents, programs, Control panel, etc.
Ctrl + Esc = Activates the startup menu too.

e) **Enter key/Return:**
Used to enter/confirm commands or move the cursor/insertion point to a new line.

f) **Tab key:**
In normal typesetting, tab keys help in having data in columns with smooth margins.
When working with tables it is used to move from field to field, and to add a field/Row in a table.
When the cursor is in the last bottom cell of the table, pressing tab key adds another row.
Shift + Tab take you back to the previous field.

g) Del + Backspace key.

h) **Escape (ESC) key** = used to Exit/close a dialog box.

i) **Cursor control Keys:**

Home = Moves the cursor at the beginning of a line.

End = Moves the cursor to the end of a line.

Insert = for overtyping.

Delete = deletes one character at a time on the right of the cursor.

Back space key = deletes one character at a time on the left of the cursor.

Page up = Moves the cursor to the top of the page.

Page down = Moves the cursor to the bottom of a page.

Num lock key = Activates the numeric keypad.

Print screen key = for printing what is on the computer screen.

Scroll Lock key = for scroll lock. Disabled in modern keyboards.

(b) **MOUSE - MICE (plural).**

It is a computer input pointin device used to move an arrow shaped pointer on the computer screen as it is gently moved onto the desk-top/mouse pad, to select, move and confirm operations.

Parts of a mouse piece.

Primary button

Secondary button

Wheel button.

Mouse piece



Rubber ball – roller for ball type mouse – signal movements.

Mouse housing which can be held in to your hand.

Cables connecting the mouse to system board.

An Interface connector to attaché the mouse piece to the mouse board.

Types of mice interface

(1) **Serial interface:** Used by old Pcs with 9 -25 pin male connectors. Most PCs used to have two serial ports i.e. COM1 and COM 2. Once the device driver is initialized it searches for the connected port.

(2) **PS/2 mouse interface:** i.e. on board mouse port interface or dedicated motherboard mouse port.

(3) **USB interface:** (input/output) this works through USB slots of the system board.

Types of Mice

Code less mouse: with optical sensor and doesn't accumulate dirt.

Ball type mouse.

Mice Faults

Mouse pieces are usually disturbed by the following;

- Dirt accumulating on mouse rollers and wheel mechanism.
- Bending pins.
- Interruption conflicts: The computer fails to recognize its mouse piece. Restart the computer or check mouse drivers/software.

Other computer pointing devices include:

Trackball

A trackball is a stationary pointing device with a ball mechanism on its top.

Joystick

A joystick is a pointing device with a vertical lever mounted on a base to control the position of the cursor

Light pen

A light pen is a handheld pen like pointing device that has a light sensitive point to select options on the screen.

Touch screen

A touch screen is an input device that permits the entering or selecting of commands and data by touching the surface of a sensitized video display device with a finger or a pointer.

Touch pad

A touch pad is a small flat rectangular pointing device that is sensitive to pressure and motion.

OTHER INPUT DEVICES

Scanners: Optical character Recognition (OCR) works like a photocopier to transmit images of data/text into the computer as digital codes.

Sensors: Used to capture and measure data in form of temperature, light and sounds.

Digital cameras: These capture clips of happenings for processing and storage into the computer.

Microphones. For inputting audio or voice signals into the computer.

Touch panels. For touch signals.

Remote controls.

Graphics Tablet (Digitizer). A flat pad, which can be drawn or written on using a pressure sensitive stylus pen. Whatever is written is converted into digital signals for the computer.

Stripped bar code reader. Used in supermarkets to pick product codes for easy price calculations.

THE SYSTEM UNIT

Is a metallic casing housing the following devices:-

Power supply unit: Picks power from the mains and distributes it in required voltages.

Floppy disk drive

CD – ROM drives.

Hard/local disk.

System Power Switch.

System Speakers.

Read Only Memory (ROM). ROM can be in form of;

EPROM = Electronically Programmable Rom.

EEPROM = Electronically Erasable Programmable Rom.

System power and hard disk lights

System Board/mother board/planner/form factor or main system board. The System Board determines the computer system. Architecture. For instance, Closed Architecture, Open Architecture, Bit-Bus architecture. i.e.

ISA = Industrial Standard Architecture.

MCA = Micro channel Architecture

EISA = Extended industry standard Architecture.

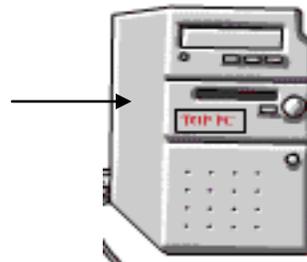
Proprietary design system boards.

System boards can also be classification according to their bit-bus architecture, hence having:

-Single layer System boards

-Double layer System boards.

System unit



System Board in Details

- CPU Socket.
- RAM Memory sockets i.e. for SIMMs or Dimms (Single in Line Memory Modules and Double in Line Memory Modules respectively).
- ROM Bios containing POST program, Bootstrap Loader, System board drivers, system setup program called CMOS setup. This can also determine and control how first operations can take place in the Pc.
- Data Buses
- Peripheral Ports
- Integrated Disk Electronic (IDE) Connectors
- USB Ports/PCI Slots
- Jumpers
- Network Adopter Card and NIC slots
- Video Adaptor Cards/VGA Cards
- Sound cards
- Television and Frequency media/modulation cards
- Etc

PROCESSING HARDWARE

This is composed of the **Central Processing Unit (CPU)**.

This is the area which is responsible for the control and execution of all the computer operations. For instance, it accesses data from memory, carries out intended operations and stores the result into memory again.

The CPU is the brain of the computer.

Physically the CPU is identified as a micro or multi processor **chip**. It is made up of a numbered of circuits and buses and compacted as a chip.

The CPU is composed of three main parts i.e.

- a. - **The control unit.**
- b. **Registers/Accumulators**
- c. - **Arithmetic Logic Unit (ALU)** i.e. works on data to be subjected to mathematical operations/calculations and logic. Arithmetic involves fundamental math operations of -, +, *, /, etc.
Logical Operations involve comparison of phenomena e.g. passed/failed, yes or no, present or absent, =, >, <, on/of, etc.

Control Unit (CU)

The CU performs the following functions;

- ◆ Fetches and sends commands to system devices and

peripherals.

- ◆ Interprets commands i.e. it's is the intermediary between the user and the computer.
- ◆ Controls and times all tasks by the CPU (typical of Multi-tasking where processor time is shared amongst competing tasks).
- ◆ Directs the movements of electronics signals between the CPU, input, memory and output devises. Hence the CPU acting as a data traffic warden.

(3) **Registers or Accumulators:** Are additional storage locations in the CPU which hold data and instructions temporarily during processing.

Examples of processor on the market include;

- Intel 8085, 8085
- Intel Pentium I, II, III, and IV. (Double layer)
- Intel Celeron – Single layer, Heats up very fast, and they are cheaper if compared to double layer processor chips.
- Pentium Dual-Core
- Cyrilx
- Motorola 68040, 68030
- Motorola G3 and G4. They are relatively expensive and can work for months and months without heating up. They are usually used in servers systems.

STORAGE HARDWARE or MEMORY UNIT

Memory hardware devices house/store computer programs or instructions, data and information.

Memory unit consists of:-

Primary memory \main storage

Secondary/Auxiliary or back-up storage units

(a) Primary Memory/Main/Internal/Memory

Primary memory consists of:-

(i) Read Only Memory. (ROM)

ROM is a write once read many memory. It houses data/information and programs the computer user can access but can not change or delete. Such information can be;

POST information

System device drivers i.e. program which enable specific parts of system to communicate with other system devices.

Manufacturers' information about his computer brand, etc. Physically, **ROM** is a chip and can be EPROM or EEPROM.

ii) Random Access Memory (RAM)

RAM holds data and programs the CPU is currently processing. It is the user at a given time. RAM is very volatile i.e. it loses its data content on any sudden electric power loss or switch off. Hence need for back-up second storage device.

Physically it is a chip with storage capacities in MBs. E.g. 64, 118, 128, 256, etc.

NB: (1) RAM chip can be in form of **Single inline memory modules (SIMMs)** or **Double inline memory modules (Dimms)**. **Others include;**

DRAM Chips = Dynamic RAM.

SRAM = Static RAM. It is faster, expensive and offers more space.

EDO – RAM = Extended data out RAM

(2) **Spooling:** This involves transferring data from one storage media to another. Without spooling data from input devices would be stored in the primary memory making it overloaded.

(b) SECONDARY MEMORY.

Secondary memory relates to either removable or fixed data storage devices which provide information storage for reference purposes. They supplement RAM which is very volatile.

Includes:-

- i) Serial Access media e.g. magnetic tapes, paper tapes, punched cards .etc
- (ii) Random Access media e.g. discs or hard disks, floppy diskette, etc.
- (ii) Magnetic (e.g. diskettes, magnetic tapes, hard disk, Zip and Jazz disc, etc) Vs Optical memory (e.g. CDs-R or W, VCD, DVD, etc).

CARE FOR DISCS AND DISKETTES

- ◆ Do not bend so avoid pocketing.
- ◆ Do not touch exposed data parts.
- ◆ Do not apply paraffin, petrol or acid.
- ◆ Do not expose to magnetic fields.
- ◆ Do not attach clips or Rubber bands.
- ◆ Do not write on or label using hard or sharp pens, or do not scratch
- ◆ Store bottom down.

Advantages and disadvantages of Floppies sizes.

Advantages

- ❖ Cheaper compared to other storage media
- ❖ Protected in plastic casing
- ❖ Facilitate data transfer.
- ❖ They are in standard sizes (e.g. 3½, 5¼, and 8½).
- ❖ Easily edited and formatted.

- ❖ Flexible/lighter making their transfer easy.

Disadvantages

- Virus transfer agents
- Have very limited storage
- Relatively not very durable
- Slower data access and storage.

HARD DRIVE DISKETTE (HDD)

Advantages

- ✓ Offer more data storage space.
- ✓ Always available.
- ✓ Faster data access and storage when compared to floppies.
- ✓ Supplement RAM. Facilitate backup.
- ✓ Provide more permanent data storage if compared to RAM.

Disadvantages

- ✓ Relatively expensive.
- ✓ Relatively heavy.
- ✓ Virus prone.
- ✓ Can clash leading to information losses.

Other Memory Options;

(1) Virtual Memory:

Storage space in the Hard disk used to expand/supplement RAM. It enables the computer user run more programs than available RAM can handle.

(2) Cache Memory:

Is a special high speed memory area that the CPU can access quickly. It can be location in the CPU or on the system board/planner. To store frequently used programs.

(3) Video Memory (VRAM)

Used to storage display images for the monitor

Its size dets:-

- How fast images appear.
- No of colour available.

(4) FLASH MEMORY:

This is a special non-volatile RAM chip inserted into USB port to simulate and supplement the hand-disk.

OUTPUT HARDWARE DEVICES

These are devices through which processed or stored data is communicated or output to the computer user. They include;

(a) The Monitor/VDU/VDT/VGA, CRT or Screen.

This is a TV-like device which produce screen oriented soft copies of processed or stored data.

Types include:

Monochrome –Black and white and Black and green monitors.

Coloured/R, G & Blue.

Prism/Flat screen or Liquid crystal Display (LCD).

(b) Printer

This is an output device which produces hard copies of computer processed data.

Or

Printers are peripheral devices used to produce hard copy of computer output, normally data, text and in certain cases, graphics; that is such as drawings or charts.

Printers vary in their capabilities as far as text enhancements such as underlining or boldening are concerned and also in their ability to print graphics.

TYPES OF PRINTERS

- (i) Impact
- (ii) Non-Impact Printer.

IMPACT PRINTER

Computer printer that creates characters by striking an inked or carbon ribbon against the paper beneath.

Features of an Impact Printer

- They create the characters by striking the paper.
- They print on most types of paper.
- Multiple (carbon) copies may be printed at once
- They are relatively slow.
- They do not print transparencies (documents printed on clear plastic film for use with over head projector.
- Print by force
- Produce some noise while printing
- Use ribbon at times

Examples

Dot –matrix are impact printer that draw a character from a series of dots.

Daisy wheel printers

Line printers

They are used to cut stencils in the printery and schools.

Advantages

1. Low cost of consumables (Ink) because they use multi-pass ribbons
2. Can print on multi-part forms (Carbon or Carbonless)
3. Can print on page sizes other than 8 1/2 x 11 You can get custom sizes
4. There are specialty impact printers that can have multiple forms loaded simultaneously and be selected by software.

Disadvantages

1. they make so much noise that nobody wants them near
2. if tractor driven the perf edge is a hassle
3. separating the sheet forms
4. no printing on back

NON-IMPACT PRINTERS

These are printers based on scanning technology to produce hard copies.

Examples of Non-Impact Printers

- Laser printers
- Inkjet printers
- Solid Ink printers
- Dye Sublimation printers
- Thermal printer
- Bubble Jet printer

Features of Non-Impact Printers

- The printer head does not make contact with the paper.
- They print on most types of paper but better quality is obtained with better paper.
- Transparencies are usually supported.
- Better print quality than Impact printers
- Use either solid or liquid cartridge-based ink.
- Non-impact printers typically require little maintenance beyond replacing the print or toner cartridges.
- Hardly produce noise. They are relatively quieter.
- They are relatively faster when printing.

- Can produce colored output
- Use Toner
- Use copying/burning principle.

Disadvantages

- Less detail (Unless you buy a top-of-the-line laser printer)
- More money up front for Toner (ink)
- Cost more
- More complicated maintenance
- Harder to use with old PC's/Technology

(ii) Serial and Parallel/Non-serial Printers.

Serial printers receive one bit of data, at a time. They are also capable of producing a single character or word at a time. Whereas parallel printers are ones which receive one character (byte) at a time. They are also capable of producing one line or page at a time.

Examples include, line printers, drum/barrel printers, etc.

(iii) Unidirectional Vs Bidirectional.

Unidirectional printers print in one direction whereas, bidirectional printers can print from either side of the paper.

Other Output Device

Speakers/Earphones.

Disks and magnetic tape.

Plotters.

The *plotter* is a computer printer for printing vector graphics, usually by moving a pen.

OTHER HARDWARE DEVICES

UPS – Uninterruptible Power Supply Unit

Anti-Glare screens.

Data buses and Electric cables

Dust covers

COMPUTER HARDWARE PROBLEM.

→ Excessively low/high temperature causing:-

- Circuit/bus cracks
- Connection breaks.
- Chip crapes small movement\dislocation.

→ Effects of dust:-

Dust builds thick coatings in slots, ports, internal chips, etc. Dust coating can cause unnecessary heat, data and electric insulation.

→Effects of corrosion:

Hardware comes into contact with atmospheric chemicals, food, human body, water etc causing rust.

→Magnetic Field:

They cause magnetic inductions, which disturb computer data movements and processing.

→Electrical Noise:

This can be in form of;

- Electronic static discharge causing short circuits.
- Electromagnetic interference, or
- Electro magnetic redactions traveling in space.

→Electrical power Variations

This causes the following.

- Blackouts
- Power transit i.e. excessive low voltage.
- Brown out. Lowered power from the mains

Differentiate digital computers from analog computers

Analog computers process data in continuous form while digital computers process data in discrete form

Digital computers can only have one of the two voltage levels while analog computers can have both voltage levels

COMPUTER GENERATIONS

	Computer Generation	Period of existence	Main feature /characteristic
1	First generation	1940-1956	Vacuum tubes
2.	Second Generation	1956-1963	Transistors
3	Forth generation	1971-Present	Microprocessors
4	Fifth generation	Present and Beyond	Artificial Intelligence
5	Third Generation	1964-1971	Integrated Circuits

Mention any three characteristics of the Electro-Mechanical Era Computers.

- They used mechanical relays
- They had moving parts
- They used punched cards for input

- They had many switches
- They had a set of gears for processing

List four characteristics of mini-computers

- Their word lengths are usually 16 to 32 bits
- They have a transfer rate of about 4 million bytes/second
- They can support all high level languages
- They support between 15 to 25 terminals
- The main memory size ranges from 256kb to 32Mb
- The CPU speed is 100 kips to 500 Mips (Million instructions per second)

Give any three advantages of PC's over mini-computers

- A lot of "business standard" software is available for it - such as Microsoft Word, Excel, Access, Outlook, etc.
- A PC and the consoles will most likely always be the gamer's choice.
- Great for large companies
- Open and powerful hardware platform, which can provide effective and reliable control, with no requirement for additional processors or complex hardware additions.
- Centralized structure, reduced hardware costs, fewer interfaces, easy upgrade paths, full integration and high reliability.

Mention any six setbacks that were associated with the first generation computers (1946 – 1958):

- Needed very many people to operate due to their huge size.
- High level of training was required before use
- They produced a lot of heat and burned out.
- They consumed a lot of power
- They produced a lot of noise.
- They broke down frequently (Required standby technicians)
- They had limited primary memory, and so they were very slow.
- They were very expensive to buy, setup and maintain.
- They were not portable/ they were very huge - One computer could take up space of several floors in big buildings.
- Manual assembly of individual components into one functioning unit required.
- Air conditioning required.

State any five characteristics of the third generation of computers.

- They used Integrated Circuits (ICs) for processing.

- The computers extremely reduced in size – could now fit on desk.
- The keyboards and monitors replaced punched cards for input and output.
- Magnetic hard disks were developed for storage purposes.
- Memory size expanded to approximately 2 megabytes of RAM
- The computers became more reliable.
- Speed increased to 5 million instructions per second.
- ICs consumed a little electric power,
- The noise produced by the computers reduced drastically.
- Simple programming languages like BASIC were introduced.
- Multi-tasking was possible.
- They required Air-conditioning in many cases due to the heat produced

State any four reasons why we study computer studies.

- To promote critical and analytical thinking for hands-on solutions through computing innovations in the sciences such as vaccine research, environmental protection, business, entertainment and education, which make a positive difference in the world.
- To create awareness in a learner about the developments and emerging issues concerning computing and society.
- To get jobs. Computer studies provide a foundation that serves as a competitive advantage in a career, in whatever field one chooses.
- To acquire skills in the use of ICT for enhanced productivity and development.
- To promote creative knowledge for problem solving. Computing develops capabilities in solving deep, multidimensional problems requiring imagination and sensitivity

Describe the terms below as used in computer studies:

(i) Debugging:

This is the process of finding and correcting errors, in a computer program.

(ii) Data:

This refers to facts and figures, which are entered into the computer by the user in a form suitable for processing.

(iii) Diligence:

This refers to the ability of a computer to perform the same task over for long time without getting tired. (Endurance)

Differentiate between a cold boot and a warm boot

A cold boot is the process of turning on the computer after it has been powered off completely while a warm boot is the process of restarting, or resetting, a computer that is already turned on.

Mention any two uses of computers in the area of Communication

- E-mail: Electronic Mail sent from one person to another using connected computers
- Can send voice, image, text and data through Telephones and mobile cell phones:
- Tele Conferencing and Video Conferencing enables people in different locations to conduct meeting as if they are in the same location
- Computers are using for Faxing: Sending an image of a document electronically.

Name two kinds of information stored in the CMOS of a personal computer

- Amount of memory installed
- Current date and time
- Type of disk drives
- Type of keyboard, mouse and monitor

Give two examples of secondary storage devices

- Floppy disk drive
- Hard disk drive
- Compact Disk drive
- Tape drive

Give four examples of secondary storage media

- Floppy disk
- Hard disk
- Compact Disk
- Tape
- Flash disk

What is the difference between Computer Hardware and Computer Peripherals?

Computer hardware refers to the physical components of a computer that can be touched. Computer hardware includes the essential mechanical, magnetic, electronic, and electrical components making up a computer system

While

A peripheral is a device attached to a host computer but not part of it whose primary functionality is to expand the host's capabilities. A peripheral device is not part of the system's core architecture.

COMPUTER SOFTWARE/PROGRAMS

SOFTWARE:

This refers to electronic instructions, commands or programs (artificial intelligence) which tells the computer how to perform tasks. It relates to all forms of information processing instructions.

Alternatively, a **program** is a complete sequence of instructions for data processing to be performed by a computer.

CHARACTERISTICS OF SOFTWARE

Portability: Portability refers to the ability of an application to run on different platforms (operating systems) with or without minimal changes.

Readability: The program should be written in such a way that it makes other programmers or users to follow the logic of the program without much effort.

Efficiency: Every program requires certain processing time and memory to process the instructions and data.

Structural: To develop a program, the task must be broken down into a number of subtasks.

Flexibility: A program should be flexible enough to handle most of the changes without having to rewrite the entire program.

Generality: Apart from flexibility, the program should also be general. Generality means that if a program is developed for a particular task, then it should also be used for all similar tasks of the same domain.

Documentation: Documentation is one of the most important components of an application development.

Software consists of:-

- Application software.
- System software.
- Programming software

(A) Application Software

Are programs or instructions, which direct data processing for a particular problem for a computer user. The problem can be word processing, spreadsheet management, presentations management, entertainment, etc.

Applications direct the computer how to produce information.

Application software is subdivided into:-

- Custom or tailor made software.
- Packaged/off-the-shelve software.

(i) Custom/Bespoke/Tailor-made Software or User Application

Are computer programs which are designed and developed for a specific customer.

Advantages custom/bespoke software

- Hard to manipulate.
- Improve image.
- Increase productivity.
- Cater if all firm needs by providing for all the necessary details.

Disadvantages

- They are very expensive to design and develop.
- They are very rigid. Since they can only be used by one customer.
- They are time consuming to develop.
- They need a lot of specialized skills which require expensive special training.

(ii) Packaged or off-the-shelve software

These are computer programs developed for sale to the general public to solve routine organizational problems. Application packages are either “specialised applications” or “generalized applications” e.g.

- Word processors like word perfect, Microsoft word, Note pad Word Star, etc.
- Electronic spread sheet Lotus 1-2-3, Microsoft Excel, etc.
- Presentation software.
- Database management software.
- Acting software like Pastel, sage, Quick books, Tally, etc.

Advantage of off-the-shelve software

- They are readily available in software kiosks.
- They are cheap to procure. Why?
- They are very flexible since they can be used by any organization.
- They are entertainment and leisure tools.
- Do not need a lot of specialized skills.
- They have educational value.

Disadvantages.

- They are very easy to manipulate since they are almost –known by every one.
- They are not very secure.
- May not handle some problem with ease.

General examples of off-the-shelve software include

- Productivity software.
- Education reference software: e.g. Infopedia, Encyclopedia English Usage Dictionary, etc.
- Home personal software for home repairs, gardening, decoration, travel planner, etc.
- Specialty software for desktop publishing, project management, presentation graphics.

B) SYSTEM SOFTWARE.

These are programs which contribute to the control and performance of the computer system. They enable application software to interact well with the computer, and also help it in managing its internal and external resources.

System software is usually found already installed by the computer manufacturer or vendor.

It consists of:-

- Operating system/the executive
- Service or utility programs /system utilities.
- Language translator.
- Database management system

(a) Operating System (OS).

(The executive or the traffic officer)

An operating system is a master control program which manages and supports the operations of the computer system. Operating systems contribute to the control and management of the computer system. E.g. Window 98, NT, 2000 & XP, UNIX, Linux, Wang, Novel Netware, Macintosh etc

Operating systems can be classified as;

- Single user OS
- Multi-user OS
- Multi-tasking OS
- Multi-processing OS

Functions of the Operating System

NB: It is worth noting that modern operating systems are embedded or come with a variety of programs and utilities which complicates their functions in view of other programs.

However, the traditional functions of the operating system involved the following;

(1) **Bootting:** Load/enable the starting of the computer by accessing “starter files” located in the bootstrap loader or boot routine.

(2) Managing storage media/files

Perform common repetitive tasks necessary for storage media e.g. formatting of blank diskettes.

In addition the operation system keeps track of the locations within main memory where programs and data are stored. It swaps portions of data and program between main memory and secondary memory. I.e. Memory management.

Memory management can be done through.

- Partitioning – dividing memory into portions. E.g. fore ground and back ground.
- Queuing: This is typical of time shaming system where data is prioritized for purposes of processing in the CPU.

(3) Management of computer resources.

For instance, the operating system supervises activities of the CPU and other components, hence acting as a police officer directing traffic.

(4) Managing tasks and processes

This is done through:

Multitasking – A situation where processor time is shared between competing tasks. Help in running more than one programs concurrently.

Multiprogramming: Several user executing different user programs concurrently.

Time sharing: i.e. executing different users programs in round – ribbon fashion.

Multi-processing: Single or multiple users processing with two or more programs at the same time.

(5) Providing User Interface

Operating systems provide user controllable parts (icons, menus, buttons etc) which make it possible for the users to communicate or interact with the computers.

Interface = Input-Output methods/modes employed by the user to input/output data from the computer. Interface can be:

- Command Driven interface.
- Menu–driven interface.
- Graphic user interface (GUI) = Image (icons) and menu user.
- Network user interface.

The Kernel of the operating system.

Also known as the core of the operation system performs.

- ✓ Management of memory, files and other devices.
- ✓ Maintaining computer system clock.
- ✓ Loading applications/programs.

(6) Provision of the platform for application software to run

Activity: identify some of the current utilities and programs embedded in modern operating systems.

(b) System Utilities.

Are programs developed to improve, expand or support or enhance performance of other existing programs in the computer system. They are also referred to as service programs.

Specific Utilities and their Functions

(i) **Back-up utilities:** Help in making duplicate copies of every file on either internal or external media as security files for reference incase the original copy is destroyed. e.g. Colorado scheduler

(ii) **Data Recovery utility:** Used to “undelete” or resurrect a file or information that has been accidentally deleted e.g. - Recycle bin for windows, Norton un-erase wizard, etc.

(iii) **Defragmentation utility** or “Defragger”

Used to find all scattered portions of files on the hard disk and reorganize them as contiguous files.

Excessive file fragments slow down their from the storage media. E.g. Norton speed disk.

(iv) **Disk Repair Utility**

Checks your disk drive for defects and make repair on the spot or mark the bad area. E.g. Norton’s disk Doctor.

(v) **Virus Protection Utilities/Anti-virus software.**

Is a utility program that scans storage media (hard disks, diskette and memory) to detect and destroy virus.

E.g. MacAfee virus scan, web scan, Norton artivirus, Dr. Solomon’s anti-virus toolkit, etc

(vi) **Data Processing Utilities.**

Utility programs which remove redundant elements, gaps, and unnecessary data from computer storage space. E.g.

-Drive-space to stacker.

-Double Disk.

-Superstar pro.

(vii) **Memory management utilities:**

Are programs that determine how to efficiently control and allocate memory resources – (usually activated by software drivers)

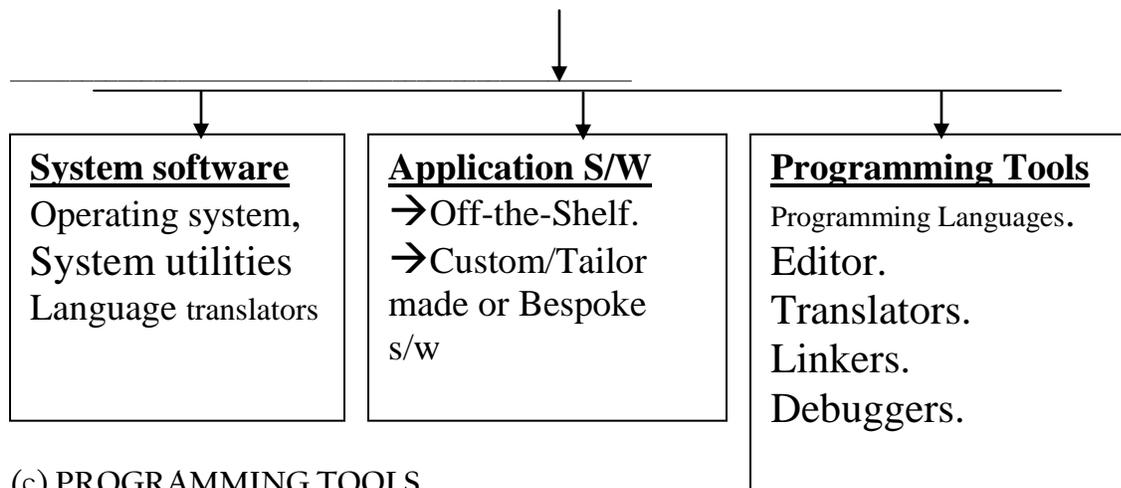
(viii) **Others:**

→Screen saving.

→Sort utility – used for taking in data and re-arranging it in any prescribed order.

→Merging utility – Involves combining data from more than one file into one or so.

Diagram showing structure of computer software
SOFTWARE



(c) PROGRAMMING TOOLS

Background

(a) **What is a program:** A program is a set or a list of instructions that a computer must follow in order to process data into information. Instructions consist of coded statements used in a programming language like Basic, COBOL, etc.

Programming languages can be;

-General programming languages or,

-Web development languages e.g. HTML, JAVA, etc. for instance we can apply HTML to design one of the web pages for UCC Tororo website as follows;

```
<HTML>  
<HEAD>  
<TITLE> UCC TORORO SITE</HEAD></TITLE>  
<BODY>  
Welcome to the centre for business adventure.  
</BODY>
```

b) **What is programming?** Is a multi-steps process for creating computer instructions.

c) **Programming Steps**

Step (1): Problem definition involving:

Specifying program objectives and users.

Specifying output requirements.

Specifying input requirements.

Specifying processing requirements.

Feasibility Study for implementing the program.

Document the analysis.

Step (2) Program Design.

Design program Logic through top-down approach and modularization using a hierarchy chart.
Design details using flowcharts, etc.

Step (3) Program Coding:

- Select the appropriate high to discover errors.
- Code the program in that language.

Step (4) Program testing

- Desk-check the program to discover errors if any.
- Run the program and debug it (alpha testing).
- Run real-world data (beta testing) as opposed to assumptions.

Step (5) Program Documentation and maintenance:

- Convert hardware, software and files.
- Write operator documentation
- Write programmer documentation
- Maintain the program.

Programming Tools Include:

- (1) **Debuggers:** Programs which help programmers, to detect, locate or remove routine, syntax (process) and logical errors.
Syntax errors are caused by:
 - Typographical errors.
 - Incorrect use of the language.Whereas Logical errors are caused by;
 - Incorrect use of control structures. For instance, forgetting to close the title, head or body in web designing.
<Head>/Head>
- (2) **Linkers:** Enable calculation of any functions in the program.
- (3) **Editors:** Facilitate creation, editing and formatting of program text files.
- (4) **Programming languages:**

Characteristics of programming language

1. **Readability:** A good high-level language will allow programs to be written in some ways that resemble a quite-English description of the underlying algorithms. If care is taken, the coding may be done in a way that is essentially self-documenting.
2. **Portability:** High-level languages, being essentially machine independent, should be able to develop portable software.
3. **Generality:** Most high-level languages allow the writing of a wide variety of programs, thus relieving the programmer of the need to become expert in many diverse languages.

4. **Brevity:** Language should have the ability to implement the algorithm with less amount of code. Programs expressed in high-level languages are often considerably shorter than their low-level equivalents.
5. **Error checking:** Being human, a programmer is likely to make many mistakes in the development of a computer program. Many high-level languages enforce a great deal of error checking both at compile-time and at run-time.
6. **Cost:** The ultimate cost of a programming language is a function of many of its characteristics.
7. **Familiar notation:** A language should have familiar notation, so it can be understood by most of the programmers.
8. **Quick translation:** It should admit quick translation.
9. **Efficiency:** It should permit the generation of efficient object code.
10. **Modularity:** It is desirable that programs can be developed in the language as a collection of separately compiled modules, with appropriate mechanisms for ensuring self-consistency between these modules.
11. **Widely available:** Language should be widely available and it should be possible to provide translators for all the major machines and for all the major operating systems.

Are sets of instruction (sw) that tells the computer what operations to do during the programming process.

They include:

(1) 1st Generation languages/Top languages or Machine language/codes: These languages provide basic computer languages representing memory location, instructions and data in 1s and 0s (binary number)

Characteristics machine codes

- ✓ Can be used directly by the computer without interpretation.
- ✓ They are machine/computer depend.
- ✓ Less user friendly - Not very easy to learn write, correct.
- ✓ They are typical of first generation computers.
- ✓ They are time consuming during programming.
- ✓ Allow the programmer to pay more attention to the problem.
- ✓ More technical if compared to others.

(2) 2nd Generation languages (1950) or Assembly (middle length).

Are low level languages (LLL) that allow the programmer to use abbreviations or easily remembered words instead of binary codes. Use mnemonic codes rather than binary code. E.g. Mult = Multiply; STO = Store, Div = Divide etc.

Characteristics of 2nd Generation languages

- Less technical compared to machine codes.
- More flexible user friendly compared to machine codes.
- Faster compared to machine codes.

(3) 3rd Generation languages (early 1960s) e.g. COBOL, Basic and FORTRAN. Also known as “High level languages (HLL)”. With HLL the programmer uses direct English words during the programming process. They are not machine dependent and can be used on more than one kind of Personnel computer.

Characteristics of HLL

Less technical if compared to both 1st and 2nd generation languages.

Less technical if compared to 1st and 2nd generation languages.

They are more user friendly.

A bit slow since they need to be interpreted to the computer first.

BASIC = Beginners all-purpose symbolic instructions

COBOL = Common Business oriented language.

FORTRAN = Formula translation

(4) 4th Generation languages (early 1970s)

Very High-level languages (VHLL)

Are non-procedural or rapid application development (RAD) tools where programs are written by only telling the computer what to do as opposed to a step-by-step process.

Examples include;

SQL = structured query language.

NOMAD, Focus, intellect 4 IBM, C++, etc.

Typical applications include report generators, Query languages, Application Generators, etc.

(5) 5th Generation language: - Natural languages

These are programming languages which allow questions or commands to be formed in a more conversational way or in alternative forms.

(6) LANGUAGE TRANSLATORS:

These are programming tools which change programs written in 2nd, 3rd, 4th, and 5th generation languages into machine codes or 1st generation language (Os and Is) which the computer can understand. Language translators are of three types, i.e.

- Assemblers
- Compilers,
- Interpreters

(a) Assembler:-

Is a program that translates the assembly – language program into machine language.

Assembly language is one that allows a programmer to use abbreviations or easily remembered words instead of numbers or binary codes.

(b) Compiler: (Executes later)

Is a language translator that converts the entire program of a high – level language into machine language before the computer executes the program.

E.g. of high–level language using compiler are Pascal, C, COBOL, and FORTRAN.

(c) Interpreters (executes immediately)

Is a language translator that converts each high–level language statement into machine language and executes immediately, statement by statement.

Other Software Classifications:

(i) Freeware:

Software distributed for free during the trial period and payment is required for continued use after the trial product.

(ii) Firmware:

Programs built in the computer at factory level with special instructions for basic computer operation

NB: - Usually stored in ROM chips which can not be easily erased.

Firmware helps in;

- Starting the computer.
- Putting characters on the screen.

(iii) Human ware

(vi) Spy ware

(iv) Malware.

(v) Computer viruses

NB:

Software related terms.

- (a) **Version:** Aversion is a major upgrade in a software product e.g. from Pas 5.0 to Pas 6.0.
- (b) **Release:** Is a minor upgrade in a software product e.g. Pas 5.0 to Pas 5.2.
- (c) **Compatibility.** Means that documents created in earlier versions can be successfully processed on later versions.

Computer literacy

Computer literacy refers to having knowledge and understands of computers and their uses.

Define the following:

INTRODUCTION TO WORD PROCESSOR

A. Word Processing

- Is the creation of documents using a word processor.
- Using a computer to create, edit, and print documents.
- Refers to the use of a computer and word-processing package or word-processor to type text documents.

B. Word Processor

- A word processor is an application software program capable of creating, storing, and printing documents.
- Is a computer application used for the production (including composition, editing, formatting, and possibly printing) of any sort of printable material.
- Software that is designed for the entry, editing, and printing of documents.

C. Footer

- Text that appears in the bottom margin of each page of a document.
- One or more lines of text that appear at the bottom of every page of a document.
- A design element printed at the bottom of a page of text.

D. Header

- Text that appears in the top margin of each page of a document.
- One or more lines of text that appear at the top of every page of a document.
- A design element printed at the top of a page of text.

Examples of word processors

Examples of word processors include the following:

- Lotus word
- Microsoft word
- Word perfect
- Word star
- Abi word
- Openoffice.org writer
- La tex editor
- LyX
- JWPce is a Japanese word processor, designed primarily for the English speaker who is reading or writing in Japanese.
- KWord
- Xiosis scribe
- Bean
- Document Editor
- EZ Word
- Feng Office Community Edition
- GNU TeXmacs
- Groff

- **FEATURES OF THE WORD PROCESSING APPLICATION**
(Characteristics)

The following features are common to all word processors

1. They allow the user to create a file, save it and open it again and again for reuse, editing and formatting.
2. They provide for the use of header and footer
3. Most word processors have the ability to create and import tables, text, and graphics from other programs
4. Nearly all word processors have a spelling checker that serves as a dictionary
5. All word processors almost have similar document window with the following features
 - a). Most are designed to look like a piece of paper with a few electronic improvements
 - b). most of the screen is blank before typing text
 - c). there is a cursor which blinks at the position where you can begin entering the text
 - d). there is a status bar, that provides the user with current status information such as saving operation, the nature of the file in use, the current page etc.
 - e). help facility, some times we get lost, confused or need more information on how to use an application thus help facility contains pointers, explanations and guidance
 - f). Editing modes

Word processors have two editing modes and these are:

- Insert mode
- Type over mode

INSERT MODE

Every character typed between words, lines or characters is placed at the cursor position. This pushes all the text in front of the cursor away without deleting any character.

TYPE OVER MODE

Every character typed deletes what was there before and replaces it with new text at the cursor position.

Entering text into a word document normally functions in insert mode that means that the text is added in a document without over writing any other text.

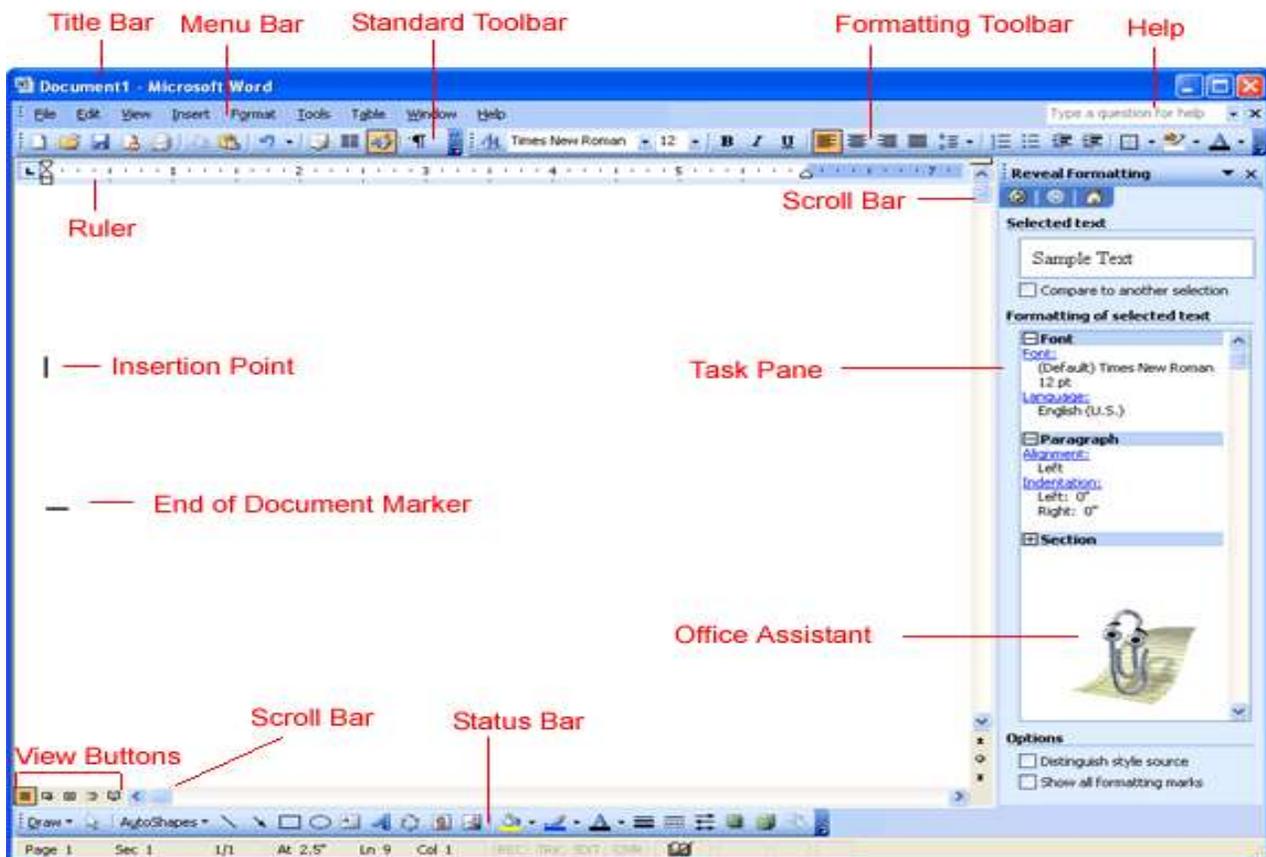
Alternatively word can function in over type mode that will over write existing text with any new text that you type in.

The status bar at the bottom of the word window indicates that you are in over type mode by highlighting OVR indicator

THE BASICS OF THE WORD WINDOW

The basic parts of the Word 2003 window shown below in the Microsoft Word default window. When Word is launched, a new blank document, or default window, opens in Print Layout view.

Here is a brief explanation of the Word window.



Title Bar

Displays the document name followed by a program name.

Menu Bar

Contains a list of options to manage and customize documents.

Standard Toolbar

This contains shortcut buttons for the most popular commands.

Formatting Toolbar

This contains buttons used for formatting

Ruler

This used to set margins, indents, and tabs.

Insertion Point

This is the location where the next character appears.

End-of-Document Marker

This indicates the end of the document.

Help

This provides quick access to Help topics.

Scroll bars

This is used to view parts of the document.

Status Bar

This displays position of the insertion point and working mode buttons.

Task Pane

This provides easy access to commonly used menus, buttons and tools.

View Buttons

This changes the layout view of the document to Normal View, Web Layout View, Reading Layout View, Print Layout View, or Outline View.

Office Assistant

This links to the Microsoft Office Help feature.

The head teacher of your school announces that the secretaries are going to start using computer based word processors instead of typewriters.

State two reasons why this change may worry some secretaries and staff

- Word processors could lead to unemployment of excess secretaries since work which could need many people using typewriters to do can be quickly accomplished by only one person.
- Word processors require computer literacy and IT skills which many secretaries don't have.
- Word processors could lead to eye disorders caused by continuous looking at a light emitting monitor screen.
- No work can be done with word processors when electricity is off.
- Word processors operate in an environment full of viruses and meltdowns which can lead to deletions and loss of data.
- Word processors require purchase of expensive machines such as computers, printers, etc.

After some time, most of the staff and students become happy with the head teacher's development of introducing word processors. Mention six word processing features that caused for the happiness.

- A variety of quick text formatting options such as bold, underline, italic e.t.c which give documents a professional look.

- Possibility of spelling and grammar checking a document to eliminate errors before printing.
- Storage of documents in softcopy for future use.
- Word wrap feature which automatically moves text that won't fit within the margin settings onto the next line as compared to manual adjustment of the lever of a typewriter.
- Mail merge feature which creates multiples or potentially large numbers of documents from a single template and a single data source.
- Easier way of creating good drawings, charts, inserting pictures and art.
- Ability to work on many pages at a time such as through inserting page numbers, watermarks, headers and footers.
- Availability of a wider range of symbols such as Greek, Arabic, Latin, and Hebrew alphabet characters.
- Little noise produced during use of word processors as compared to the noise produced during the operation of typewriters.
- Presence of preformatted elements such as designs and document templates e.g cover pages which can just be modified and used.
- Lesser strength required to strike keyboard keys as compared to typewriters which need much energy so as to have a strong visible impact on the stencil.

Apart from Microsoft office word, state two examples of word processing packages you know

- WordPerfect
- Lotus Word Pro
- Word Star
- OpenOffice.org Writer
- Abiword
- Word Pad
- Kingsoft Writer
- KWord

What is mail merge?

- The process of combining a form letter with a list of names and addresses to produce individualized letters
- **Mail merge** is a software function describing the production of multiple (and potentially large numbers of) documents from a single template form and a structured data source.

Name three ways in which mail merge can be useful:

- Easy to make a change to a single letter and for that change to happen in every letter e.g. change the date

- Thousands of letters can be produced very quickly
- Much easier to proof read just one letter than thousands of individual letters
- Letters can be sent to people who meet specific criteria
- A standard letter can be saved and reused
- Letters can be personalized
- The same data source can be reused - reducing the risk of errors

INTRODUCTION TO SPREADSHEET SOFTWARE

This is an example of application software. A spreadsheet is essentially a ledger sheet that lets you enter, edit and manipulate numeric data.

There are two types of spreadsheet namely:

- Manual spreadsheet
- Electronic spreadsheet

MANUAL SPREADSHEET

This is the most commonly used type of book keepers as a ledger book with many sheets of papers divided into rows and columns in which amount of money are entered manually using a pen or a pencil

ELECTRONIC SPREADSHEET

A type of software for microcomputers that offers the user a visual display of a simulated worksheet and the means of using it for financial plans, budgets, etc

Advantages of using electronic spreadsheet over manual spreadsheet

- The electronic spreadsheet utilizes the powerful aspects of the computer like speed; accuracy and efficiency to enable the user quickly accomplish tasks.
- The electronic spreadsheet offers a larger visual sheet for data entry and manipulation for example the largest paper ledger you can get is on that does not exceed 30 columns and 51 rows. While with a electronic spreadsheet the least ledger has at least 255 columns and 255 rows.
- The electronic spreadsheet utilizes the large storage space on computer storage devices to save and retrieve documents.
- The electronic spreadsheet enables the user to produce neat work because the traditional paper, pencil and rubber plus calculator are not put aside. All the work is edited on the screen and the final clear copy is printed and yet with a hand written spreadsheet, neatness depends on the writer's hand writing.
- Electronic spreadsheet has inbuilt formulas called functions that enable the user to quickly manipulate mathematical data.

- Electronic spreadsheet automatically adjusts the result of the formula if the value in the worksheet is changed while for manual worksheet changing one value means rubbing the result and writing the correct one again

Explain any five features of a spreadsheet application.

- **Insert text:** Allows you to insert text anywhere in the spreadsheet.
- **Delete text:** Allows you to erase characters, words, charts, or worksheets as easily as you can cross them out on paper.
- **Cut and Paste:** Allows you to remove (cut) a section of text from one place in a spreadsheet and insert (paste) it somewhere else.
- **Copy:** Allows you to duplicate a section of text.
- **Page layout:** Allows you to define various page sizes and margins.
- **Search and Replace:** Allows you to direct the spreadsheet to search for a particular word or phrase. You can also direct the spreadsheet application to replace one group of characters with another everywhere that the first group appears.
- **Headers, Footers, & Page Numbering:** Allows you to specify customized headers and footers that the spreadsheet file will put at the top and bottom of every worksheet. The spreadsheet automatically keeps track of page numbers so that the correct number appears on each page.
- **Merges:** Allows you to merge text from one file into another file. This is particularly useful for generating many files that have the same format but different data.
- **Spell Checker:** A utility that allows you to check the spelling of words in a spreadsheet file.
- **Print:** Allows you to send a spreadsheet file to a printer to get a hardcopy or many hardcopies as you would like.
- **Thesaurus:** A built-in thesaurus that allows you to search for synonyms (words with similar meaning) and antonyms ('opposites') without leaving the word processor.
- **Graphics:** The spreadsheet application permits the addition of various types of graphics, such as bar charts, line charts, clip art, and photographs.

Briefly explain five advantages of using Microsoft Excel.

- The ability to reuse the data as many times as required
- The ability to automatically recalculate the spreadsheet
- The ability to share the data from one application to another
- The ability to be able to apply different types of fonts and cell formatting to your spreadsheet
- The ability to be able to include drawing objects such as photos, lines, Excel art, cartoons, moving and text and even video
- The ability to spell check the whole spreadsheet in one go or at once
- The ability to add up and apply different formulas to your spreadsheet

- The ability to carryout What If scenarios in “real time”

State five examples of Electronic Spread Sheets software known to you

- Lotus 1-2-3
- Microsoft Excel
- VisiCalc
- Frame works
- Microsoft works
- Quattro-pro
- OpenOffice.org Calc
- Web based spreadsheets
- Apple Numbers

Name three Components of a spread sheet

- Worksheet:
- Database
- Graph

Components of Microsoft excel application windows

Title bar

It has the title of the application and control buttons for minimizing, maximizing and closing the application

Menu bar

It displays a list of menu options for example clicking one of them displays a menu that has commands which can be selected in order to manipulate data in spreadsheet. The most common of these are the standard and formatting tool bar

The standard toolbar has shortcuts to some of the most commonly used menu commands like print, copy, paste, save etc.

The formatting toolbar has shortcuts to the commonly used commands found on the format menu options

Formula bar

This is the one of the most important components of the Microsoft excel application window. It enables the user enter or edit a formula or data in a cell.

If the formula bar is not available, click on view menu, then select formula bar.

Cellpointer

It makes the pointer of a current cell or insertion point. It is a special cursor rectangular in shape and makes the current cell appear as if it has dark boundaries.

Worksheet

This consist of cells organized into rows and columns. Data is entered her for manipulation and storage. Several worksheets can appear in one workbook

Status bar

This shows the processing state of the application

Worksheet labels

These are usually of the format, sheet 1/sheet2/ sheet3 e.t.c.

A workbook may have several sheets. It is possible to rename the sheets by right clicking on the labels then choosing rename command from the shortcut menu that appears. The active sheet (one being used) has its label appearing darker in colour than the rest. To move to a particular sheet in the workbook simply click its sheet label

What is the difference between a cell and cell reference?

A cell is an intersection between a column and a row

Cell reference is a combination of the column letter and the row number

Name the three types of data that can be entered into a cell.

- Labels (text)
- Values (numbers)
- Formulae

What is a formula a term used in computer studies?

A formula is an instruction that tells the computer to work out the answer for the value entered.

Outline three types of formulae you know

- Numeric Formulae
- Logical Formulae
- Text Formulae

Define the following computer terminologies

- i. Range

This group of adjacent cells; vertical or horizontal
- ii. Worksheet

This is the biggest range because it consists of all the cells in a worksheet.
- iii. Work book

This is the collection of various worksheets
- iv. Worksheet Frame

This consists of columns ranging from A-IV...end and Rows ranging from 1-16384....
end
- v. Worksheet tabs

These indicate whether the file consist of more than one worksheet
- vi. Cell address

The reference to particular cell
- vii. Range address

The reference which has a format of top-left cell address: bottom-right cell address
- viii. label

A label is a text entry
- ix. A Value

A Value is a piece of data that can be used in calculations
- x. software

Set of instructions and programs that instruct the computer hardware on what to do.
- xi. Cell
 - Small box in an Excel worksheet.
 - Intersection point of the row and column.
 - Where a row meets with the column.
- xii. Worksheet
 - A single page of workbook or spreadsheet file.
 - A single working area in a spreadsheet program, consisting of a grid of lettered columns and numbered rows.
 - Is a grid of columns and rows
- xiii. Workbook
 - A file that contains a series of Worksheets

- A spreadsheet document that contains one or more worksheets.
 - Collection of related spreadsheets that are saved as one file.
- xiv. **Mixed Formula**
- Contains both absolute and relative arguments.

CELL REFERENCING/ADDRESSES

Cell reference identifies a cell or a range of cells on the worksheet and shows Microsoft excel where to look for the values or data needed to use in a formula

Types of cell addresses in excel

1. Relative Cell Address

When performing tasks that require cell referencing, one needs to use a formulae whose cell references keep on changing automatically depending on their position in the worksheet; this is called relative cell referencing

2. Absolute Cell Address

These are cell references that always refer tp cells in a specific location of the worksheet even if they are copied from cell one to another e.g \$d\$6. In this case both the column and the row are absolute

3. Mixed Cell Address

It is a cell reference that has either the row or column is made absolute, but not both, using the dollar sign.

A1 is relative.

\$A1 is mixed.

A\$1 is mixed.

\$A\$1 is absolute.

INTRODUCTION TO DATABASE

Database

Database software is a collection of structured and related data items organized so as to provide a consistent and controlled access to the items.

Examples

- Telephone directory
- School grade book
- Address book
- Library catalog

We are often faced with the need to keep search for or give a report of daily experiences. This is the reason why many people use data storage methods like recording daily experiences in a diary. However these methods have a number of weaknesses which include.

- Unnecessary duplication of data
- Boredom and time wasting especially when searching for a particular item
- Misleading reports due to poor entry and organisation
- Poor updates of records e.t.c

Today, computerized systems have radically change the way data and information is managed by use of special programs called **Database management system (DBMS)**

DATABASE CONCEPTS

Computerized database creating and manipulation is achieved by using DBMS software. This software facilitate the creating, organisation and maintainace of data base

Examples of database management software

- Microsoft access (MS Access)
- Oracle
- Fox Pro
- Dbase IV
- Lotus approach

Functions of a database management software

1. Allow the user add or delete records
2. Update or modify existing records
3. Organize data for easy access, retrieved and manipulation of records
4. Act as an interface between a database and other application programs
5. Ensure security for the data in the data base by safeguarding it against unauthorized access and corruption (damage)
6. Keep statistics of data items in a database.

Data organistion in a database

One of the functions of a database system is to organize data for easy access, retrieval and manipulation. Data is organized from the simplest for m called a field to a very complex structure called database.

FILE

A file is a collection of related records. For example

- The student file in a school database contains the details of all the students in the school

- An Address book

RECORD

This is a collection of related fields that represent a single entity. Examples include

- Students' report card that may contain the student's name, admission number, class, total marks, average and grade.
- A person's entire entry

Primary key

A primary key refers to **one or more fields** whose value(s) uniquely identify each record in a table.

A primary key is a column or combination of columns whose values uniquely identify a row in a database table. The primary key(s) have a unique value for each record or row in the table.

FIELD

A field is a character or a logical combination of characters that represent a data item. Example, Names, Address, Phone number e.t.c. that is in a class list.

LAYOUT

This is the way information is displayed

SORT

This a convenient way to usefully display data for example either alphabetically or by date or hierarchically.

Functions of database

- Create data
- Organize data for easy access, retrieval and manipulation of records
- Manage a collection of related information (data)
- Retrieve and interpret information from existing database.

Use of virus database features

Reports

These are formatted printers or screen displays of records from tables or query

Most database systems provide the user with a tool for generating reports from an underlying table or query.

Creating reports

Reports are used to summarize the present information from a database. A good database software should enable the user to generate database reports and print them for presentation and distribution.

Parts of a report layout in a design view

Report header

This contains unbound controls that displays title of the report.

Page header

Contains heading or labels data items to be displayed in every column.

Detail

Hold bound controls that display data items fr the table or query it was created from.

Page footer

Holds a control that is to be displayed on every page such as the page number and date

Primary Key (Unique Key)

Is a candidate key to uniquely identify each view in a table. It comprises of a single column or a set of columns. No two distinct views in a table can have the same value in this column for example Social security number, telephone numbers.

Foreign key

Is a reference to a key in another relation, meaning that the referencing table has as one of its attribute the value of a key in the referenced tuple.

For example

Employee		Employee Data
ID: Number		Employee ID: Number
First Name: VarChar	Foreign Key Employee Data 	Emergency ID: Number
Last Name: ValChar		Years of Service: Numbers
Salary : Number		
Address: ILNumber		

A tuple

This usually represents an object and information about that object

Flat file database

Is a plain text or mixed text and binary file which usually contains a record per line or physical records for example on a disk or tape.

With such a record, the single field can be separate by delimiter for example commas or have a fixed length.

Typical examples of flat files are

*/etc/ password and /etc/ group on unix – like operating system. A name and address list with the field name address and phone number.

Relational database

This is a database that groups data using common attributes found in the data set.

Examples

- A data set containing all the real estate transactions in a town can be grouped by the year the transaction occurred
- It can be grouped by the sale price of the transactions
- It can be grouped by the buyer's last name.

TYPES OF DATABASES

Database has two generic architecture centralized and distributed databases

Centralized database

Here all data are located at a single site. This type of database provides greater control over accessing and updating data than distributed databases, but they are more vulnerable to failure since they depend on the availability of resources at the central site.

There are three common types of centralized databases and these are;

- (a) Personal (Individual) computer database
- (b) Central computer database
- (c) Client/server database

Personal (Individual) Computer database

This is a collection of integrated files primarily used by just one person. This database normally has a single user who creates the database, updates and maintains the data and produces reports and displays.

Data and DBMS are typically under the direct control of the user. They are stored either on the user's hard disk drive or on a LAN file server.

Central computer database

The data that most applications in large organisations access is stored on a central computer which depend on the size of the organisation is usually a mainframe or a mini computer. Data modem, multiplexors e.t.c. central computer database often involve number of users.

Client/server database

This type of database is used to support work group computing. This is the use of computing resources for decision support and other application by a team

Client/server database differs from centralized database system in that;

- (a) Each client is an intelligent part of the database processing system.
- (b) The application program runs on the client and not on the host or server.
- (c) The application program handles all interactions with the user and local devices such as printers, keyboard, screen e.t.c. thus there is a division of duties between the database server and the client.
- (d) A database server handles all database access and control functions and the client handles all user interactions and data manipulation functions.
- (e) The client sends database commands to the database server for processing

Advantages of client/server database

1. It allows companies to leverage the benefits of a micro computer technology. Work Stations today deliver impressive computing power at a fraction of the cost of mainframe.
2. It allows most processing to be performed close to the source of database being processed thereby improving response. Time and reducing network traffic.
3. It facilitates the use of graphical user interface (GUI) and visual presentation techniques commonly available for work stations.

Types of client/server databases

1. Distributed databases

This is a single logical database that is spread physically across computers in multiple locations that are connected by a communication network. Computers may range from micros to large scale or even super computers.

A distributed databases differs from a centralized database in that although also in a centralized database, data is stored on computers in multiple locations, the computers are not

interconnected by a network thus users at virus sites cannot access and this is best regarded as a collection of independent databases

Distributed databases must provide users with location transparency meaning that a user (program) requesting data need not to know the location of data but any request to access data, to retrieve, update, and copy

There are two generic categories of distributed databases namely;

- Homogeneous database
- Heterogeneous database.

Homogeneous database

This means that the database technology is the same or at least compatible at each of the locations are also compatible. This should be so with the following conditions.

- The computer operating system used at each of the location are the same, or at least highly compatible.
- The data models used at each of the locations are the same. A relation data model is commonly used for distributed database today.
- The database management system used at each of the locations are the same or at least they are highly compatible
- The data at various locations have common definitions and format
- The data of various locations have common definitions and format

Homogeneous databases simplify the sorting of data among the various users, and they are the design goal for a distributed database which however, require a high level of planning throughout the organisation.

Heterogeneous database

In most organizations, databases evolve over a period of time without careful guidance or planning. Different computers and operating systems may be used at each locations, different models and databases are also common

Heterogeneous database, however, usually limits the type of processing that users may perform. For example, a user at one location maybe able to read but not update data at another location.

Advantages of Databases

1. Sharing of data

A database being a collection of logically related records, information from one department can be shared with others.

2. Security issues

With complete authority over the operational data, a database administrator can ensure that the only means of access to the database is through proper channels. He/she defines authorization checks to be carried out whenever access to sensitive data is attempted.

3. Data redundancy can be reduced.

In a non-database system each application or department has its own private site resulting in a considerable amount of redundancy of the stored data. This redundancy wastes storage space with a database, previously separate (and redundant) data files are integrated into a single.

4. Data integrity

Integrity means that data in the database is accurate, older filing systems many times did not have integrity. This is because a change made in the file in another department, which might cause serious problems and conflict when data is used for important decisions affecting both departments.

5. Inconsistency can be avoided

When the same data is duplicated changes are made at one site, but not propagated to the other site, then this gives rise to inconsistency. Thus the two entities regarding the same data will not agree.

6. Data independence

A database system keeps descriptions of data separate from the applications that use the data. Thus changes in the data definitions can occur without necessarily requiring changes in every application program that uses those data.

PROBLEMS OF DATABASES

1. Concurrency problems

When more than one user utilizes a database management system, problems can occur if the system is not designed for multiple users. One of these problems is concurrent access to records or concurrency.

2. Resource problems

A database management system usually requires extra computing resources. After all, the new database management systems programs must be run.

LIMITATIONS OF DATABASES

- Ordinary compilations of data may not possess the requisite level of creativity to be copyrightable at any level of abstraction.
- As deist makes clear, the degree of copyright protection for factual databases is thin and covers only expressive portions are protected.
- Any portion of the work that is a part of the public may not be protected.
- Database has more value by being more encompassing but does this undermine the selection required for copyright ability.

Feature of a database

1. Calculated field for powerful database applications. Create powerful dynamic database that use calculated field formula to automatically update.
2. Permission and access. Maintain control over your information by using permission basses access manage and privilege to add, modify and delete information.
3. Mail merge. Create personalized address labels, envelopes and emails sure accurate of your client correspondence using mail merge between your database and MS outlook
4. Import/export between database and application. Share data between two databases or form other applications like MS excel. Populate your databases quickly and accurately.
5. Relational database capacity. Link several databases together for more information sharing for example you can link database containing numbers and descriptions to an inventory or purchasing database
6. Customizable views or printable reports. Create customer views to filter and sort data fr better analysis print reports using customizable professionally designed formats
7. Ridiset of field type. Specify texts. Numeric, file attachments, images or even compound fields and currency.

FORMS

A form is a graphical interface that resembles the ordinary paper forms used to collect data. However, database form enables the user to view and enter data into a table.

A form is an interface that enables the user to view and make data entities into an underlined table more easily.

In Microsoft access, a form is designed using graphical objects called controls. A control is an object such as a text box, check box, command button or shape that you place on a form design grid to display data of actions. There are two types of controls you can place on the grid

- (a) Bound Controls
- (b) Unbound controls

A bound control

Is one whose source of data is a field in a table or query

Unbound control

Is a control that is not connected to any data source

You design or modify a form layout by dragging these controls to the required position

Creating a form layout using a form wizard

To create a form layout, you can either use the form wizard or start from the scratch. Using the formal wizard, you can create wither a columnner, tabular, a datasheet of justified form layout.

The fields for each record are displayed down the columnie each value displays on a separate link with field labels to the left.

Tabular

Records are displayed from left to right across the pages and labels appear at the top of each column and each row represents a new record.

Datasheet

The form resembles a table datasheet view.

Justified

One record occupyes the whole form.

Relationships:

A relationship works by matching the data in two different tables using a common primary field.

There are two kinds of relationships:

One to one relationship; for one record in the table A, there is a corresponding record in table B.

One to many relationships; for each record in table A, there are many records in table B.

Linking Employee table with Salary table, follow steps below.

- Click Tools from menu bar
- Click Relationships

- Click on the Employee Code field in the employee table and hold the left button of the mouse down.
- Drag the mouse pointer on top of the ID field in the Salary table and release the mouse.
- Click Create
- Observe the relationship and click close

QUERY

A query is a filter through which data is evaluated. There are three types of queries:

Select query; displays a subset of the entire data, sorted using the criteria you specified.

Action queries; create new tables or delete, append and update records in existing tables.

Cross Tab queries; display spreadsheet like cross tabular result forms.

FORM

Forms are used to simplify data entry work or to display information in a specific manner.

They help us to add, modify and delete database data. There are different types of forms I.e. columnar, Tabular, Datasheet, Main/subform, Chart and Pivot Table form.

REPORTS.

A report summarizes data in a format suitable for publishing I.e. to view data on the screen or to print it on a printer or to publish it on the web in a meaningful and attractive manner.

You can combine data, charts, images, audio and video.

The six ways of creating reports are; design view, report wizard, columnar autoreport, tabular autoreport, chart wizard and label wizard.

COMPUTER NETWORKS

Dimensions of Chapter analysis:

- Definition of Network.
- Types of Network.
- Network operating systems
- Some Network Features
- Impact of Network.

A network is a system of inter-connected computers, telephones or other communication devices that can communicate with one another, and share applications, messages, data, graphics and printers (resources) fax machines, modems, Digital cameras, etc.

Types of Networks

Local Area Network (LAN)

This is an inter-connection of computers which are in a relatively close proximity.

LANs are designed to allow resources to be shared between personal computers or workstations. The resources to be shared can include hardware (e.g., a printer), software (e.g., an application program), or data.

A common example of a LAN, found in many business environments, links a workgroup of task-related computers, for example, engineering workstations or accounting PCs.

Wide Area Networks (WAN)

Is a network connecting LANs across geographical distances. E.g. states and continents.

(WAN) provides long-distance transmission of data, image, audio, and video information over large geographic areas that may comprise a country, a continent, or even the whole world.

Metropolitan Area Network (MAN)

Is a network connecting computers within a geographic or regional area.

is a network with a size between a LAN and a WAN. It normally covers the area inside a town or a city. It is designed for customers who need a high-speed connectivity, normally to the Internet, and have endpoints spread over a city or part of city. A good example of a MAN is the part of the telephone company network that can provide a high-speed DSL line to the customer.

Types of LANs or Network Models

The term computer network model defines the category in which a computer network can be grouped into. Networks are divided into two broad categories:

PEER TO PEER NETWORKS model

When nodes or workstations perform the same communication functions, they are referred to as peers, in this network model, both server and client operations are performed by the same computer.

Each user administers his/her workstation and the resources in it. In a peer-to-peer network, there are no dedicated servers, and there is no hierarchy among the computers.

All the computers are equal and therefore are known as peers. Each computer functions as both a client and a server, and there is no administrator responsible for the entire network. The user on each computer determines which data on that computer is shared on the network.

Security is also managed by the user of the devices. This model is not quite secure and is suited for a small computer networks (with 10 computers or less) where users do not want to share files. User's files are decentralized – they are not stored in a single location.

Criteria for selecting peer to peer

1. Where ten or fewer users will be sharing resources.
2. No server is available.
3. Nobody has the time or knowledge to act as a network administrator.
4. There is little or no concerns about security (security in data processing is the ability to protect data from unauthorized access or, theft or damage)
5. The organization and the network will experience only limited growth within the foreseeable future.

Advantages of using peer to peer

- They are easy to configure
- Computers communicate easily.
- They don't require additional server hardware or software
- Users can manage their own resources.
- They don't require a network administrator
- They reduce total cost of network setup.

Disadvantages of using peer to peer

1. They provide a limited number of connections for shared resources.
2. Computers with shared resources suffer from sluggish performance.
3. They don't allow for central management
4. Users are responsible for managing resources. These resources include data in shared directories, printers, fax cards, and so on.
5. They offer very poor security.

Server Based/Client LAN

Is a LAN configuration with client computers serviced by a main computer called a server.

A server is a big and fast processor computer allocated the task of servicing other computers with applications, data, and other utilities on the network.

This is a network model that offers centralized access to services and devices. One computer plays the role of a server. It is the most common type of network architecture today that provides centralized data storage, security, management of applications and network administration.

Disadvantages

- **Cost:** - More expensive in terms of hardware and network operating system.
- **Complexity:** - Experienced system administrators are required to manage the systems.
- **Dependence:** - When server goes down, operations will cease across the network.

Advantages

1. They are best suited for **10 or more users**.
2. **Security:** - All major server based systems provides sophisticated security.
3. **Administration:** - Servers are centralized making them easier to manage.
4. **Stability:** - Server based systems are designed to support a wide range of organization sizes. Additional servers are added to increase capacity.
5. Client server networks offer **centralized backup** where data can be stored in one server.
6. **Flexibility** - New technology can be easily integrated into the system.
7. **Accessibility** - Server can be accessed remotely and across multiple platforms.

COMPONENTS OF A NET WORK

Basic hardware and software for a Network facility

(1) Network operating system:

Master control program/instructions that manage basic network operations like data and file transmissions, etc. e.g.

- Windows 2000, NT and xp
- Novell Netware.
- Apple Talk.
- IBMs LAN. Etc.

(2) Network Adaptor/Network Interface Card (NIC)

Hardware devices which make it possible for all computers on the network to communicate with others on the network.

(3) Hubs and Repeaters

Are devices which accept transmitted signals, amplifies them, and put them back on the network media rejuvenated. Hubs are typical of LANs whereas repeaters are typical of WANs.

NB. The most common network faults necessitating hubs and repeaters include;

- (i) Distortion: - where information is confused at the source.
- (2) Attenuation; i.e. Loss of signal strength.

Hubs can take any of the following forms:

- ✓ Active Hub: - Rejuvenates data signals
- ✓ Passive Hub
- ✓ Managed Hub
- ✓ Unmanaged Hub

(4) Shared peripherals

E.g. Network printers, scanners, fax machines etc.

(5) Client computers:

I.e. Computers sharing resources and capable of sending and receiving data signals to and from the server.

(6) Transmissions/Communication Media:

These can also be referred to as communication lines or links.

Coaxial cables

These are metallic connecting wires. They are typical of the following characteristics;

- They are shielded
 - They have a lot of signal noise
 - Provide minimum data strength.
 - Used on Network antennas.

Fiber optic cables

These are non-metallic transmission media carrying signals in form of light beams.

Twisted pair cables:

These are typical of the following characteristics;

- ✓ Two or more twisted wires.
- ✓ Twisting conceal out or eliminates signal noise.
- ✓ Usually shielded but unshielded at times.

Wireless media

- Radio waves.
- Infra-red waves.
- Micro waves. These transmit voice and data through the atmosphere as super high frequency radio waves. They can not bend around corners.– use microwave Dishes/Antennas.
- satellite systems. I.e. microwave wave relay stations in orbit around the earth.
- pagers. Simple radio receivers that receive data sent from a special radio transmitter.

(7) Server:

Very fast processor computer dedicated to providing specific services for other computers connected on the network. A server can be in form of:-

- ✓ A file server.

- ✓ Application server.
- ✓ Communication server, etc.

Prerequisites for a Server

- ✓ Very strong processor e.g. Motorola G4 and Pentium V, IV, III, II, etc, Power Pc, etc.
- ✓ High RAM capability – DIMMs for RAM 500 + mBs.
- ✓ Very powerful storage abilities.
- ✓ Enhanced Network through-put.
- ✓ Expansion abilities.

Functions of a Server

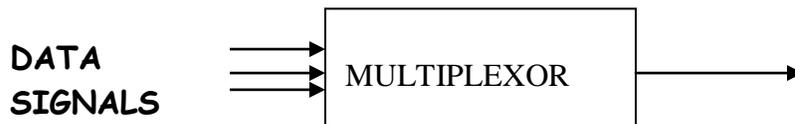
- ✓ Administration of client computers.
- ✓ Security of files and applications.
- ✓ Managing printer Jobs.
- ✓ Data bank.
- ✓ Software and Applications handling.

(8) MODEM

A hardware device which transforms digital signals into wave form (analog - Modulation) to facilitates their transmission into air space, and vice versa (demodulation)

(9) Multiplexer

A hardware device which merges several low speed transmissions into one high-speed transmission.



10. concentrator

A network device which enables several client computers to share a single line.



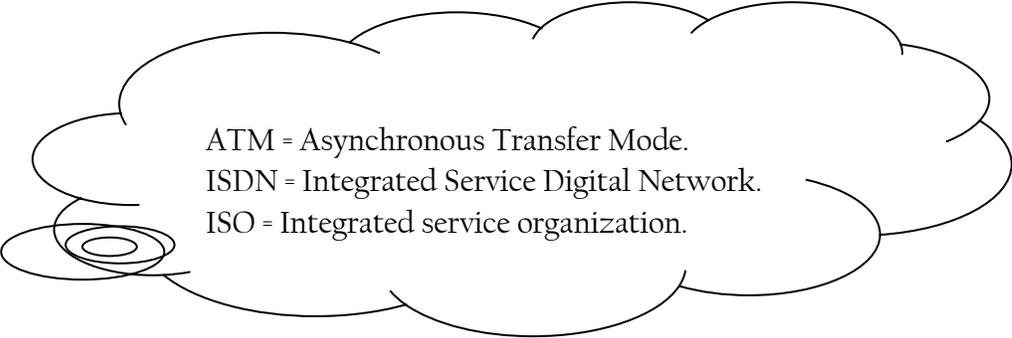
Factors to consider for a Network choice

- ✓ Size of the organization. A peer-to-peer network configuration is ideal for less than ten users.
- ✓ Needs of the Network e.g. network administrator, hardware and software, etc.
- ✓ Level of data security needed. A peer-to-peer network configuration is not very secure.
- ✓ Amount of network traffic expected (band width)
- ✓ Network budget/cost of the network configuration and installation.

- ✓ Maintenance requirements.
- ✓ Level of administrative support available.
- ✓ Types of business or organization.

Advantages of computer Network facilities/Rationale of networking

- ✓ They facilitate sharing of peripherals devices.
- ✓ Facilitate Sharing of programs and data files (resources).
- ✓ Better and enhanced communication and collaboration (networking).
- ✓ Better access to data bases and files for sharing through Uploading and Downloading receipt of files from host computer
- ✓ Down sizing and reduced operational cost. Flatter organizational structures.
- ✓ Offers more Data security. Information on networks (internet) can not be easily altered.
- ✓ Better management control through shortening the decision making process.
- ✓ Data consistence. Necessary changes can easily be made.
- ✓ Down sizing
- ✓ Large data transfers.
- ✓ It helps to access to Resources anytime or anywhere
- ✓ It helps to increase Storage Capacity
- ✓ It helps to reduce Communication Costs



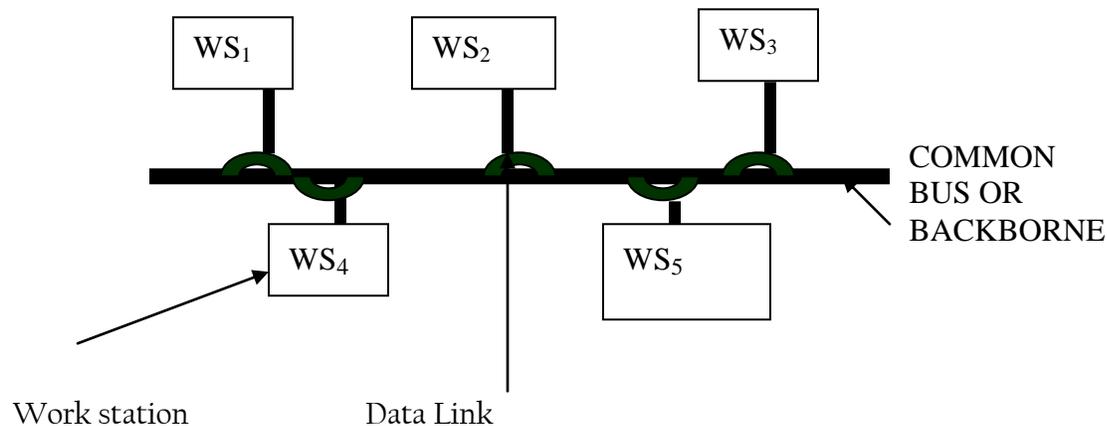
ATM = Asynchronous Transfer Mode.
ISDN = Integrated Service Digital Network.
ISO = Integrated service organization.

NETWORK TOPOLOGIES

Is the pattern by which the signaling and cabling medium is laid to interconnect the various computers which form the network. Include:-

(1) Bus or Linear Bus Topology

This is a topology in which all client computers connected to main cable – common bus or backbone server or peer – to – peer network.



Advantages of bus topology;

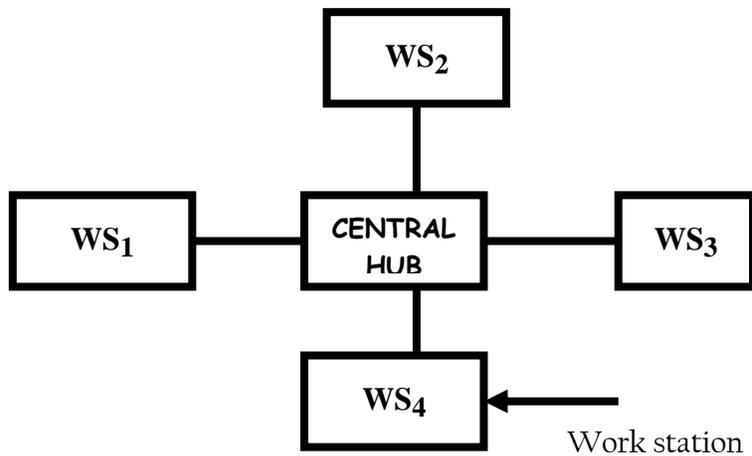
- ✓ It is cheaper as it does not involve expensive hubs and servers.
- ✓ Break down of one work station does not affect others.
- ✓ Easily organized into client server.
- ✓ Communication is very direct and faster.
- ✓ A bus uses less cabling than mesh or star topologies.

Problems of bus topology;

- ✓ Data is not very secure.
- ✓ Difficult reconnection and fault isolation.
- ✓ A fault or break in the bus cable stops all transmission, even between devices on the same side of the problem.

(2) Star Topology

Is a network cabling configuration that uses a central connection point called a hub, through which all communication is directed.



Advantages of bus topology;

- ✓ Life continuous even when connection is broken
- ✓ Data flow is faster with an active hub. Hub minimizes collisions between messages.
- ✓ Easily organized into client server.

Problems of bus topology;

- ✓ It is a bit expensive.
- ✓ If the hub goes down the entire network stops.

(3) Ring Topology

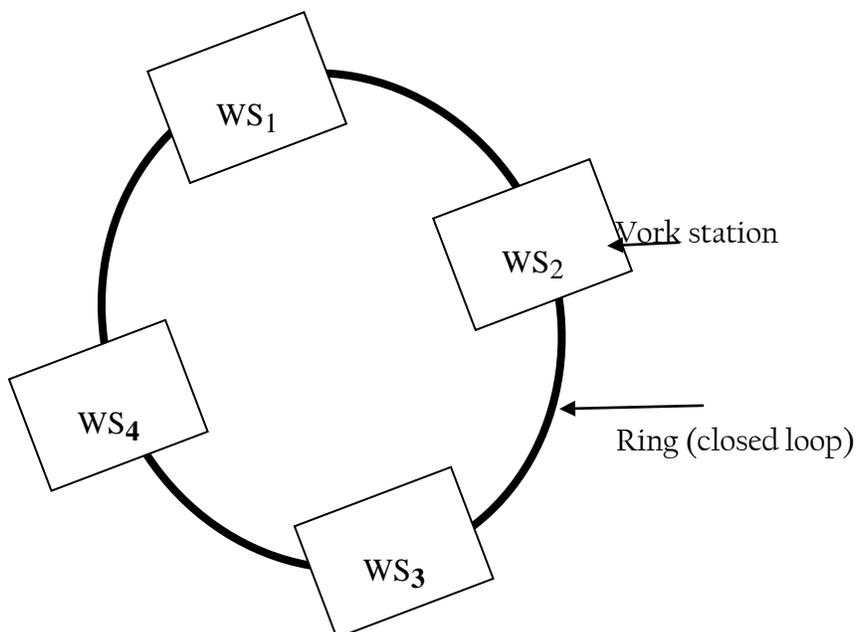
Is a topology in which the networked computers are connected in a series forming a closed loop.

Advantages of ring topology;

- ✓ Signal flow is one direction which avoids the danger of data collision.
- ✓ Where a double ring (FDDI) is involved data flow is continuous even in cases where one ring brakes down.
- ✓ Having no central server makes it cheaper.

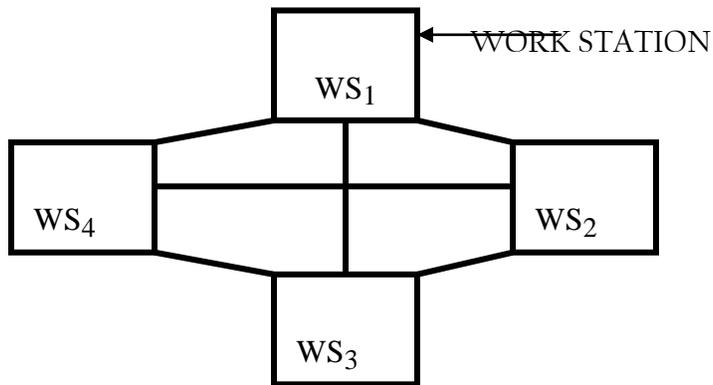
Disadvantages of ring topology

- ✓ If a connection in a single ring is broken the entire network stops working.
- ✓ Having no central server makes data very insecure.



(4) Mesh Topology:

Is a topology in which every client computer (WS) has got its own link to every other client computer on the network. This allows every client work station to communicate freely at any time.



(5) FDDI = Fiber Distributed Data interface.

FDDI network uses fiber-optic cables with an adaptation of a two token-ring configuration topology.

Advantages of FDDI

- ✓ Data flow is very fast. It can transmit 100 – 200mbs
- ✓ Where one ring fails another ring can continue with data supply.
- ✓ It can transmit 100 – 200mbs

Disadvantages of FDDI

- ✓ It is relatively expensive.
- ✓ A bit time consuming to construct.

(6) Hybrid/Tree Topology

Is a network configuration formed as a result of combining two or more of the above topologies interconnected by hubs. It can help in linking different types of LANs

NB;

A network can either stand alone (i.e. PBX configuration) or be connected to other different network configurations which can be either similar or not, hence need for the following devices:

(a) A BRIDGE:

Is a device used link two similar networks to communicate to one another e.g. Bus – 2 – Bus or Star 2 star, etc.

(b) A GATEWAY

Is a device (interface) used link two different networks to communicate with one another. E.g. Bus to star, LAN to MAN, etc.

(c) ROUTER

Is a device used to link more than two different network configurations to communication to one another?

Factors affecting communication among devices

- **Transmission rate** – frequency and Bandwidth. High frequency, wider bandwidth means more data.
- **Line configurations** – point-to-point Vs multipoint. In a P-2-P a single line the sending and receiving devices are directly connected to one another. Whereas, in a multi-point configuration, a single line interconnects communication devices to one computer.
- **Serial** (bits are transmitted sequentially one after the other) Vs **parallel transmission** (bits are transmitted through separate lines simultaneously).
- **Direction of transmission** – Simplex (one direction flow), half – duplex (two but one at a time) and full – duplex (back and forth at the same time).
- **Transmission mode** – asynchronous (one byte at a time) Vs synchronous (in blocks).
- **Packet switching.**
- **Multiplexing.**
- **Protocol** – Set of convention governing the exchange of data amongst devices. Protocols are built into the hardware and software one is using.
- **Type of material** one is trying to access. Pictures and other complex graphics take long to load because of larger files.
- **Speed of your modem, and modem at the other end.**
- **Amount of other traffic on the Network.**
- **Transmission media**

Factors/Parameters of a good network

Consistence/reliability parameter. This describes the predictability of the network.

Flexibility. This defines networks ability to grow or change with minimal disturbances to the users and applications.

Availability = availability.

Recovery parameter. It should be very easy to restore the network to its operational level following it failure.

Performance. This is measured in terms of network throughput and response time. Throughput = work load per unit time ratio whereas response time = the rate at which the CPU interprets commands to the user.

Security parameter. This describes the restrictions to access information from the network, and limitations to network spasm plus hackers/crackers.

THE INTERNET

Is a global connection of computers and LANs sharing resources, data and information.

Or

Is a network of computers connected by telephone lines, cables or satellite radio links, sharing resources and data globally.

Internet = World Wide Web (www) = the Net

WWW transmissions range from simple letters (mail) to full

Multi-media i.e. text, sound, still and motion pictures

NB:-

Internet connectivity can be through;

- ✓ Dial-up Internet connectivity – (requires a telephone line).
- ✓ Wireless connectivity.

Brief History of Internet

The Internet was created by the U.S. Department of Defense in 1969 as **ARPAnet**. **ARPA** was the U.S. military department's **Advanced Research Project Agency (ARPA)**.

The US military came up with this idea to serve two main ideas. That is;

- ◆ To share research among military, industry, and University sources.
- ◆ To provide a more secure diversified system for sustaining communication among military units in the event of nuclear attack.

The system was designed to allow many routes among many computers so that a message could arrive at its destination by many possible ways, not just a single path.

In the next ten years the network had been extended to connect over 200 computers in the military and research establishments throughout the U.S. and overseas. Some us universities followed by setting up systems of their own and by mid 1980's they merged with ARPA to form the Internet.

Today, most of the world's universities are connected directly or indirectly and many businesses have joined to take the advantage of the cheap and efficient international communication, advertising medium, and data source for research.

The original network system was largely based on the Unix Operating System using the Network Control Protocol (NCP) standard. With the many different kinds of computers being connected a more efficient and compatible standard **TCP/IP for Transmission Control Protocol/Internet Protocol** was developed in 1983. This made it easy for different computers on different networks to communicate with each other efficiently.

They Internet is growing day-by-day with very limited procedures and ownership.

BASIC WWW REQUIREMENTS/INFRASTRUCTURE

→ High memory/processor, client and host computer to receive, edit, keep, maintain and distribute data at any time.

→Moderns

→Communication software.

→Telephone line or satellite facility.

Connecting to the Internet can be done through;

- ◆ Schools, universities/colleges or places of work.
- ◆ Online information services.
- ◆ Internet service providers (ISP). 1st – tier = Large ISPs from where small ISPs can buy access privileges.

→**Internet Services Provide (ISP)** i.e. an organization which maintains LANs attached to the WWW e.g.

- Africa online -MTN
- Info-Com - UTL
- Bush net - Afsat
- One2 net
- Dehezi international

NB: (1) The ISP provides the client with an Internet account or address through which he can control use of the satellite facility.

(2) Internet backbone = is a ultra – fast network that connects large organizations together. E.g. huge manufacturing firms, universities, or military services together.

FACTORS TO CONSIDER WHEN CHOOSING ISP

→Setup costs/Budget

→Experience for both ISP and client.

→Auxiliary services offered by the ISP e.g. E – Mail/telephone SMS facility.

→Availability of online help.

→Compatibility of ISP ware with yours e.g. windows Vs Linux Vs Wang.

→Efficiency/Effectiveness of ISP devices e.g. speeds of ISP modem, Bandwidth etc cabling architecture, Bit–Bus architecture for devices etc.

NB:

- (a) Bandwidth refers to the rate at which data is transmitted over a communication channel.
- (b) The Internet has emerged as the framework upon which to build global information infrastructure.
- (c) It has attracted worldwide attention because of its very low user costs.
- (d) The open architecture of the Internet and its underlying TCP/IP has opened up possibilities to exchange text, audio, video and other between different types of computer.

USES FOR THE INTERNET

- (a) Offers personnel connectivity for friends and financiers through E- mails, E- collaboration and chat – rooms, online telephone calls, voice mails, video phones, etc

- (b) It is a tool for entertainment through on-line games, clubs and interactive games, online chats, refreshing video clips (movies) and animals' zoos.
- (c) It is a source of important electronic programs/applications through downloading of freeware, shareware and other programs.
- (d) Offer travel services like E-Booking and reservations for aviation firms and hotels, to business travelers and holidaymakers.
- (e) Is a tool for financial management offering answer to financial management challenges of where, when and how to invest especially in financial securities.
- (f) Offers education and research facilities for either academic or knowledge enrichment. E-Publishing and E- Learning have greatly improved distance learning. Hence the WWW being a body of knowledge. The common wall-less classrooms.
- (g) Multimedia: offers Audio and video services.
- (h) Offers Banking services for online Banking institutions, and electronic funds transfers (EFT). A case for western union. Digi Cash, Cyber Cash, Millicent, ATMs, and credit card facilities are in this category.
- (i) Offers news updates (information Retrieval) for politics, social events, climate and weather, and sports. These usually in form of live radio, live TV, online newspapers and magazines, educative short films, etc.
- (j) On - line employment for job seekers through online employment agencies, and firms advertising jobs online.
- (k) E-Medicine where diseases diagnosis and drug prescriptions are done on-line
- (l) E-Courtships and marriages, etc
- (m) **Telecommuting.** Through internet connectivity and interactivity one can now work from home and communicate with the office through networked computers and telephone facilities.

- (n) A tool for transacting business through E-commerce or E- Business where products can be "Marketed" (Procured OR shopped) on-line (Tele-shopping).

NB: - E-Business needs Avery secure, efficient and effective banking system.

Challenges/risks of E-Business

- High initial and maintenance cost.
- Lack of paper basis for basis for business creates skeptics.
- Mis use of customer bank account.
- Limited to on line firms and areas.
- Business strategies can be easily accessed by unauthorized competitors.

INTERNET/NETWORKING CHALLENGES/FLOW /HAZARDS OR SECURITY THREATS

- ✓ Privacy violations
- ✓ Information interceptions
- ✓ Viruses/malicious programs – can read copy or destroy sensitive files/folders.
- ✓ High cost implications for initial and maintenance costs.
- ✓ Dangerous information on grounds of health and morality (**pornography**). Others - information is available on how to make explosives (bombs) and detonation of explosives.
- ✓ Continued isolate man from man.
- ✓ **Internet scams** where people are conned property and loss life at times. The most recent true story is of a European dater who was abducted in West Africa and made to pay a ransom for his release while looking for his internet date.
- ✓ Addiction.
- ✓ **Spamming**. Uncalled for mails in form of advertisements, chain letters, etc.
- ✓ **Plagiarism**. This is manifested in sites offering academic papers for either free or at a cost and students just change the authors name to their own and present.
- ✓ **Risk of data and system obsolescence due to the rampant technological changes.**

WAYS HOW THE INTERNET CAN BE USEFUL IN THE AREA OF EDUCATION.

- **Research.** Internet is widely used in the area of education for research. The Internet provides up-to-date information on a variety of classroom-related topics unavailable from other sources. While it takes hours for one to search the library for the information, it takes only an Enter click to find what he is seeking for.
- **Email.** Email is used in the area of education as a great communication tool between teachers and students. Students can for instance send their assignments to the teachers electronically over the internet
- **Publications.** Presence of collaborate webpages where the students and teachers can publish a variety of valuable aids to education or upload their courses on the webs so the whole world benefits from it. e.g. Wikipedia
- **Social Networking.** This helps students to keep in touch with friends on other institutions, and interact about different issues online. Examples include Facebook and Twitter.
- **Distant Education Online.** The internet now offers opportunity to attend online schools where someone can acquire a degree without going to class.
- **Virtual Geographical Field trips.** There are many websites like efieldtrips.org that help students to learn field work without going for school field trips.
- **Web blogs.** These are webpages where students express their ideas about a given topic which others can react to as a form of debating and sharing ideas.

- **School website development.** Schools also use the Internet to create websites that allow parents to find out about school events and communicate with the administration and teachers.

FACTORS THAT AFFECT THE SPEED OF AN INTERNET CONNECTION

- 1. Computer Processor speed.** A person using a Computer with dual Pentium IV processor is most likely to get faster connectivity to the internet as compared to one with a Pentium III or Pentium II processor.
- 2. Distance the data travels.** Actual Internet speeds will vary, depending on the distance the data travels coupled with how many servers it has to go through and the different speeds of each server.
Additionally, the shorter the cables or the closer the receivers are to the routers, the faster the connection speed.
- 3. Heavy traffic on the network.** The greater the number of computers on the network is, the more the internet speed reduces. ISPs are allocated a certain amount of **bandwidth** (the maximum amount of information (in bits/second) that can be transmitted along a channel) which is shared among all of the computers on the network.
- 4. Malware, Spyware and Viruses.** Viruses hinder the operation of programs on the computer, regardless of its processor strength; this in turn slows down the speed of connectivity.
- 5. Modem speed.** If the modem is substandard with a low rating, or not compatible with the ISP's modem then this will slow down the speed at which data is transmitted.
- 6. Natural Conditions.** Instability in connection speed is also commonly caused by natural conditions such as stormy weather and thunder, which interfere with the transmission of signals.
- 7. Positioning of Routers.** Routers in wireless networking should be strategically positioned.
The routers should not be put below or under tables but should be raised well to be able to send the signals directly to the receiving computers/ laptops
- 8. Hardware problems.** A poor network card, video card or signal receiver can seriously reduce the speed of the data being processed by your system, slowing down the speed at which your computer can take the information coming in. Also, if your Internet service comes over the phone line and you have a faulty filter attached, the speed will be compromised.
- 9. Software problems.** You need a good updated web browser software to display the web pages efficiently. It is also good to have updated software and device drivers to newer versions for optimum performance.
- 10. RAM Memory available.** With each program you open on your computer, you are using up more RAM memory. Your computer has to write this data to the disk, and the more

memory you are using up on open programs, the less memory there is available to receive the data.

11. Computer internet settings. Improper computer settings can also affect the speed of your internet connection. Setting your firewall, safe search and other options properly will improve the speed as well.

12. Technological Circumstances. Slow speed of an internet connection can be due to technical causes such as maintenance works being done by an ISP.

13. Cookies. When surfing, the browser collects information, such as passwords and stores it on your local hard drive in a file known as a cookie. Over time, these cookies can compromise the speed of your Internet connection, particularly if you visit many websites during a browsing session.

INTERNET TERMINOLOGIES

(1) Web Server

Is a high speed and storage computer whose primary purpose is to provide requested information to computers on the WWW. It can be;

- File server acting as cd\base
- Application server
- Communication server.
- Multipurpose server

Characteristics

- Very high storage plus memory capabilities.
- Very strong multiprocessor e.g. Motorola G4, G3.
- High capacity RAM – DIMMs.
- Improved Network through-put (Enhanced NIC).
- Expansion capabilities for up grades to be effected.

(2) Web Browser or Browser.

A master control Network program which makes it possible for computers to share resource or data globally. e.g.

- Emissary.
- Netscape Navigator.
- Web surfer
- Ms Internet explores.

(3) HTML = (Hyper Text Markup Language)

It is a programming language/program used to design web pages and web sites.

As a standard tagging language or program, it helps in the creation and formatting of links, and other special handling of text, images, and objects in a web page so that a browser can know how to display them.

NB: Common Gateway Interface (CGI), is a script used when creating forms using web page wizard in order to accept the information a browser submits in a form and also forward the information to other programs.

(4) TAG

Is an embedded HTML code that specifies formatting for text and graphics for their proper display in a web browser.

E.g. <Head> </head>

<Body > </Body>, etc

(5) Hyper Link

Is a text or graphic designed to provide links in a website or document. Once a hyperlink is clicked it takes you to a related document, graphic or file.

Characteristics of hyperlinks

→They are usually underlined.

→Change colour.

→Mouse pointer changes shape to finger like pointer.

(6) WEBSITE/HOME WEB DIRECTORY:

A website is a collection of hyperlinked html documents (web pages) with related information, meant to creating awareness about something on the internet.

Or

This is an internet location on a computer/server on which a hyper link document is located. It is a group of HTML, JAVA, SQL, etc document and associated files covering one or more related topics, and interconnected through hyperlinks on the world wide web.eg manu.com, gifted bynature.com look smart, CNN, bbc.com, yahoo etc.

A website can be;

Spider type website: With links e.g. Google etc

Yellow pages type websites: With just a list of possible pages on the sites e.g. yahoo which has a list 14 major topics including Art, Education, Entertainment, computer and internet, Health, News, Recreation, etc.

FUNCTIONS OF A WEBSITE:

Below are the major reasons why a school should have a website:

1. Making of a website quickens the publishing of information to the community such as abrupt announcements, circulars, results, etc. Once uploaded, it will be already accessible to the targeted readers
2. Through a website, the school can get feedbacks from the community through online user comments and questions.
3. If students are involved in the Website development process, this enhances skill building such as writing, editing, layout and design.

4. A school website provides motivation and pride of ownership. This can be evidenced through use of customized email. E.g. username@jinjacol.sc.ug instead of username@yahoo.com
5. Information listed on a school website removes doubt. Information such as school fees, and everything presented at the site appears in a positive light, as compared to information from other sites about the school which may be false.
6. If a school has a website, they can use the web mail service to send parents and other stake holders items such as newsletters, reminders etc.
7. A website increases ways of contact. Once you have a website you can list your website address on your business cards, report cards, and even the school signpost.
8. Internet today is being used 24 / 7 and is accessible from every house. People are becoming highly dependant on the internet. By having a web presence, the market of the school expands your significantly.
9. A school website helps students and parents to make a wise academic choice after using the vast quantities of information about a given college or university.

(7) URL (Uniform Resource Locator) or Web Address.

Is the address used to locate/visit/access a particular website on the WWW. It can be:

-Numerical e.g. [http:// 10.181.62.81](http://10.181.62.81)

[Http: // 127.0.0.1 \student\html\.](http://127.0.0.1/student/html/)

-Alphabetic e.g.

Bbc.com

Visit Uganda.com

Hatwib. 4t.com etc

<http://>

(8) SEARCH ENGINE

Is a program which allows web user to look for specific information or documents of interest on the WWW.eg Alta vista, Google, yahoo, Netiquette, info-see, Dog pile, Lycos, Excite, etc.

Search engines use the Boolean logic operator to facilitate the searching. Major operators

-AND e.g. K and B.

-NOT e.g. Server Not Linux

-Near e.g. Server near Linux

(9) GOPHER

Is a menu driven program that links many internet data banks (website) into a unified information service.

(10) INTRANET

A network of networks within an organization used to share company resources and information amongst employees and departments.

(11) EXTRANET

Is an extended co-operate internet that uses WWW technology to facilitate communication with company customers, suppliers, or relevant government department.

(12) PROTOCOL

Refers to a set of rules (program) that control the way communication is handled across the internet (data exchange between the hardware and software)

Protocol includes:

-IP = Internet protocol

Are sets of rules which provide connectionless information delivery between computer systems, though IP does not guarantee delivery of data.

-TCP = Transmission Control Protocol

Are sets of rules that provide connection oriented communications. Provide and guarantee delivery of data, and should errors occur during transmission, TCP is responsible for retransmitting the data.

Protocols that suite TCP/IP include:

- 1) HTTP = Hypertext Transfer protocol: Used for sending and receiving web pages to and from web server.
- 2) FTP = File Transfer Protocol: Used for transferring any kind of file to and from the web server.
- 3) SMTP = Simple Mail Transfer Protocol: Used for transferring mail messages.

Others include;

SLIP = Serial line internet protocol, and PPP = Point-to-Point Protocol, Both used for controlling network traffic over a dial-up connection.

(13) TELNET

This is a terminal emulation protocol that allows you to connect to remote computers

Enables one to log on to a remote computer/machine and use it.

(14) ELECTRONIC MAIL (E- MAIL)

Is an SMS sent and received over the WWW. In order for one to send and receive E- mail he or she must have an E-mail account or address.

Elements of an E-mail account.

- ◆ User name
- ◆ Domain address.
- ◆ @ Sign between the user name and domain address.
- ◆ Pass word. A secret personal pin-code to avoid unauthorized access.
- ◆ An extension. E.g. .COM, .UK, .UG, etc.

E.g.; martovd @ yahoo .com

The diagram shows the email address 'martovd @ yahoo .com' with three hand-drawn brackets underneath. The first bracket is under 'martovd' and has a downward arrow pointing to the text 'User name'. The second bracket is under '@' and has a downward arrow pointing to the text '@ Sign'. The third bracket is under 'yahoo .com' and has a downward arrow pointing to the text 'Domain address'.

User name Domain address Extension

Distinguish an E-mail account from a uniform resource locator (URL).

How to create a free mail account

- ◆ Get hooked on the net or ISP.
- ◆ Select my mail or mail icon.
- ◆ Double click new user or sign me up button to load the account application form for new user.
- ◆ Fill in user identification details/account name; pass word, location of the user, security questions, first name, last name, language, country, town/city, postal address code and zip. One should pay close attention to those details which are mandatory and those which are optional.
- ◆ Click on submit button for your account to be registered for use.

Basic E-mail features/autonomies;

In box = Lists the messages received.

Out box = Lists the messages you have composed but not sent.

Sent = Lists copies of all sent copies for reference purposes.

Send = Sends the message you have composed.

Compose = Activates the screen onto which a message to be sent is typeset.

Attachment = Helps you to attach other files and folders to accompany the directly composed message.

To = It's where you typeset the E-mail address of the receiver.

Subject = Subject of the message.

Cc = Enables copies of the E-mail to be sent to a third party while acknowledging other recipients.

Bcc = Enables copies of the E-mail to be sent to a third party without acknowledging any other recipients.

Advantages of electronic mails;

- ✓ Reduces paper costs and irritation.
- ✓ Provides immediate delivery feedback.
- ✓ They offer provision for attachments.
- ✓ Secured by passwords.
- ✓ E-mails can be conveniently sent to multiple recipients.
- ✓ By providing a list of senders and subjects one can prioritize on which messages to read first.
- ✓ Sending is cheaper.
- ✓ There is a possibility of multimedia mails where they can be received as voice mails and read aloud.

- ✓ Can easily go across many time zones (continents).

Disadvantages of electronic mails;

- Emails can carry **Viruses**: The recipient needs to scan the mails, as viruses are transmitted through them and have the potential to harm computer systems.
- **Spam and Junk**: E-mails when used to send unsolicited messages and unwanted advertisements create nuisance called Spam. Checking and deleting these unwanted mails can unnecessarily consume a lot of time, and it has become necessary to block or filter the unwanted e-mails by means of spam filters.
- E-mail **spoofing** is another common practice. Spoofing involves deceiving the recipient by altering the e-mail headers or the addresses from which the mail is sent.
- **Hacking and email interception**: The act of unauthorized attempts to bypass the security mechanisms of an information system or network is termed as hacking. After the e-mail is sent and before it is received by the desired recipient, it "bounces" between servers located in different parts of the world. Hence, the e-mail can be intercepted by a professional hacker.
- **Misinterpretation**: One has to be careful while posting any kind of content through an e-mail. If typed in a hurry, the matter could be misinterpreted.
- Since the content posted via e-mails is **considered informal**, there is a chance of business documents going unnoticed. Thus, urgent transactions and especially those requiring signatures are not managed through e-mails.
- **Crowded inbox**: Over a period of time, the e-mail inbox may get crowded with mails. It becomes difficult for the user to manage such a huge chunk of mails.
- **Need to check the inbox regularly**: In order to be updated, one has to check his e-mail account regularly, which may be expensive in the long run.
- Email **cannot be used without computers** especially in remote areas without electricity
- In case one **forgets his/her password**, signing in is not possible and this can lead to loss of information.
- Email may violate privacy in case someone else **gets to know your user password** since the other may check your mails.