Computer System Software

Definition of Software

1. Computer software or simply software is a program that enables a computer to perform a specific task, as opposed to the physical component of the system (hardware).
2. Software is a set of instructions and procedures passed to the computer to perform certain activities or task.
3. It can also be defined as a set of instructions that direct the activities of the computer system in order to undertake a specific task.
4. Computer software is that part of a computer system that consists of encoded information or computer instructions, in contrast to the physical hardware from which the system is built.

Type of System Software

Software is divided into two broad groups, these are:

1. System Software
2. Application software

Definition of System Software

a. System software is a collection of program design to operate, control and extend the capabilities of computer.

b. These are software that control the way the different computer components communicate with one another.

c. It can also be defined as programs that helps run the computer hardware and software.

Types of System software

The major types of system software are:

i. Operating System

ii. Translators

iii. Utility programs (or tools)

A. Operating System

Operating (OS) is software program that manages the hardware and software resources of the computer and provides common services for program. The operating system is the most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs.

Examples of Operating Systems

Mac (Macintosh), Windows, Linux, UNIX, DOS, Android, IOS, etc.

Functions of the Operating System

The major functions of the operating system are:

a. Starting the computer automatically when the power is turned on.

b. Scheduling processes

c. Controlling program execution

d. Managing the main memory

e. accounting resource usage

f. managing and manipulating files

g. controlling input and output

h. Easy interaction between human and computer

i. Loading and scheduling users' programs along with necessary compilers.

Types of Operating System

a. **Real-time operating system (RTOS**) - A Real Time Operating System, commonly known as an RTOS, is a software component that rapidly switches between tasks, giving the impression that multiple programs are being executed at the same time on a single processing core. Example VxWorks, QNX, eCos, RTLinux

b. **Single-user, single task** - As the name implies, this operating system is designed to manage the computer so that one user can effectively do one thing at a time. Examples Palm OS, Pocket PC, MS-DOS

c. **Single-user, multi-tasking** - - As the name implies, this operating system is designed to manage the computer so that one user can effectively do more than one thing at a time. Examples Windows Family, Mac OS, Linux

d. **Multi-user** - A multi-user operating system allows many different users to take advantage of the computer's resources simultaneously. Examples UNIX, Novell, Windows Server

e. **Distributed** - A distributed operating system manages a group of independent computers and makes them appear to be a single computer. Examples, Solaris, AIX, Mach/OS

f. **Embedded** - Embedded operating systems are designed to be used in hand held computer systems. Examples:

Symbian

Embedded Linux - Of which Android is a subset.

BlackBerry OS - For BlackBerry phones

iOS - Subset of Mac OS X, used in Apple's mobile devices

Palm OS

Windows Mobile

User interfaces

A user interface (UI) refers to the part of an operating system that allows a user to enter and receive information

1. Graphical user Interface (GUI) operating system: This operating system allows users to click and drag objects with a mouse instead of entering command line. Examples of GUI based operating system are Mac, Windows, and Linux.
2. Text User Interfaces (TUI)/Command line also known as command screen is a user interface that requires the user to type in commands via the keyboard in order to pass instruction to the computer. Examples are DOS (Disk operating System), Unix, etc. in MS-DOS the command line prompt is "C:/>"..

B. Translators

Translators are programs for converting programs in other languages into machine language instruction so that the computer can execute them. A *computer* language *translator* is a program that translates a set of code written in one programming language into a functional equivalent of the code in another programming language. Examples of translators include, Assembler, compiler and interpreter.

Assembler: An assembler is a computer program for translating assembly language into machine language. Assembly language is a mnemonic representation of machine language. The computational step where an assembler is run is known as assembly time.

Compiler: A compiler is a computer program that translates text written in a computer language into another language. The original sequence is called the source code and the output called the object code.

Interpreter: An interpreter is a computer program that directly executes instructions written in a programming language, without previously compiling them into a machine language program. An interpreter translates one statement at a time to machine code and executes it immediately before taking the next statement.

C. Utility Program

Utility software also known as service program, service routine, tool, or utility routine) is a computer software designed to help analyze, configure, optimize or maintain the computer.

Examples of Utility program

1. Anti-virus: Antivirus or anti-virus software is used to prevent, detect, and remove malwares. Computer viruses, computer worms, Trajan horse, spyware and adware from the computer
2. Backup utilities: Backup utility can make a copy of all information stored on a disk, and restore either the entire disk or selected files in event of disk failure or accidental deletion.
3. Data compression utilities: output a smaller file when provided with a file.
4. File managers: It provide a convenient method of performing routine data management tasks, such as deleting, renaming, cataloging, copying, moving, merging, etc.
5. Cryptographic utilities: cryptographic utilities encrypt and decrypt streams and file.
6. Disk Cleaners: Disk cleaner can fine files that are unnecessary to computer operation, or take up considerable amount of space. It helps the user to decide what to delete when their hard disk is full.
7. Disk partitioners: Disk partitioners can divide an individual drive into multiple logical drives.

Overview of Computer System

Definition of Computer System

- Computer system can be defined as an electronic device which manipulates data and produces output using step-by-step instructions.
- A programmable machine that receives, stores, retrieves, processes and outputs data
- A computer may be defined as a machine that can solve problems by accepting data, performing certain operations and presenting the results of those operations under the direction of detailed step by step instructions.

Constituents of a Computer

The two major constituents of the computer are hardware and software

1. **Hardware:** Hardware can be defined as all the parts of the computer that are tangible. I.e. they are the parts of the computer you can see, touch, or handle.

   Examples of Hardware

   The following list represents a basic set of set of hardware found in most computers

   a. PC case, b. Motherboard, c. Hard Disk Drive (HDD), d. Floppy Disk Drive (FDD), e. Compact Disk Drive (CDD), f. Digital Video Disk Drive (DVD), g. Monitor, h. Keyboard, i. Power supply, j. Mouse, k. Cables and wires.

Hardware can be broadly divided into two parts namely: System unit and Peripherals.

System Unit: A case that contains the electronic components of the computer used to process data.

Peripherals: A computer peripheral is any external device that provides input and output for the computer. The term peripherals refer to all hardware devices that are attached to the computer and are controlled by the computer system. Peripheral devices, are sometimes called "I/O devices"

Types of Peripheral Devices

There are many different peripheral devices, but they fall into three general categories:

1. Input devices, such as a mouse and a keyboard
2. Output devices, such as a monitor and a printer
3. Storage devices, such as a hard drive or flash drive

2. **Software:** software is defined as set of instructions and procedures passed to the computer to perform certain activities or task. It can also be defined as a set of instructions that direct the activities of the computer system in order to undertake a specific task. Unlike the hardware, software cannot be seen or touched.

Examples of Software

The following list represents some software found in most computers.

a. Windows, b. MS word, c. Norton anti-virus, d. CorelDraw, e. MS Access f. MS Excel, g. BASIC Language, h. Assembler, etc

Computer software is divided into two broad groups, these are:

1. System Software
2. Application software

1. System Software

System software is a collection of programs that supports computer operations. It can also be defined as programs that helps run the computer hardware and software. E.g Operating System, Translators and Utility programs.

2. Application Software

These are software that allow humans (the users) to accomplish one or more specific (non-computer) task. E.g Word processing software, Spreadsheet software, Presentation software, Database packages, Graphics packages, Etc.

Characteristics of Computer

The characteristics possessed by computer can be listed as follows

1. **Speed**: A computer can add and subtract numbers, compare letters to find alphabetic sequence, move and copy numbers and letters. This feature is very important and useful for humans.

2. **Accuracy**: Computers are very accurate. They can perform hundreds of thousands of operations with great accuracy as there are no moving parts to wear and go wrong. They can run without error for months at a time.
3. **Storage:** Because various computer devices can store lots of data in a small area, there are tremendous saving in the storage area required to maintain the records necessary in a business.
4. **Versatility:** A computer can perform many different types of tasks. You can perform arithmetic operations, do word processing, send email, and use Internet.
5. **Automation:** Automation is one of the most important features of the computer. Once a command is given to the computer, it can perform the job without the need of human help until the job has been completed.
6. **Diligence:** Computers do not get tired like humans. They can perform the jobs continuously for days and even weeks together without errors without affecting its speed and accuracy.
7. **Cost:** Hardware costs have been decreasing at an estimated annual rate of 25 percent.

Limitation of a Computer

Computer is a very intelligent machine but it also suffers from many limitations such as:

1. Computer can't do anything unless they are first program to perform a specific task.

2. Computer cannot interpret the data they generate
3. Computer cannot detect if the operator feeds any data into it.
4. Computer cannot implement the decision that they suggest.
5. Prolong usage of the computer can lead to fatigue and sight problem
6. Over dependence on the use of computer can stop or hold work whenever there is a breakdown by the system or a virus attack in the system

Data and Information

Definition of Data

Data are raw facts. They are figures, words and symbols that have not been processed or put into meaningful form. Data can be referred to as raw material from which information is produced.

Types of data

1. Numeric data: Data consisting of digits and not letters of alphabets or special character. E.g. 0 – 9

2. Alphabetic data: Data consisting of letters and not digits or special characters. A-Z and a-z

3. Alpha-numeric data: Data consisting of digits, alphabets as well special characters. Ussm12, #, !, ?, etc.

Sources of data

Data could be gathered or collected from various sources. Some of the sources include the following:

i. Federal Office of Statistics

ii. National Population Commission

iii. Independent Electoral Commission

iv. Examination Bodies

v. School attendance Register

vi. Bank Statement

Definition of Information

Information is processed data.

Sources of information

Information could be gathered from different sources. Some of the sources of information include the following:

i. Radio

ii. Television

iii. Newspaper

iv. Computer

Qualities of good information

1. Relevance: It must be suitable for the purpose it is required for.
2. Accurate: It be free from errors
3. Availability: It should be easy to obtain or access
4. Timely: It should be available at the right time
5. Comprehensive/Completeness: It should contain all necessary details
6. Reliability: It should come from a reliable source.

Processing of Data into Information

The processing of data into information consist a combination of activities and procedures. Some of the ways in which raw data can be converted into information are:

Collecting: Data to be processed need to be gathered from various sources

Classifying: This is the process of identifying certain characteristics in an items of data and putting them into categories or groups according to those characteristics

Sorting: Sorting takes the form of arranging data into a predefined order of sequence.

Editing: This takes the form of correcting mistakes from the body of data.

Calculating: This is by performing arithmetic manipulation such as adding, subtracting, dividing and multiplication

Translating: This is the process of changing the language form of a data into another.

Difference between Data and Information

Data	Information
1. Raw facts	1. Processed data
2. Unorganized array of elements	2. Arranged element
3. Unanalyzed sets of element	3. Analyzed element

4. It makes no meaning

4. It is meaningful

Computing Devices I (Pre-Computer to 19th Century)

Man has put every effort to have better method of calculations. As a result of man's search for fast and accurate calculating devices, the computer was developed.

19th Century Device

Some of the 19th century devices are: Abacus, Napier's bones, Pascal's calculator, Leibniz multiplier Jacquard's Loom, Charles Babbage's engine, Hollerith Census machine and Borrough's machine.

Abacus

The first calculating device was probably the Abacus. The Chinese invented it.

Components: It is made up of frame divided into two parts by a horizontal bar and vertical threads. Each thread contains some beads. It is known as Soroban in Japan and Suan Pan in china.

Uses: to do simple addition and subtraction

Napier's Bone:

In 1617 an eccentric (peculiar, unusual person) Scotsman mathematician named John Napier invented Logarithm which is a technology that allows multiplication to be performed via addition.

Components: A set of eleven rods, with four sides each which was used as a multiplication tool. These rods were made from bones and were the reason why they were called Napier's Bone.

Uses: the rods had numbers marked in such a way that, by placing them side by side, products and quotients of large numbers can be obtained.

Slide Rule

Napier's invention led directly to the slide rule, first built in England in 1632 and still in use in the 1960's by NASA engineers and Apollo programs which landed men on the moon.

Components: In most basic form, the slide rule uses two logarithmic scales to allow rapid multiplication and division of numbers. Traditionally side rules were made out of hard wood with cursor of glass

Uses: The slide rule is used primarily for multiplication and division and for functions such as roots, logarithm and trigonometry, but normally not used for addition and subtraction.

Pascal's Calculator

In 1642 Blaise Pascal, a French mathematician and scientist at age 19, invented the Pascaline, as an aid for his father who was a tax collector. Pascal built 50 of this gear-driven one-function calculator (it could only add) but couldn't sell many because of their exorbitant cost and they were not that accurate.

Features: Numbers were entered by dialing a series of numbered wheels in this machine. A sequence of wheels transferred the movements to a dial, which showed the results.

Component: the calculator had spooked metal wheel dials, with the digit 0 through 9 displayed around the circumference of each wheel

Uses: Addition and subtraction of up to 8 digit number.

Leibnitz's Calculator

It was realized that scientist that pascal's toothed wheel could also perform multiplication through repeated addition of a number after careful consideration. Baron Von Leibnitz, the German philosopher and mathetician, added this development to the Pascal machine in1694. The Leibnitz reckoning machine was the first two motion calculator designed to multiply by repetitive addition.

Features: The Leibnitz calculator incorporate a new mechanical feature called the stepped drum. The step drum is a cylinder bearing nine teeth of different length.

Components: the device is made of copper and steel.

Uses: It can multiply, divide, add and subtract.

JACQUARD'S LOOM

In 1801, Joseph Marie Jacquard (French), a silk-weaver, invented an improved textile loom. The Jacquard loom was the first machine to use punched card. These punched cards controlled the weaving, enabling an ordinary workman to produce the most beautiful patterns in a style previously accomplished only with patience, skill, and hard work. Jacquard's loom was one of the first machine run by program.

Components: It consist of a loom that controlled the raising of the thread through punch cards

Uses: It is used to produce textile design as per the program on the punch card.

Difference engine

Features and components

In 1822, An English mathematics professor called Charles Babbage invented the Difference engine. It was composed of 25000 parts, weighed 15 tons and stood 8 feet (2.4m) high.

Use

Used for calculating differential equations.

Analytical Engine

Features and components In 1832, Charles Babbage designed another machine called Analytical engine which was deemed to be the first mechanical computer. The machine was steam-powered, though never completed, outlined the basic elements of a modern day general purpose computer. It contains input in the form of punched card containing operating instructions and a "store" for memory of 1,000 numbers of up to 50 decimal digits long. It also contained a "mill" with a control unit that allowed processing instructions in any sequence, and output devices to produce printed results.

Use

It could store 1000 numbers of up to 50 decimal digits long. It was programmable

Hollerith Census Machine

In 1880, a census Statistician Herman Hollerith, devised a card machine called "Tabulator. He set up a company called "The Computing Tabulating Machine Recording Company" and later became International Business Machine (I.B.M)

which today is one of the largest computer manufacturing companies in the world.

Features: He proposed to store information in the form of holes punched through a strip of paper.

Uses: It was used to process information obtained in the census of the population carried out in the United State in 1890. With this machine, he was able to achieve in three years what will take seven years to do manually.

Burroughs Machine

Williams Burroughs (1857 – 1898) built his first experimental model of an adding machine with printed output in 1884.

Features: The distinguishing features are the; the high sloping keyboard, beveled glass front, and the printing mechanism out-of-sight at the rear of the machine.

Uses: The machine performed addition only.

Computing Devices II (20th to Date)

ENAIC

ENIAC (**Electronic Numerical Integrator and Computer**) was the first electronic general-purpose computer. ENIAC used a word of 10 decimal digits instead of binary digits. It was designed by John Mauchly and J. Presper Eckert of the University of Pennsylvania, U.S. ENIAC was formally dedicated at the University of Pennsylvania on February 15, 1946 and was heralded as a "Giant Brain" by the press. It had a speed on the order of one thousand (10^3) times faster than that of electro-mechanical machines

Components: By the end of its operation in 1955, ENIAC contained 17,468 vacuum tubes, 7200 crystal diodes, 1500 relays, 70,000 resistors, 10,000 capacitors and approximately 5,000,000 hand-soldered joints. It weighed more than 30 short tons was roughly 2.4m × 0.9m × 30m (8 × 3 × 100 feet) in size, occupied 167m^2 (1800 ft^2) and consumed 150 kW of electricity. This power requirement led to the rumor that whenever the computer was switched on, lights in Philadelphia dimmed.

Uses: The addition of two numbers was achieved in 200 microseconds and multiplication in 2,800 microseconds.

EDVAC

EDVAC (***E****lectronic* ***D****iscrete* ***V****ariable* ***A****utomatic* ***C****omputer*) was one of the earliest electronic computers. Unlike its predecessor the ENIAC, it was binary rather than decimal, and was a stored program computer. ENIAC inventors John Mauchly and J. Presper Eckert proposed the EDVAC's construction in August 1944, and design work for the EDVAC commenced before the ENIAC was fully operational.

Components: The computer had almost 6,000 vacuum tubes and 12,000 diodes, and consumed 56 kW of power. It covered 490 ft^2 (45.5 m^2) of floor space and weighed 7,850 kg. The full complement of operating personnel was thirty people per eight-hour shift.

Uses: EDVAC's addition time was 864 microseconds and its multiplication time was 2900 microseconds (2.9 milliseconds).

UNIVAC 1

On June 14, 1951 the US Census Bureau officially put into service what it calls the world's first commercial computer known as UNIVAC 1. UNIVAC stands for Universal Automatic Calculator. It was designed principally by J. Presper Eckert and John Mauchly, the inventors of the ENIAC. Design work was started by their company, Eckert–Mauchly Computer Corporation, and was completed after the company had been acquired by Remington Rand

Components: the machine was 25 feet by 50 feet in length, contained 5,600 tubes, 18,000 crystal diodes and 300 relays. Power consumption was about 120 kva. It's reported processing speed was 0.525 milliseconds for arithmetic function, 2.15 milliseconds for multiplication and 3.9 Milliseconds for division.

Uses: UNIVAC 1 was used for general purpose processing with large amounts of input and output.

DESKTOP PERSONAL COMPUTER

Desktop personal computers (PCs) are small, relatively inexpensive computer that are designed for individual users. Typically, these devices include a monitor, keyboard, mouse, and other peripherals. Desktop personal computer uses a microprocessor technology that enables manufacturers to place an entire central processing unit (CPU) on a single chip.

LAPTOP AND NOTEBOOK COMPUTER

Notebook and laptop computers are portable computers that usually feature integral keyboards and monitors.

Input Devices

Definition of Input device

Input device is any hardware component that allows a user to enter data and instructions into a computer.

Any peripheral used to provide data and control signals to a computer. Without any input devices, a computer would only be a display device and not allow users to interact with it. Before computer processing, data must be entered into the computer by an input device so that they can be translated into machine readable form.

Some input devices include the following: Keyboard, Mouse, Joy Stick, Light pen, Track Ball, Scanner, Graphic Tablet, Microphone, Magnetic Ink Card Reader (MICR), Optical Character Reader (OCR), Bar Code Reader Optical Mark Reader (OMR), etc.

Keyboard

Keyboard is the most common and very popular input device which helps in inputting data to the computer. The keyboard looks very similar to the keyboards of electric typewriters, with some additional keys. Keyboards allow a computer user to input letters, numbers, and other symbols into a computer.

Mouse

The mouse is a device that controls the movement of the cursor or pointer on a display screen. The mouse is important for graphical user interfaces because user can simply point to options and objects and click a mouse button.

Touchpad

A touchpad is a small, touch-sensitive pad used as a pointing device on some portable computers. By moving a finger or other object along the pad, you can move the pointer on the display screen.

Touch screen

A touch screen is an electronic visual display that can detect the presence and location of a touch within the display area.

Trackball

A trackball is a mouse lying on its back. To move the pointer, you rotate the ball with your thumb, your fingers, or the palm of your hand. It does not require much space to use it.

Light Pen

A light pen is a computer input device in the form of a light sensitive pen used in conjunction with a computer's CRT display. It allows the user to point to displayed objects or draw on the screen in a similar way to a touch screen but with greater positional accuracy.

Stylus

A stylus is a small pen-shaped instrument that is used to input commands to a computer screen, mobile device or graphics tablet.

Joystick

A joystick allows an individual to move an object in a game such as navigating a plane in a flight simulator.

A gamepad, game controller, joypad, or video game controller is a peripheral device designed to be connected to a computer or console gaming system. It has multiple buttons and may have one or two mini joysticks.

Digital Camera

A camera that stores the pictures or video it takes in electronic format instead of to film.

Webcam

A webcam is a camera connected to a computer that allows anyone connected to the Internet to view either still pictures or motion video of a user or other object.

Optical Scanner

An optical scanner is a hardware input device that allows a user to take an image or text and convert it into a digital file, allowing the computer to read or display the scanned object.

Barcode Reader

A barcode reader or scanner is a hardware device capable of reading a barcode and printing out the details of the product or logging that product into a database.

Microphone

A microphone is a hardware peripheral that allows computer users to input audio into their computers.

Structure of the Keyboard

Keyboards are of two sizes 84 keys or 101/102 keys, but now keyboards with 104 keys or 108 keys are also available for Windows. A standard computer keyboard is called a QWERTY keyboard because of the layout of its typing area which is similar to that of a typewriter.

Keyboards will vary from manufacturer to manufacturer but generally have the following areas:

Function Keys: These keys are assigned a special task or function. Here is a sample of common function keys and associated tasks.

F1 Get Help or visit Microsoft Office Online

F5 Find and replace

F7 Choose the Spelling command (Review tab)

F8 Usually used with LCD projector/dual monitor device.

F10 Show Key Tips

F12 Choose the Save As command (Microsoft Office Button)

Function keys are also used in combination with the Shift, Alt, and Ctrl keys. (For a list of Function keys and combination commands, click Help feature of your program. Enter shortcut keys. Click Keyboard shortcuts for Microsoft Office.)

Typewriter Keys: letters, numbers, and punctuation keys. Additional keys include the space bar, shift key (for capital letters and top symbol on keys), and Caps Lock key for a series of capital letters. Press the Enter key to begin a new paragraph in a word processor program (also the same as clicking the OK button in a dialog box) The Spacebar separates a series of letters and/or numbers into Standard English text.

Cursor Control Keys: also called arrow keys, which move your text cursor in the direction of the arrow.

Numeric Keypad: similar to a calculator for entering numbers and doing mathematical operations quickly and easily. (You may also have a calculator shortcut key on your keyboard.)

Combination Keys:

1. **Shift Key:** The Shift key is used to make capital letters or to access the punctuation and other symbols on the number keys and other keys. (Also used in combination with function and/or ctrl keys.)
2. **The Alt key**: It is used in combination with the command keys for special functions such as Ctrl+Alt+Dlt for task manager or ALT+F4 Exit Office Word 2007
3. **Control key:** It used in combination with other command keys. CTRL+F10 will maximize the document window. .

4. **Caps Lock**: The Shift key is used for a single capital letter and the Caps Lock could be used for emphasis or to create a title. (If you press the Shift key while the Caps Lock is on, the letters will return to normal.)

Helpful Keys

1. **Windows key**: Shortcut for the start menu.
2. **PrtScn/SysRq Print Screen**: pressing print screen will capture the entire screen, while pressing the alt key in combination with print screen will capture the currently selected window.
3. **Esc Escape:** shortcut in dialog boxes for No, Quit, Exit, Cancel, or Abort, as well as a common shortcut key for the Stop button in many web browsers.

Others are:

i. Navigation keys: Arrow keys, Page Up/Page Down, Home, and End are convenient to move your cursor to the desired location.

ii. Backspace: Erases text to the left of the cursor for each time you click on the key.

iii. Delete: Erases text to the right of the cursor for each time you click on the key. Or click and drag your cursor over a line(s) of text to select the text and click Delete. All the selected text will be deleted.

Types of Mouse

a) **Mechanical Mouse:** Mechanical mouse contains a rubber or metal ball inside it. The movement of the cursor depends on the movement of the ball. This mouse is normally used on mouse pad. Mouse pad is a- small flat pad made of rubber or foam to provide easy movement for the mouse. It protects the mouse from dust and dirt.

b) **Optical Mouse**

Optical mouse contains no ball inside it. It uses a device that emits light to detect the mouse movement. Optical sensor or laser is used in these types of mouse. It is more expensive than mechanical mouse.

c) **Wireless Mouse**

Wireless or cordless mouse is a type of mouse that does not require a wire to

work. It transmits data using wireless technology like radio waves or infrared light waves. The receiver is connected to the computer through a serial or USB port.

Parts of a Computer Mouse

The parts of a computer mouse can vary by the type of computer mouse. Below is a general overview of the parts found on most computer mice.

1. Buttons
2. Ball, Laser, or LED
3. Mouse wheel
4. Circuit board
5. Cable or wireless receiver

Functions of the mouse

The primary function of the mouse is to move the mouse cursor on the screen. Others include;

1. **To open or execute program** - Once you've moved the cursor to an icon, folder, or other object clicking or double clicking that object opens the document or executes the program.
2. **To select** - A mouse also allows you to select text or a file or highlight and select multiple files at once.
3. **To drag-and-drop** - Once something is selected it can also be moved using the drag-and-drop method.
4. **To hover** - Moving the mouse cursor over objects with additional hover information can help discover the function of each object on the screen. For example, hover the mouse over the hover link to see an example.
5. **To scroll** - When working with a long document or viewing a long web page you may need to scroll up or down which can be done using the mouse wheel or clicking and dragging the scroll bar.

Differences between Mouse and Keyboard

Keyboard	**Mouse**

Used to enter instructions	Used to point and select
Keys are pressed	Buttons are clicked
Combination of keys can be pressed	Left or right button is clicked
Cannot drag and drop text	Drags and drops text
It has keys	It has buttons
Requires no mouse pad	Requires a mouse pad

Output Devices

Definition of Output devices

Output devices are devices that enable the computer to communicate the results of data processing carried out by it to the user. These devices enable the computer to display text, graphics (pictures and images) and produce sound. Examples of computer output devices include monitor, printer, speaker, plotter, braille embosser etc.

Features and uses of output devices

1. Monitor: The monitor, also called Visual Display Unit (VDU) is a TV-like structure attached to the System Unit through the VGA cable. It displays text and graphics (pictures and images). The content showing on the monitor is called a soft copy.

2. Printer: A printer is a device attached to the System Unit through the USB cable or other types of cable. It is used to produce the information (text, graphics, images, illustrations) showing on the monitor on paper, transparencies, and plastic. Such a printout is called a hardcopy.

3. Speaker: A speaker is a device used for producing sound captured by the microphone or music in mp3, wav, etc. formats. Speakers come in different forms such as headphones, earphone, canalphones, headset etc. and can also be used with portable devices such as mp3 player, mobile phones etc.

4. Plotter: A special type of printer used for printing drawings, charts, maps etc. using multi-coloured automated pens. It is usually used by architects, engineers and surveyors. They are rarely used now and are being replaced by wide-format conventional printers, which can produce high-quality graphics.

5. Projector: A device that helps direct the content on a display screen (monitor) onto a particular flat surface.

Structure and type of CRT monitor

The Cathode Ray Tube (CRT) used as a computer monitor was invented by Karl Ferdinand Braun. This monitor employs the CRT technology used most commonly in the manufacturing of television screens. In this, a stream of intense high energy electron is used to form images on a fluorescent screen. A cathode ray tube is basically a vacuum tube containing an electron gun at one end and a fluorescent screen at another end. From this electron gun, a process called thermionic emission generates a strong beam of electrons. These electrons travel through a narrow path within the tube with high speed using various electro-magnetic devices and finally strike the phosphor points present on the fluorescent screen, thus creating an image.

Today, CRT monitor are being replaced with flat Plasma screen, Liquid Crystal Display (LCD), etc.

Types of monitor

There are two types of monitor, namely:

1. Monochrome monitor: This monitor displays its characters in only one colour. The colour could be white, green or amber. Looking at the monochrome monitor, one can see two colours; one colour for the background and one for the foreground. The two colour combinations can therefore be black and white, green and black or amber and black.

2. Colour monitor: This monitor displays information in colours. It is similar to a colour television but it handles data more quickly and has a sharper output.

Types of printer

There are two types of printer, namely impact and non-impact printers.

I. Impact Printers: This type of printer behaves like a typewriter whereby a character is printed when a metal slug strikes on a carbon ribbon. Impact printers have contact with the surface of the paper. Examples of impact printer include the following:

A. DOT MATRIX printer: This prints characters and graphic images by impacting a ribbon and transferring dots of ink onto the paper. It prints dot matrix characters by pressing the end of selected wires against ribbon and paper. The dots are used to form the characters and images on the paper.

B. LINE printer: This prints a line of characters at a time. The output speed is between 200 to 3000 lines per minute (LPM)

C. CHARACTER printer: This prints one character at a time moving across the paper. The output speed range from 200 to 400 characters per second (cps)

II. NON-IMPACT PRINTER

Non-impact printer creates images on paper in a manner similar to that of a photocopying machine. They do not have contact with the surface of the paper. Examples include:

A. INK JET printer: This prints by spraying small streams of quick-drying ink onto the paper and using it to form characters, shapes and images. The ink is stored in disposable ink cartridges, which can be black or coloured. They are found in homes and offices.

B. LASER printer: This uses an electrically charged drum to transfer toner or dry ink onto paper like the photocopier does. It traces an image by using a computer-controlled laser beam.

C. THERMAL printer: This prints by transferring dots of ink or dye from a ribbon onto paper and passing the ribbon and the paper across a line of heating elements. The characters are produced with a print head containing a matrix of small heating elements. This printer is very quiet in operation because the printer head does not strike the paper.

DIFFERENCES BETWEEN IMPACT AND NON-IMPACT PRINTER

S/N	IMPACT PRINTER	NON-IMPACT PRINTER
1	Makes noise while printing	Does not make noise while printing
2	Produces low quality images	Produces high quality images
3	Uses ribbon to print	Uses ink (dry and wet) to print
4	Does not have heating element	Has heating element that dries the ink on paper
5	Prints only one colour at a time	Can print more than one colour at a time
6	Has striking pins/heads that strike the characters or dots on paper	Does not have striking pin heads to strike characters on paper

DIFFERENCES BETWEEN THE MONITOR AND THE PRINTER

S/N	MONITOR	PRINTER
1	Has screen	Has no screen
2	Uses no ribbon, ink, cartridge or toner	Uses ribbon, cartridge, ink or toner
3	Uses no paper	Uses paper and printable medium
4	Display texts, images and pictures	Prints text, images and pictures on paper
5	Some have vacuum tubes or a liquid crystal	Has no vacuum tube or a liquid crystal
6	Has no paper tray	Some have paper tray

Application Software

Definition of Application Software

1. Application software is a program or group of programs designed for end users.

2. A program is called an application program if it performs some human-oriented task.

Types of Application Software

It is divided into two which are

(i) User application software: These are user-written software tailored to meet the user's specific needs. This includes spread sheet templates, word processor macros, scientific simulations, graphics, and animation scripts. Users create this software themselves and often overlook how important it is.

(ii) Application packages: This consists of multiple programs bundled together to address a specific need. It is also known as application suite or integrated package. Examples are Microsoft office, Open office.org, and iwork which bundle together a word processor, a spread sheet, and several other discrete applications. The separate applications in a suite usually have some capability to interact with each other in ways beneficial to the user.

Application Package Categories

1. **General purpose application software packages**: General-purpose application software is software used to perform a broad variety of tasks and is useful to nearly all computer users**.** It is not limited to one particular function. Examples are

(i) Word Processing: This is the process of using a computer to create, edit and print text – based documents. Examples are Ms – word, Word star, Word perfect, Window Word pad etc.

(ii) Spreadsheet: Spreadsheet applications are computer program that let you perform mathematical, statistical and accounting calculations electronically. Google Sheets - (Online and free) iWork Numbers, Lotus 1-2-3, Microsoft Excel, VisiCalc, WPS spreadsheet, etc.

(iii) Presentation**:** A presentation program is a computer software package used to display information, normally in the form of a slide show. Examples are MS power point Corel Presentations, OpenOffice.org Impress, SlideSlider, SlideRocket SlideWiki, Audience (software), Ease, Emaze, WPS presentation, etc.

(iv) Database management**:** This is a program lets one or more computer users create and access data in a database. Examples of DBMS are MS Access, Oracle, Paradox, SQL Server, SyBase, FOXPRO, Dbase, etc.

(v) Graphics package**:** A graphics package is an application that can be used to create and manipulate images on a computer. Examples are Corel draw, Microsoft paint, Photoshop etc.

(vi) Games: This is an electronic game that involves interaction with users interface to generate visual feedback on a video device

2. **Special (specific) purpose application software packages:** These are software that is limited in what they can do, but usually does that one thing much better than general purpose program. They include:

(i) Accounting Management: This is the practical application of management techniques to control report on the financial health of an organisation.

(ii) Payroll System: This is a program designed for calculating the regular salary, wages or other compensation paid to every employee in a company.

(iii) Banking software: It enables the management, monitoring and control of transactions for financial institutions and banks.

(iv) Hospital Management Software: It is also known as Hospital information System. It is a comprehensive, integrated information system designed to manage the administrative, financial and clinical aspect of a hospital. It benefits are easy access to patient data, helps in decision support system for health care polities, efficient and accurate administration of finance, improved monitoring of drug usage, etc.

(v) Reservation System: A computer reservations system is a computerized system used to store, retrieve information and conduct transactions related to air travel. It is designed and operated by airlines.

(vi) Human Resources (HR) Management: It functions includes a variety of activities, and key among them is deciding what staffing needs you have and whether to use independent contractors or hire employees to fill these needs, recruiting and training the best employees, dealing with performance issues, etc.

(vii) Attendance System: There are three components that make up a Time and Attendance system. First, Barcode readers are used to allow employee to make quick and adequate time transaction. Second, data taken from devices needs to be managed and stored by PC's. Third, management of

the time transactions, payroll generation and detailed reports is done by the Time and Attendance software.

(viii) Billing system: This is a system that tracks customer usage of services, and calculates the impact on a customer's account, based on the price of the service. Billing systems have come to include noncore functionality such as customer management, integration with payment gateways, and statistical analysis.

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Programming Language

Definition of Terms

Program: A computer program is a sequence of related instruction (command) that tell the computer how to accomplish a specific task. A program can also be defined as a set of instruction that is executed by the CPU.

Programming: Programming is the act of writing computer program. A computer program are written by trained and qualify people called programmer.

Computer language: Computer language is a language used by, or associated with the computer.

Programming Language: A computer programming language is an artificial language that can be used to control the behavior of a machine particularly a computer. Programming language is a means through which programmer communicate with the computer in solving different categories of problems. A set of rules governing how the words in the language are written is called syntax and the meaning associated with each word is called semantic. Markup languages like HTML are generally not regarded as programming languages, but they are computer language. Programming language foster the communication of programs among programmers and computer; markup language communicate the formatting or structure of document among human and computer.

Levels of Programming Language

There are three levels of programming language

1. Machine Language
2. Low Level Language (Assembly Language)
3. High Level Language

Machine Language

This was the first generation programming language. A computer will only understand one language, which is the machine language. There are two symbols in machine language; these are 1 and 0 generally called binary digits or bits.

Advantages

1. Machine language makes fast and efficient use of the computer.
2. It requires no translator to translate the code. It is directly understood by the computer.

Disadvantages

1. All operation codes have to be remembered
2. It is machine dependent

Advantages

3. It is hard to amend or find errors in a program written in the machine language.

Low Level Language

A low Level programming Language is a programming that provides little or no abstraction from a computer's microprocessor. The word low does not imply that the language is inferior to high level programming languages but rather refers to the small or nonexistent amount of abstraction between the language and machine: because of this, low level languages are sometimes described as being "close to the hardware. The example of low-level language is the assembly language, and it was the second generation programming language, or 2GL. It was developed to overcome some of the many inconveniences of machine language. Assembly language is a mnemonic representation of machine language. It is one level above machine language. A program for translating low assembly language is called assembler.

Advantages of Assembly Language

1. It is easier to understand and use as compared to machine language.
2. It is easy to locate and correct error as compared to machine language
3. Program written in assembly language executes faster than that of high level language.

Disadvantages of Assembly Language

1. Assembly language, like machine code is also machine dependent
2. Difficult to remember the syntax.

High Level Programming Language

These are programming languages that allow for programs to be written in forms that are readable to human beings. A high level language is a programming language that, in comparison to low level programming languages, may be more abstract, easier to use, or more portable across platforms.

Examples of High Level Language include

a. PASCAL

b. BASIC (Beginners All-purpose Symbolic Instruction Code)

c. C ++

d. Java

e. FORTRAN (Formula Translation)

f. COBOL (Common Business Oriented Language)

g. PROLOG

h. ALGOL (Algorithmic language)

i. APL (A Programming Language)

j. RPG (Report Program Generator)

k. Python

Advantages of High Level Language

1. It is easier to learn and use

2. It user friendly

3. Programs in high level language requires less time to write

4. It is easier to maintain

5. It is machine independent

6. It does not require programmer to have knowledge of the computer hardware architecture

Disadvantages of High Level Languages

1. It takes time to execute or run because it must first be translated into machine code by a translator before it can be executed.

2. Programmers need to remember a large set of syntax and semantics

Comparison of Machine Language, Low Level Language (assembly language) and High Level language

Language	**Characteristics**
1. Machine Language	1. Machine dependent 2. Uses special code and the assignment of storage locati
2. Low Level Language (Assembly language)	1. Machine dependent 2. Uses mnemonics(symbolic operation code) and (symbolic storage address)

	3. 1 to 1 language
3. High Level Language	1. Machine independent 2. Uses instructions that seem English like 3. 1 to many language, i.e. for one high level instructio machine level statement may be generated.

BASIC Programming Language

BASIC stands for Beginners All-purposed Symbolic Instruction Code. It was developed in 1964 by Professor John Kemeny and Thomas Kurtz to teach students at Dartmouth College. It has undergone series of historical development, which has resulted in several forms of the language.

Versions of BASIC

1. **BASICA**
2. **GWBASIC**
3. **Torbo BASIC**
4. **Quick BASIC**
5. **VB.NET**

BASIC CHARACTER SET

1. Alphabetic Characters – A to Z
2. Numeric Character – 0 to 9
3. Special Characters – 0 + % ^ # = ( ) etc

BASIC VARIABLES

A variable is a quantity that changes during the execution of a program. It can also be defined as a name that is used to represent some storage location.

Types of Variable

1. **Numeric Variables**: These are used to store numeric values such as 23, 98, etc. There are two major types of numeric variables, which are; **Integer variable and real variable**

a. Integers are whole numbers without decimal places.

b. Real numbers are numbers with decimal places

Hence Integer variable are names which the computer can assign integer values or constants to and real variable are name which the computer can assign real numbers or constant to. Integer variable name are written with a "%" sign as the last character. E.g. . When a numeric variable name is written without the % sign, it can take both integer and real numbers.

2. **String Variables**: These are used to store alphabetic and alpha-numeric values. A string variable name is always written with a dollar sign ($) as the last character. E.g. Name$="John"

Rules for coding variable

1. In BASIC combining alphabets, numbers and decimal point (a maximum length of 40 characters) may for variable.
2. No reserve word can be used as a variable name.
3. Special characters cannot be used for naming variable.
4. A string variable corresponds to string data whereas a numeric variable corresponds to numeric data,
5. In a program, each variable is referred throughout the program by its name.

CONSTANTS

A **constant** is data that remains the same as the program runs (executes).

BASIC allows two types of constants:

1. Numeric constant: Numeric constant in BASIC is any signed or unsigned number.
2. Alpha-Numeric or string constant: It consists of the combination of letters, digits, and other symbols that is treated in a manner completely analogous to numeric constant. They are enclosed within inverted comma

Rules for numeric constants

1. A number can have maximum of 8 digits
2. No comma is allowed
3. A decimal point can appear anywhere
4. If the value is quite larger it is expressed in exponent form
5. No blank space, special characters or any other letter is allowed in the number.

Expressions and Operators

In programming, an expression can be defined as the combination of operand and operator which is to be evaluated to produce answer. Operands are the data items involved in an expression. Operators determine the action to be carried out on the operand in the expression. For instance in the statement: LET C = A + B, A and B are the operands while "+" is the operator.

There are three major types of expression in BASIC. They are:

i. Arithmetic expression

ii. Relational Expression

iii. Logical expression

Arithmetic Expression and Arithmetical Operator

BASIC arithmetic expression is used to represent mathematical formulae in BASIC programming. Below is a list of BASIC arithmetic operators:

Arithmetic Operator

SYMBOL	NAME	FUNCTION
^	Upper caret	Exponential
/	Slash	Division
*	Asterisk	Multiplication
+	Plus	Addition
-	Minus	Subtraction

Arithmetic Expression

Mathematical formulae	**BASIC Expression**
lbc	L*B*C
ut+1/2at^2	U*T+1/2*A*T^2
2(lb + bh + lh)	2*(L*b+B*H+L*H)
PTR/100	P*T*R/100

Relational Expression

Relational Expression is used for comparison of two or more data items. BASIC relational operators are listed below:

SYMBOL	NAME
<	Less than
>	Greater than
=	Equal to
<>	Not equal to
<=	Less than or equal to
>=	Greater than or equal to

Logical Expression

Logical expression involve is an expression involving two or more relational repression joined by logical expression. BASIC logical operators are:

i. AND

ii. NOT

iii. OR

EVALUATION OF ARITHMETIC EXPRESSION

To evaluate arithmetic expression, the following order is followed:

PRIORITY	OPERATOR
1ST	Parenthesis I.e. (and)
2nd	Exponentiation
3rd	Multiplication and Division
4th	Mod and Inter Division
5th	Addition and Subtraction

Example: evaluate 4*A*B^2+ (A^2*B+C)/(A+B) if A=2; B=4 and c=2

Solution

Step 1 Substituting we have 4*2*4^2+ (2^2*4+2)/ (2+4)

Step 2 evaluate terms in the parenthesis 4*2*4^2+18/6

Step 3 evaluate 4^2 4*2*16+18/6

Step 4 evaluate 4*2*18 128+18/6

Step 5	evaluate 18/6	128 + 3
Step 6	evaluate	131

BASIC STATEMENT

1. **LET Statement**

   The let statement is used to assign a numeric or string value to a variable.

   Syntax

   LET [variable] = [constant] for numeric value

   LET [variable]$ = [“value”] for string value

   Example

   LET X = 12

   LET B$ = “Clementina”

   LET AREA = L*B

2. **INPUT Statement**

   The INPUT statement is uses to enter data into the computer with a user prompt or a group of variable during program execution.

   Syntax for numeric value

   INPUT “[prompt]”; [variable]

Syntax for string value

INPUT "[prompt]"; [variable$]

Example

INPUT "type in the number"; A

INPUT "Type in your name"; N$

3. **READ-DATA statement**

READ and Data are two statement concerned with each other which are used to put data in a line of the program and to read the data when it is needed.

Example

READ A, B, C

DATA 5, 6, 7

LET SUM = A+B+C

PRINT SUM

END

4. **REM (Remark) Statement**

The REM statement is used to insert comments or remarks into a BASIC program. The use of remark statements improves the readability of the program. REM is a non-executable statement.

Syntax

REM [remark]

Example

REM program to add six numbers

5. **PRINT statement**

This statement is used to transmit data from the computer memory to the output device.

Examples

PRINT A

PRINT “I Like Writing Program”

Program Terminators (END and STOP)

6. **STOP and END statement**

The STOP statement is used to terminate the execution of a program at any point in the program. The END statement indicates the actual end of a program. The STOP statement may appear many times and anywhere, whereas an END statement can only appear at the end of a program and only once.

Example

REM END statement

PRINT “Good morning”

END

7. **FOR – NEXT**

Looping is used to have the computer do repetitive tasks in a fraction of the time that would be otherwise be required. The most common type of loop used in QBASIC programming is the FOR…NEXT and WHILE WEND loop that repeats a series of instructions a specified number of times.

Syntax

FOR variable=x TO y [STEP z]

.

.

.

NEXT [variable][,variable…]

x,y, and z are numeric expressions.

STEP z specifies the counter increment for each loop.

Example 1

```
FOR I = 1 TO 5
PRINT “the dullest pencil is better than the sharpest memory”
NEXT I
END
```

EXAMPLE 2

```
REM program to print odd numbers from 1 to 20
PRINT “odd numbers from 1 to 20 are”
FOR ODD =1 TO 20 STEP 2
PRINT ODD
NEXT ODD
END
```

SIMPLE BASIC PROGRAMS

Example 1: Program to find the sum and difference two number

```
10 REM this program accepts two numbers and finds their sum and difference
```

```
20 INPUT “Type the first number and press ENTER”; NUM1

30 INPUT “Type the second number and press ENTER”; NUM2

40 LET SUM = NUM1 + NUM2

50 LET DIFF = NUM1 – NUM2

60 PRINT “first number is  “; NUM1

70 PRINT “second number is   “; NUM2

80 PRINT “================”

90 PRINT NUM1; “+”; NUM1 “=” ; SUM

100 PRINT NUM1; “-“ ; NUM2 “=” DIFF

110 END
```

Example 2: program to calculate the area and perimeter of a rectangle

```
10 REM program to find the area and perimeter of a rectangle
```

```
20 INPUT “Type the length of the rectangle”; L

30 INPUT “Type the in the breadth of the rectangle”; B

40 LET AREA = L*B

50 LET PERI = 2 * (L + B)

60 PRINT “The area of the rectangle is “ ; AREA

70 PRINT “The perimeter of the rectangle is” ; PERI

80 END
```

Communication System

ICT is an acronym that stands for Information and Communication Technology.
Information is refers to knowledge obtained from reading, investigating, study and research.
Communication is an act of transmitting message.
Technology is the application of scientific knowledge for practical purpose especially in industry.

ICT can therefore be defined as the use of diverse set of technological tools and resources to communicate, create, disseminate, store and manage information. **ICT** also refers to technologies that provide access to information through telecommunications.

Communication strategies in ICT
There are two types of communication strategies in ICT:

1. Synchronous communication
This is a communication strategy where all parties involved in the communication involved are present and available at the same time. E.g. online chat, video conferencing, etc.
2. Asynchronous communication
Asynchronous communication does not require that all parties involved need to be present and available at the same time. E.g. Discussion forum, Blogs e-group, etc.

Types of ICT
The following are types of ICT:

1. Broadcasting
2. Telecommunication
3. Data network
4. Information system
5. Satellite communication

Broadcasting
Broadcasting is the distribution of audio and video content to a dispersed audience via any electronic mass communication medium. Types of broadcasting include Radio broadcasting, Television broadcasting, Satellite TV system broadcasting and Webcasting.

Telecommunication
Telecommunication is the transmission of information over significant distance, for the purpose of communication. A basic telecommunication system consist of three primary units; a transmitter, transmitting medium and the receiver. Types of telecommunication system include:

- Public Switched Telephone Network (PSTN) – land line.

- Mobile phone (GSM)
- Circuit Switched Packet Telephone (CSPT)
- Satellite Telephone
- Fixed wireless Telephone

Data Network

Data network is an electronic communication process that allows for orderly transmission and receptive of data only.

Types of data networks network include:

- Personal Area Network (PAN). It refers to interconnection of information technology devices or gadgets within the environment of an individual user (typically within 10 meters). PAN may be wired with computer such as USB and Fire wire. A wireless Personal Area Network (WPAN) can be made possible with network technology such as infrared Data Association (irDA) and Bluetooth.
- Local Area Network (LAN). A local area network is a computer network covering a small local area, like a home, office, or school.
- Metropolitan Area Network (MAN). MANs are large computer network usually spanning a large campus.
- Wide Area Network (WAN). WAN is a computer network covering a broad geographical area.
- Internet. The internet is a worldwide network of computers that share information

Information Systems

Information system is an integrated set of components for collecting, storing, processing and communicating information. Types of informative system include Data processing system and Global positioning system (GPS) a satellite based navigating system.

Satellite communication

A satellite is an object that moves around a larger object. Satellite communication, in telecommunication is the use of artificial satellites to provide communication links between various points on Earth. Approximately 2,000 artificial satellites orbiting Earth relay analogue and digital signals carrying voice, video and data from one or many location worldwide.

Application Areas of ICT

ICT has different types of applications for different fields. These fields are explained below:

Teleconferencing

The word tele means distance. The word conference means discussion, consultation. It be simply defined as the process of holding conference via telephone or network connection. Teleconferencing is the live exchange and mass circulation of information among several person and machine remote from one another but linked by telecommunication system

Video conferencing

With videoconferencing people can interact as if they were talking face to face with both images and sound relay in real time. Thus far video conferencing has been used in the following fields; Business, Distance learning, Home offices, Legal environment and Telemedicine.

Telepresence

Telepresence is also called virtual presence, is a technique to create a sense of physical presence at a remote location using multimedia such as sound, vision and touch.

Telecommunication and Networking

Telecommunication is the process of sending and receiving electrical signal over a large distance by electronic means. A single telecommunications circuit consist of two stations, each equipped with a transmitter and a receiver. There are certain mediums of telecommunication systems such as coaxial cables, fiber optics, radio frequency and air etc. a telecommunication network is a network of nodes and links and the communication signal passes through one link to another.

Telecomputing

It is a generic (common) term referring to the use of computers for communication. The term includes communication using computers linked either one-to-one or in networks of interlinked computers. The most common use of interlinked computers now is by the way of the internet and Intranet. Intranet is a private network which serves a single organization, such as a corporation.

Messaging

The most common forms of messaging are emails, paging, Short Message Service (SMS), Enhanced Message Service (EMS), Multimedia Message (MMS) and instant Messaging.

Information Search, Retrieval and archival

Information Retrieval is the science of searching for documents, information within documents, and metadata about document, as well as that of searching relational databases and the World Wide Web. **An Archival Information System** consists of an organization of people and systems that has accepted the responsibility to preserve information and make it available for a designated community

ICT-BASED GADGETS

A gadget is a small technological device or an appliance that has a particular function. Examples of ICT gadgets include Computer, Automated teller machine (ATM), Dispensing machine, Radio sets, Television set, Fax machine, Telephone, GSM, etc.

Mobile Phone

Cell phones, also known as mobile phones or wireless phones, are hand-held phones with built-in antennas. Unlike home phones, cell phones can be carried from place to place with minimum fuss.

Computer

A computer is a programmable machine that inputs, processes and outputs data. A computer system refers to the computer and all its equipment.

Fax Machine

Fax machine is a short form for facsimile machine. It is a device that can send or receives text and pictures (graphics) over a radio broadcast or a telephone line.

Automated Teller Machine (ATM).

Automated Teller Machine is also known as automated banking machine (ABM) or cash machine is a computerized telecommunication device that provides the client of financial institution with access to financial transactions in public space without the need for a cashier, human clerk or a bank teller.

Dispensing machine

A dispensing machine is a machine that gives items to customers automatically, after the customer inserts currency or credit into the machine.

Point of sale machine

Electronic retail payment device which reads a customer's bank's name and account number when a bank card or credit card is swiped through a magnetic stripe reader, contacts the bank and if funds are available transfers the customer approved amount to the seller's account, and prints a receipt.

Radio Set

A radio receiver (commonly also called a radio) is an electronic device that receives radio wave and converts the information carried by them to a useable

form. It is used with an antenna. The antenna intercepts radio waves (electro-magnetic) and converts them to tiny alternating current which are applied to the receiver, and the receiver extracts the desired information

Television

Television or **TV** is a telecommunication medium used for transmitting sound with moving images in monochrome (black and white), or in color, and in two or three dimensions

Basic Computer Operations

Definition of Booting

In computing, booting (also known as "booting up") is a bootstrapping (self-starting) process that starts the operating system when the user turns on a computer system. Booting can also be defined as the initial set of operations that the computer performs when power is switched on.

Description of the Booting process

When the computer's power is first turned on, the CPU (Central Processing Unit) initializes itself to look for the system's ROM BIOS (Read Only Memory Basic Input Output System) which is the first program that runs every time the computer is turned on. The BIOS performs the Power-On Self-Test (POST), which begins by checking the BIOS chip and then test CMOS (Complementary Metal Oxide Semiconductor) RAM. If the POST does not detect a battery failure, it then continues to initialize the CPU (Central Processing Unit), checking the hardware devices to ensure they are functioning properly. Once the POST has determined that all components are functioning properly and the CPU has successfully initialized the BIOS looks to the CMOS chip to tell it where to find the Operating System (OS), which on most personal computers (PCs), the OS loads from the C: drive.

Therefore, for a computer to successfully boot, its **BIOS**, **Operating System** and **Hardware components** must all be working properly; failure of any one of these three elements will likely result in a failed boot sequence.

Types of booting

1. **Cold booting (Hard booting)**: This is the process of turning the computer system **ON** by pressing the power of the system unit and the monitor.
2. **Warm booting (Soft booting)**: This is the process when the operating system alone is restarted (without being switched off) after a system crash or freeze. On PCs, warm booting is done by pressing the Control, Alt, and Delete keys simultaneously.

   Both types of booting clear out (for the time being) the bugs, bombs, memory conflicts, and other idiosyncrasies (peculiarities) of the operating system.

Difference between Cold Booting and Warm Booting

Cold	**Warm**
Use of power-switch is involved	It involved short cut keys e.g. (CTRL+A
It is done when the system is already off	CPU continuous running
CPU stops working	CPU continuous running

Memory and BIOS are reset	Memory and BIOS are not reset
The computer may not necessarily have program error before it is performed	It is necessary when a program encoun it cannot recover

Windows Desktop

Windows desktop is the graphical user interface (GUI) of the Windows Operating System. The desktop is what is displayed when you log in on must operating systems. It provides a platform for the user to interface with or operate the computer by pointing and clicking the mouse button on graphical symbols to send data and instruction to the computer and get out from it.

NOTE: Whenever a program is started in windows it occupies certain space on screen in which it runs. That frame or box is called a window.

Elements of Window Desktop

a. **Mouse pointer**: The mouse pointer indicates the current position of the mouse

b. **Icons**: Icons are shortcut to folders, files programs and other items

c. **Desktop**: The launch pad for application and workspace

d. **Task bar**: A bar that allows quick access to current or favorite applications.

e. **Start menu**: Gives quick access to computer settings and computer programs

f. **Quick launch Toolbar:** The quick launch toolbar is a section of your taskbar near the **Start menu** where you can add shortcuts to programs. The **Quick Launch** toolbar always stays visible, even when you have a window open, for easy access to your shortcuts.

g. **System tray:** The system tray is a notification area on the operating system taskbar.

Running an Application program

To run an application program,

1. Click the start button, the start menu appears.
2. Click on all programs or All apps.
3. Navigate through the various categories or submenus that appear until you fine the program intend to start.
4. Click on the application to start the application

Shutting Down Windows

To shut down Windows and prepare to turn off your machine, do the following

i. Close all your open applications, making sure that any document you're currently working on are saved.

ii. Select Start > Turn Off Computer.

iii. Click on Turn Off.

Word Processing

Definition of Terms

Word Processing: Word processing means using the computer to create, edit, and print document.

Word processor: A *word processor* is an electronic device or computer software application, which performs the task of composition, editing, formatting, and printing of documents.

Text Document: Text document is something written, printed, or online document that presents data in the form of an articles, letter, memorandum, report, etc.

Examples of word processor

There are many word processing software packages available today, such as WordStar, MS-word, Corel WordPerfect, WordPad, Notepad, WPS writer, etc

Application Areas of Word processing Software

i. Offices
ii. Publishing
iii. Journalism
iv. Education
v. Articles

Steps Involved in Loading Microsoft Word

There are two ways of loading Microsoft word:

a. If the icon of the package is on desktop, double click on it for it to open
b. If the icon is not on the desktop, follow the step below:

i. Click the Start Button
ii. Click on all program
iii. Select and click Microsoft office
iv. Select and click Microsoft Word

MS-Word processing environment

The word window is made up of many components that are displayed onscreen at the start of the program such as:

a. **Title bar**: The title bar is the top part of the window displaying MS Word. It displays the name of the active document.

b. **Menu bar**: The menu bar contains commands for word operation. E.g Home, Insert, view, insert, page layout, etc

c. **Status bar**: bottom of the window it displays the status of the document

d. **Toolbar**: Toolbar serves as short cuts for common commands such as save, print, new, open, undo, etc.

e. **Work space**: it is the area where actual word processing is done.

f. **Formatting toolbar:** This toolbar contains shortcut to the commands used for formatting text. You can change your word or line paragraph to bold, italic or underline,

etc

Facilities Available in a Word Processor

a. **Type document**: the Keyboard is used to type a document. You type a document by pressing the relevant keys on the keyboard in order to arrive at the desired word.

b. **Edit document**: This is the ability to change text by adding, deleting and rearranging letters, words, sentences and paragraph.

c. **Store document**: Word processor gives the opportunity of accessing a previously saved file or document either on the computer or on external storage facility.

d. **Move, copy and paste**: A word, line or text, paragraph, page or diagram can be moved from one document to another. It could be also be within a document that for one line to the other. It can also be from one application packages to the other, e.g., from CorelDraw to Microsoft Word.

Word processor varies considerably, but all word processors support the following basic features:

Insert text: Allows you to insert text anywhere in the document

Delete text: Allows you to erase characters, words, lines, or passages.

Cut and paste: Allows you to remove a section of text from one place in a document and insert it somewhere else

Copy: Allows you to duplicate a section of text

Page size and Margins: allows you to define various page size and margins.

Search and replace: Allows you to search for a particular word or phrase and also replace one group of characters with another everywhere that first group appears.

Word wrap: The word processor automatically moves to the next line when you have filled one line with text.

Headers, footers, and page numbering: Allows you to specify customized headers and footers the word process will display at the top and bottom of every page

Font Specification: Allows you to change font attributes within a document.

Spell Checker: A utility that allows you to check the spelling of words. It will highlight any word that it does not recognize

Thesaurus: Allows you to search for synonyms without leaving the word processor

WYSIWYG (what you see is what you get): With WYSIWYG, a document appears the display screen exactly as it will look when printed. **ETC**

Presentation Packages

Definition

A presentation program is a software package used to display information in the form of a slide show. It has three major functions: an editor that allows text to be inserted and formatted, a method for inserting and manipulating graphic images, and a slide-show system to display the content.
Examples oSlideWiki, Audience (software), Ease, Emaze etc.

Features of presentation package

- **Creation of Slides**: A slide is a single screen of a presentation, and every presentation is composed of several slides. Slides contain any mixture of text, images, video, animations, links and sound
- **Animation**: Animation effects allow the various elements on each slide to appear after a certain amount of time or when a presenter presses a button.
- **Transitions**: This is how the presentation software "moves" the display of one slide to another. Transitions usually include dissolving from one slide to the next or the current slide being moved in some way to show the next slide as though it was underneath.
- **Etc**

Steps Involved in activating MS PowerPoint

There are many ways of loading Microsoft word:

a. If the icon of the package is on desktop, double click on it for it to open
b. If the icon is not on the desktop, follow the step below:

i. Click the Start Button
ii. Click on all program
iii. Select and click Microsoft office
iv. Select and click Microsoft PowerPoint

PowerPoint Operations

The following operations can be performed on MS PowerPoint.

i. Create new presentation
ii. insert text, pictures and graphs
iii. Animate contents
iv. Add new slide
v. Save presentation
vi. Run slide show
vii. Print presentation
viii. Close presentation

Guidelines for Creating a Good MS PowerPoint Presentation

a. Font size should be such that the text is readable from the back of the room/by all viewers
b. Message/Points should be brief/concise and precise! straight to the point
c. Maintain consistent use of colour on all Slides
d. Avoid too many texts on a slide, contrast text colour and backgrounds

e. Transitions and animations sound should be used sparingly and consistently to avoid distractions
f. Add images to compliment messages and not to decorate slides
g. Use font size and type consistently on all slides

Benefits of Presentation Package

i. Easy to create colourful and attractive design/presentation
ii. Easy to convey messages to the audience
iii. Easy to present and maintain eye contact with large audience
iv. Enhances the assimilation of information
v. It makes the presentation interesting
vi. It supports multimedia
vii. To add) create slides effects
viii. Useful for developing speaker interaction
ix. It supports Object Linking and Embedding (OLE)
x. It engages multiple learning styles
xi. It improves audience focus
xii. It supports easy way to organize ideas and information
xiii. Presentation in the absence of the speaker.