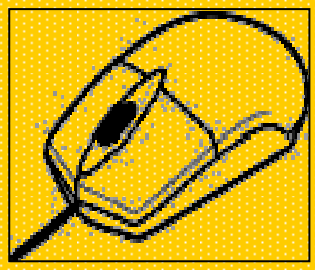
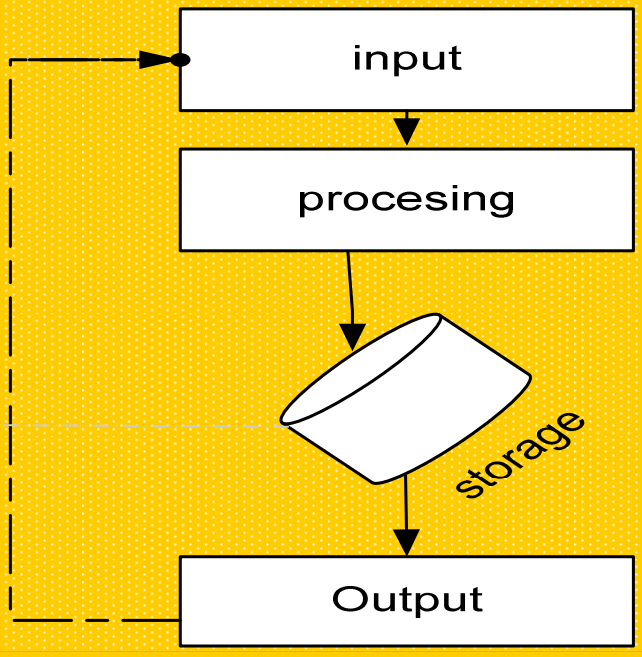
KCSE

Level one

INTRODUCTION TO

COMPUTER - FORM ONE





e-book-edition one

M.A.NYAMOTI

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ABOUT THIS BOOK

KCSE INTRODUCTION TO COMPUTER is a new course book for computer starters and inline with the currents KCSE (KENYA CERTIFICATE OF SECONDARY EDUCATION) syllabus, it covers goals and objectives to certify curriculum demands. It can also be used as a reference book for all students who wish to source information on computer studies.

WHY THIS BOOK?

1) Provides a creative and more practical environment for learners
2) Features the current trends in the technological world
3) More pictures have been used to insist on a point
4) Prepares the learner in a logically laid sequence of topics
5) Provides group discussion questions, practical questions and answers
6) Uses a user friendly language
7) Cost effective and ECO friendly
8) Approved by IT experts and teachers from every school it has been introduced
9) Provides an environment for own learning
10) Easy to download/easy to use/can be used with a TV and DVD players

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ABOUT THE AUTHOR

Maurice Atika Nyamoti has been in the IT field since 1999 a s a student at Maseno University– Bsc. Computer science and Engineering. Has taught a number of colleges and schools since 2004 which include Medinum college-Kisii from 2004-2006, St. Mary's Girls Secondary school-Thigio from 2007-2013 and he is now a computer teacher at Gatitu secondary school- Gatundu South. Has been in a number of computer workshops at St. Paul's University, Catholic university, LinuxChix LTD, CFSK and Kenyatta University. His experience in computer studies and handling of students at secondary level is the reason why his books are competent both in class and own learning. Be a friend of Maurice at *www.facebook.com/Maurice Atika Nyamoti*

SYTEM REQUIREMENTS

To effectively use this book, you may require a system that has the following features:

1. Computer
   - ◊ PIII OR PIV, WINDOWS XP OR LATER, OFFICE XP,2003 OR LATER, PDF READER
2. Television
   - ◊ ANY TELEVISION WITH A DVD/CD PLAYER– USER SHOULD DOWNLOAD JPEG FORMAT

Acknowledgement

My special thanks goes to God for a making me successful in producing this book, special thanks also goes to my Late mother Sabina, Father Joseph, my wife Leah and kids Juliet and Sabina. Thanks to St Mary's Girls Secondary School– Thigio led by Mrs Murungaru and Gatitu Secondary School community. For all those who criticized, input and amended my piece of work, thank you so much.

M.A.NYAMOTI

LIST OF CONTENTS

Definition of a computer

- In simple terms a computer is a machine that processes data into information
- A computer can also be described as an electronic device that saves, transmits and processes data into information.

The physical parts of a computer include: Mouse, Keyboard, system unit and screen.

Common terminologies used in computer

Data- it simply refers to a collection of numbers, characters which have no much meaning to the user.

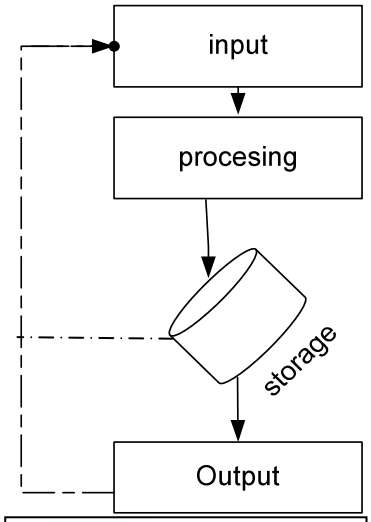
Information-it's a sequence of numbers and characters which can be interpreted as having meaning. Information can also be described as processed data

A computer Program- is a sequence of instructions written to perform a specified task with a computer.

Input stage- this stage involves entering data into the computer using input devices i.e. keyboard

Processing- this stage involves processing of data using processing devices i.e. the CPU

Output stage- this stage involves the processing outcome that will be displayed by output devices i.e. the screen



Cross-section view of a computer

Parts of a computer:

System Unit –this part consists of the CPU and the Motherboard. It also houses drives (used to read/write disks) and cards (used to support peripheral devices).

Peripheral Devices- these are devices connected to the system unit via communication media i.e. *interface cables* and *wireless means*. The cables are attached to the system unit using special sockets called *ports,* while wireless peripheral devices use light rays (optical means) to connect to the system unit i.e. *infrared rays.*

Examples of peripheral devices

Keyboard- this peripheral device looks like a typewriter. It is used to enter data into the computer in form of characters, symbols and instructions. Therefore, the keyboard is an input device.

Mouse- this is a pointing device that enable the user to enter commands in a computer. To input a command, the user moves the mouse which also moves the pointer on the screen. The pointer is then clicked on *icons* and *controls* to issue commands.

Monitor- the monitor is also called *screen* or *visual display unit (VDU)*. This output device enables the user to see what is happening in the system unit.

Modem- the word modem is derived from ***mod****ulation (converting a digital signal to analogue)* and ***dem****odulation (converting an analogue signal into digital).* This device connects the computer user to the Internet. It can be used as either an input or output device.

Printer- this is an output device which converts softcopy (intangible data) into hardcopy (tangible data).

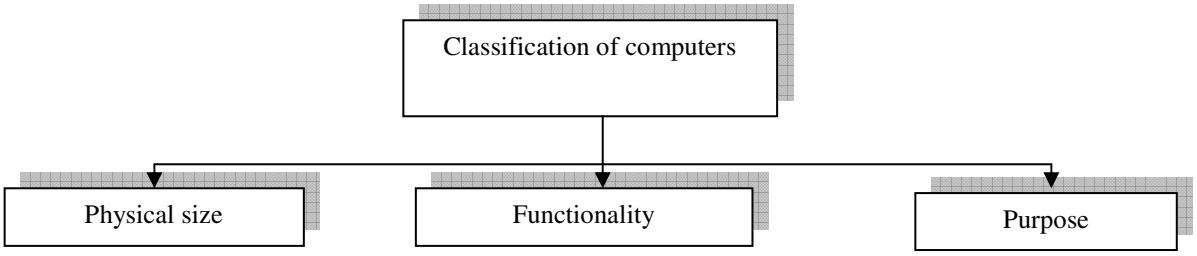
Development of Computers

The table below shows a summary of development of computers

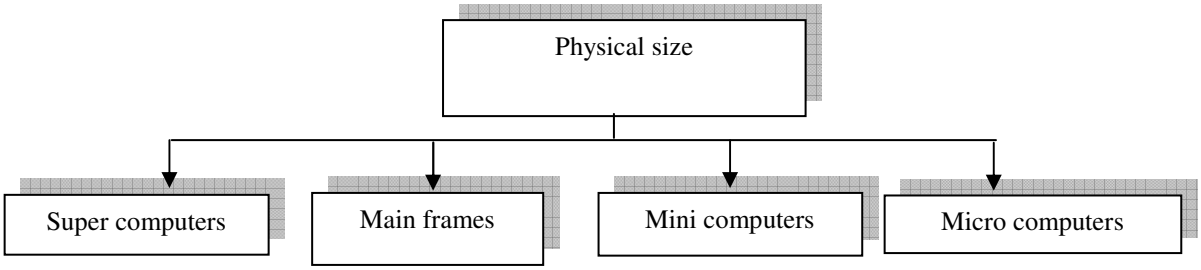
Age	Name	Advancements	Use
Before Christ	Abacus	It was made of wood and beads.	Used by Asian merchants to count wealth
1614-1620	Log tables	Paper and pen	Used to calculate complex mathematical expressions
1647	Mechanical calculator	calculator	To solve complex mathematical expressions
1792-1871	Analytical engine	Computer	Combine arithmetic process with decision based on its own computer
1946-1956	First generation computers	Computer (used thermionic valves and vacuum tubes to process data)	Store and Process Data
1957-1963	Second generation computers	Computer (used transistors to process data)	Store and Process Data
1964-1979	Third generation computers	Computer (used integrated circuits (ICs) to process data)	Store, transmit and Process data with better storage and increased speed of processing
1979-1989	Fourth generation computers	Computer (used VLSI-very large scale integrated circuits to process data)	Store, transmit and Process data with better storage and increased speed of processing than 3G computers
1990-present	Fifth generation computers	Computer (use advanced VLSI in the name of microprocessor to process data)	Store, transmit and Process data with better storage and increased speed of processing, small in size and emit less heat and consumes less power. Faster than 4G computers and also portable.

Classification of computers

Computers can be classified according to physical size, functionality and purpose as shown in the organizational chart below



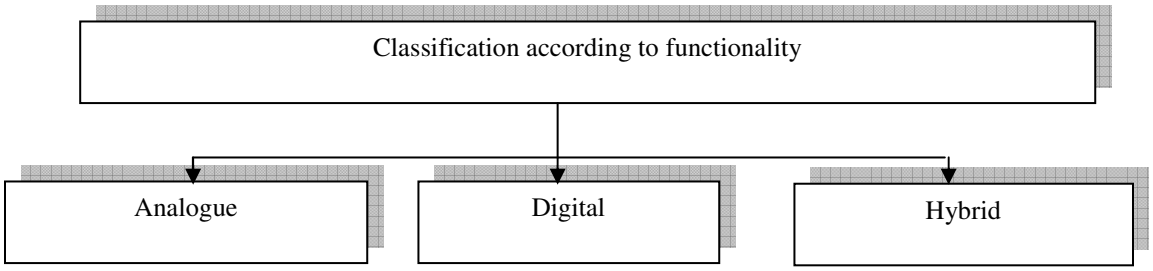
1. Classification according to physical size



Description of computers according to physical size

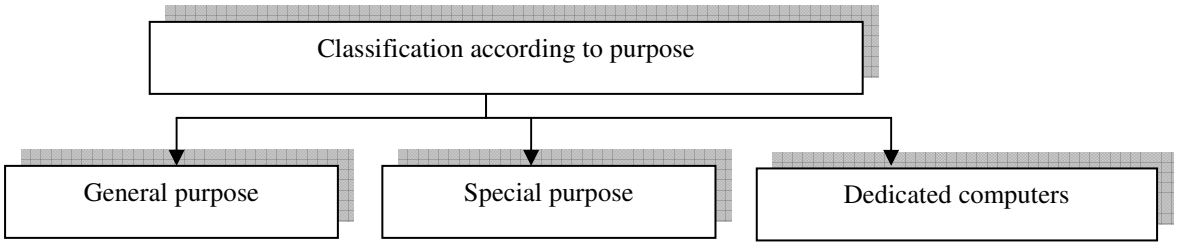
Size	Characteristics	Uses
super computers 	Largest, fastest, powerful and most expensive. they also generate a lot of heat	Used for advanced scientific research such as nuclear physics.
Main frames 	Less powerful and less expensive than super computers. They also have a large storage capacity	Used to handle all kinds of problems whether scientific or commercial. I.e. performing complex mathematical calculations. they are mostly found in banks, hospitals, airports etc.
Mini computers 	Smaller and less powerful than the main frame	Used in scientific laboratories, research institutions, engineering plants and places where processing automation is required.
Micro computers 	Smallest, cheapest and relatively least powerful. Uses a micro processor to process data. Examples: desktop, laptop and personal digital assistant (PDA)	Used to perform a variety of tasks including research, communication, banking, learning institutions, libraries etc.

2. Classification according to functionality



Computer	Characteristics	Uses
Analogue	Process data that is discrete in nature	Used by PCs, home appliances, TVs, Microwaves, wall clocks etc
Digital	Process data that is continuous in nature	Used in manufacturing process control like monitoring temperatures, pressures, density etc
Hybrid	Designed to process both analogue and digital data	Used on manufacturing process control. And returns a digital value. Examples are:- a digital weighing machine, digital thermometer etc

3. Classification according to purpose



Computer	Uses	Examples
General purpose	Designed to perform a variety of tasks	PCs, cell phones, notebooks etc.
Special purpose	Designed specifically for one task	Calculators, robots, cell phones, thermometers etc
Dedicated computers	Designed as a general purpose but dedicated to perform a specific task	PCs used for learning environment, banking, communication etc.

Functions of a computer:

The main functions of a computer are:

- Saving data
- Processing data
- Transmitting data
- Detecting events

Purpose of a computer

The main purpose of a computer is to help the user accomplish a specific computational task i.e. calculating mathematical and logical expressions, transmitting data signals and saving data for future reference.

Areas where computers are used

Just like all other machines, computers are used in a day-to-day life to make work easier and more efficient. Some important application areas of a computer are given below.

Area	Uses
Industry and Commerce	Saving records, security, real-time response, automating records, communication, process control, detection, manufacturing, accounting etc
Health Care	Save records, diagnose patients, scanning of body parts, security, management of records, communication, research, consultations, preserving bodies etc
Government Institutions	To save and manage records of people, vehicles, activities etc, plan government calendars, security, forecasting and drawing of budgets, communication, research activities, traffic control etc
Education and Research	Learning aids, research tools, keeping research records, budgeting, accounting, security, forecasting, communications, consultations etc
Communication Industry	Prepare programs on TV/Radio, broadcasting, producing music, tracking activities, automating communication processes, relay of telephone signals etc
Police and Defense	Tracking criminals, keeping records, used in forensic labs to filter DNA and fingerprints, controlling traffic, communication, automating armory, military vehicles and tanks, controlling CCTV cameras, keep track of temperatures in nuclear stations etc.
Home and Leisure	Entertainment, used as TV, Radio, DVD player etc, communication, security, keeping home records and budgeting family finances, can be used as a diary, notebook or an address book, etc
Transport and tourism	Hotel booking system, marketing, air travel, booking and control system, communication and research, traffic light system, shipping and sea navigation, security etc.
Agriculture	Keeping inventory record, controlling farm machinery, keeping track of plants and livestock, research and consultations, diagnosing farm diseases and pests, tracking livestock movements, breeding and health records, irrigation etc.

Exercise questions

1. What are the different parts that make up a computer?
2. CPU stands for?
3. What is a Modem? What is it used for?
4. Data that has been processed and has meaning is referred to as?
5. List three stages involved in transforming data?
6. Compare third generation and fourth generation computers.
7. Which key areas were improved from first to fourth generation computers?
8. Was Abacus a digital or an analogue computer?
9. Describe five uses of computers in our society today.
10. Describe the five generations of computers in terms of technology used and give an example of a computer developed in each generation.
11. How are computers classified? List the different types of computers and briefly explain where each type is most commonly used.
12. Briefly state the differences between desktop and laptop computers.
13. Describe hybrid and dedicated computers.
14. Compare with the aid of a diagram, the physical appearance and electronic components of a microcomputer.
15. List any four advantages of computers.
16. Briefly explain the similarities and differences between human beings and computer systems.

The computer laboratory

A computer lab is a room set aside for installation and use of computers.

Safety precautions and practices in the computer lab

Computer systems are expensive to acquire and maintain, and should therefore handled with care.

Causes of computer damage and measures to avoid them

Dust and Smoke- dust and smoke damage the surface of the hard disk and other moving parts. To avoid them:

- Avoid smoking in the computer lab
- Cover computers with dust covers
- Put curtains along the windows
- Avoid entering the lab with muddy shoes
- Use the dust blower to blow off dust from the computers more often

Water and Humidity

- humidity is the amount of water vapor in the air. Water and humidity can cause rusting and if water spills on sensitive computer parts, it can cause short circuiting thus damaging the components. To avoid this kind of scenario:

- Avoid entering the computer lab with drinks and beverage.
- Install the computer lab with humidifiers and dehumidifiers to keep humidity at bay.
- Don't put a water based fire extinguisher in the computer lab
- Avoid splashing water when washing the computer lab. Though, vacuum cleaning is recommended.

- **Temperature** –initially computers are installed with a heat sink and a fan to cool down the CPU when it's processing. Too much heat can break down the CPU or cause delay in processing. Therefore the computer lab must be kept with cool temperatures in the following ways:

- Avoid overcrowding of computers and users
- The computer lab should be well ventilated
- Consider installing air conditioning system
- Uncover computers when using them

Power Fault

-Electricity is the most precious need in any computer lab. It is also the most dangerous if not properly used. Power surge and brownouts are responsible for damaging computers. To avoid this:

- Avoid unnecessary movements in the computer lab to avoid hitting power cables
- Keep water off the power sockets
- Switch off the computer and the monitor immediately incase power fault has been detected
- Avoid children/pets in the computer lab
- Consider installing **AVS switches** (automatic voltage switches) to stabilize power
- Use **UPS** (uninterruptible power supply) to regulate power before entering into the computer. They can also be used to alert the user when power goes off.
- Electric lines should always be insulated to avoid electrical shocks. They should pass in trunks along the edges of the wall into the strategically positioned sockets.

Data security and burglar proofing

-data theft and stealing of computers should be kept into consideration when building the computer lab. To avoid this:

- Install security alarms
- Shut down the computer using the right procedure
- Put metallic grills at the doors and windows, strong roof and **CCTV (**closed circuit television) cameras
- Usually use passwords and encrypt confidential data. A **password** is a secret code the user must provide before accessing computer resources. **Data encryption** is the process of encrypting/encoding data in way that only the sender and the receiver can understand. For one to read this data, an encryption key (like a password) is required.
- Consider hiring security personnel
- Do not welcome strangers into the computer lab.

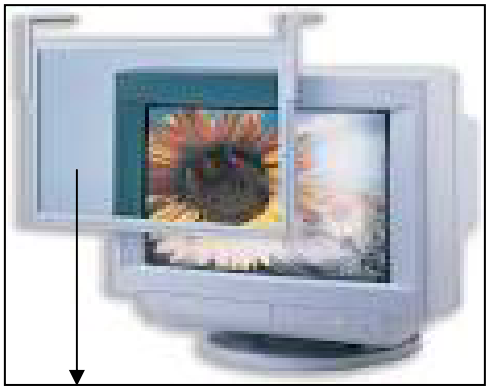
Fire

- fire can physically damage computers. To avoid fire:

- Do not smoke in the computer lab
- Install a gaseous fire extinguishers
- All electrical cables should be laid properly.

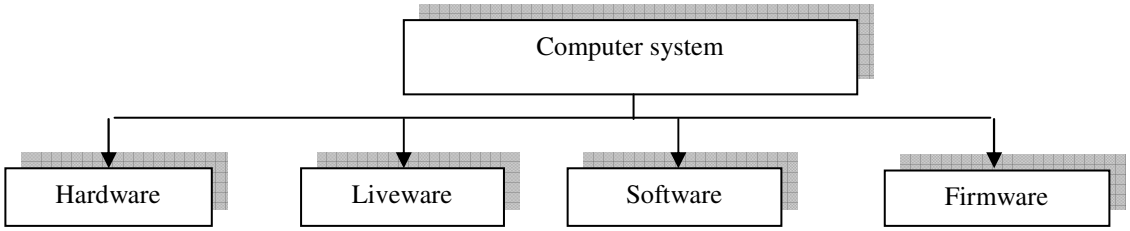
Measures to protect the user

- All cables should be insulate and laid away from busy paths
- Provide standard furniture i.e. the seat should have a straight backrest and the table should be strong enough to support computers and their peripheral devices
- Avoid overcrowding
- Provide anti radiation (anti-glare) screens to filter light. as shown in the diagram below:
- The room should be properly lit and ventilated



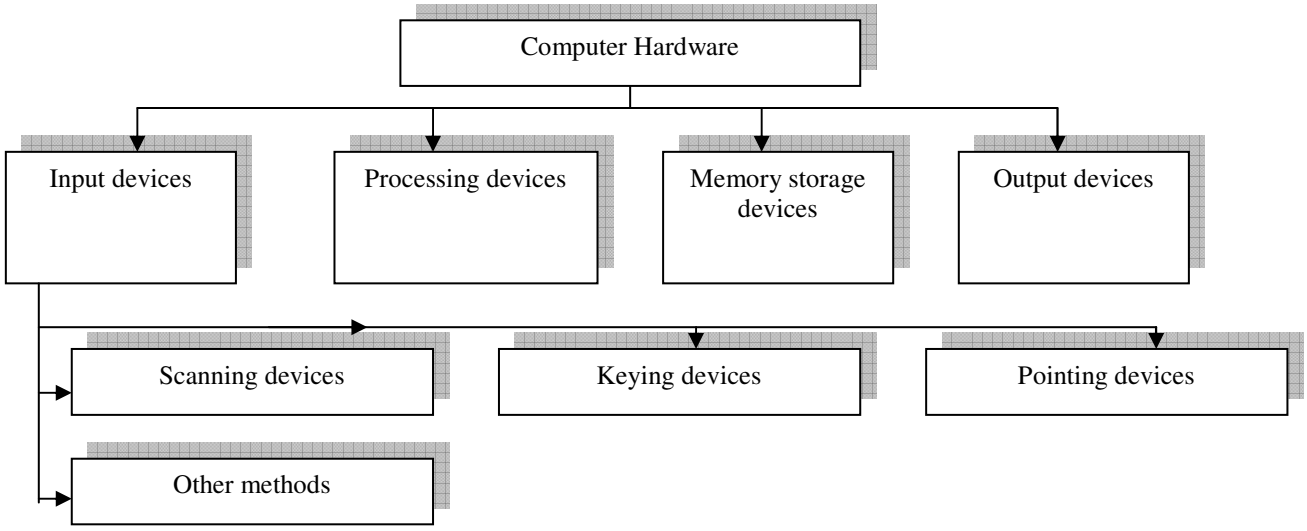
Anti-radiation/glare screen

Computer systems



- **A system-** a system is a collection of entities that work together of achieve a common goal
- **A computer system-**is a collection of entities (hardware, software, liveware, and firmware) that work together to receive process, manage and present information in a meaningful format.
- **Liveware-** can also be termed as *wetware* and *greyware*. This word is used to describe a computer user.
- **Hardware-** this is the tangible parts of a computer i.e. keyboard, mouse, CPU, monitor etc

- **Software-** can be described as computer programs or this is the intangible parts of a computer i.e. computer programs etc
- **Firmware-** these are manufacturer's settings though, can be classified under software i.e. programs in ROM chips



Input devices

- these are devices that convert input data from human readable form into machine readable form

Human readable form

- is a kind of language that the user understands i.e. Kiswahili, English etc

Machine readable form

- this is a language that the computer understands i.e. binary language, assembly language etc

Examples of input devices include:

1. **Keying devices**

- these are devices that converts typed numbers, letters and special characters into machine readable form examples: keyboard and keypad

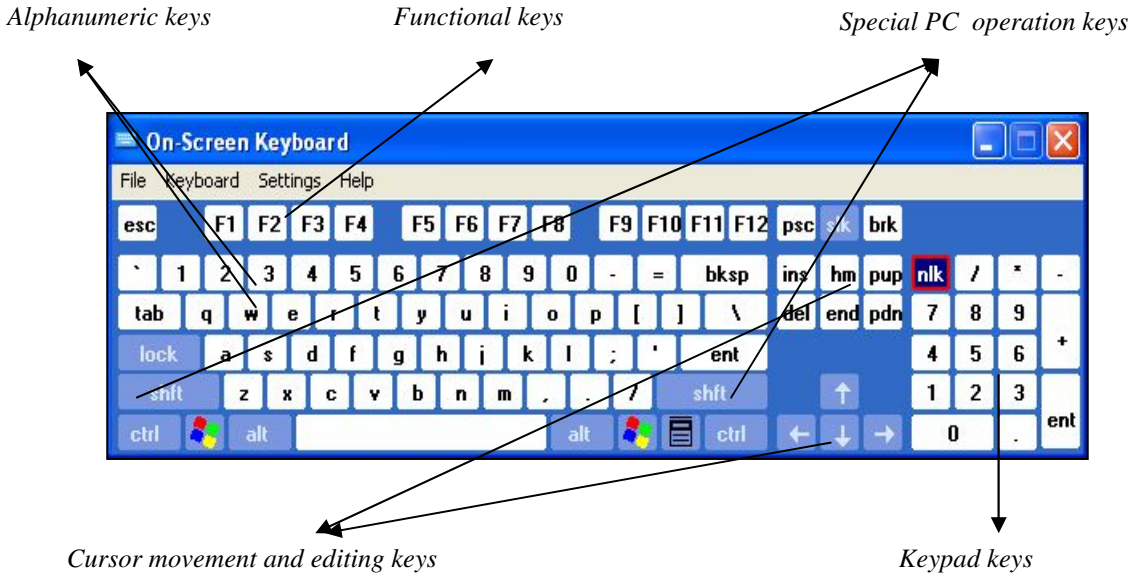
Keyboard

- this is the most commonly used keying method with desktop and laptop computers. Examples include:

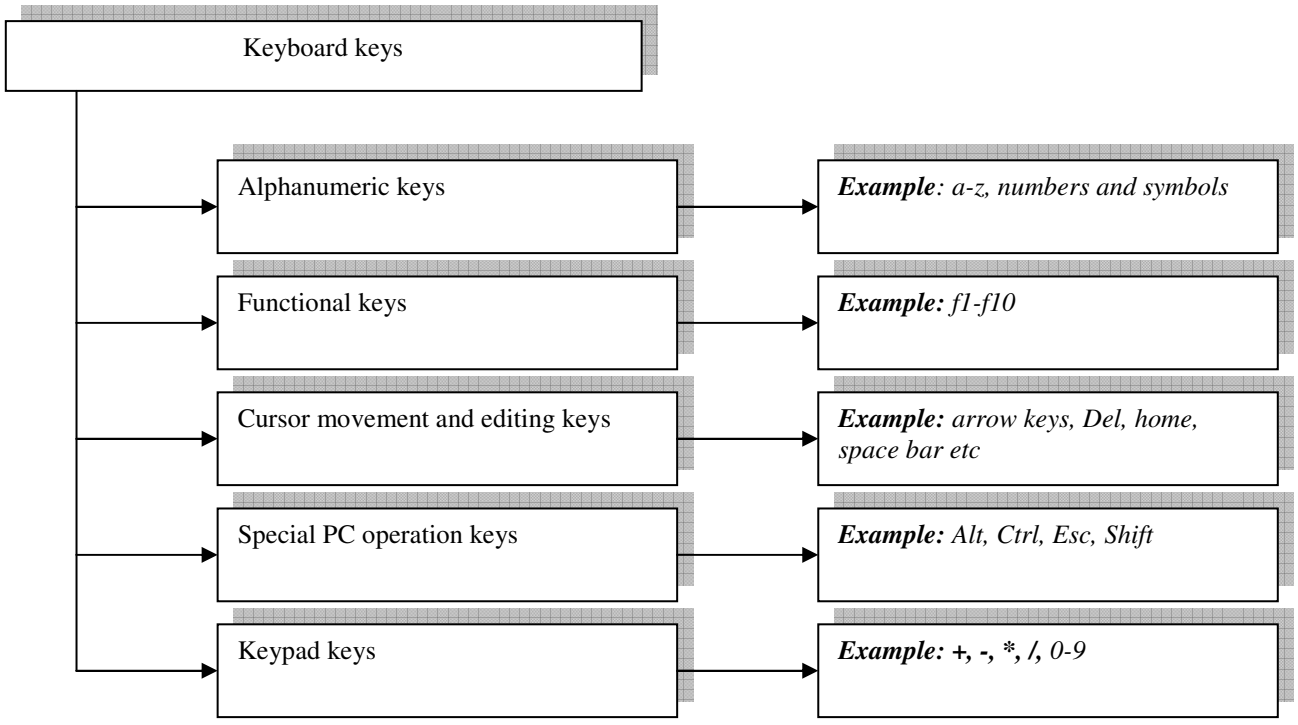
-traditional keyboard, flexible keyboard, ergonomic, wireless etc

Keypad

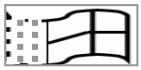
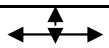
- this is a small keyboard used with hand held devices i.e. cell phones, calculators, notebooks etc



Classification of the keyboard keys/ Parts of the keyboard



Summary of keyboard keys and uses

Key	Symbol/Sign	Uses
Shift		Enables other keys to activate second functions
Escape	ESC	Used to stop some application windows and pop ups
Caps lock	Caps Lock	Dead key used to activate upper case letters
Num lock	Num Lock	Activates numeric keypad keys
Home	home	Display the top of the active window.
Alternate	ALT GR ALT	Used with a combination of other keys to perform a function
F1	F1	Activates help
F10	F10	Activate the menu bar in the active program.
Insert	INSERT	Switch from insert mode to type over editing modes and vice versa
Delete	DEL	Delete a letter just typed
Tab key		Move forward through options/tab stops
End	End	Display the bottom of the active window
Pause	Pause Break	Used by windows media player to pause play
Print screen	Print Scrn SysRq	Takes screen shots on the desktop
Enter/Return		Carry out the command for the active option or button/starts a new line when editing
windows logo key		Display or hide the **Start** menu, or works with a combination of other keys for other functions i.e. +r, +u, +h etc
Spacebar	*No symbol*	Select or clear the check box if the active option is a check box/ creates one character/byte space at a time when editing
Backspace		View the folder one level up in My Computer or Windows Explorer/delete a character
Control	Ctrl	Used with a combination of other keys to perform a task i.e. ctrl+s to save
F7	F7	Activate spelling and grammar checkers in text editors
F5	F5	Refresh the active window.
F4	F4	Display the Address bar list in My Computer or Windows Explorer.
F6	F6	Cycle through screen elements in a window or on the desktop
F3	F3	Activates the Search tool
Application/ menu key		Display the shortcut menu for the selected item.
Arrow keys		Moves the cursor in all direction

Multiplication sign	*	Multiplication
Subtraction sign	-	Subtraction
Division sign	/	Division
Equal sign	=	Equal
Addition sign	+	Addition
Hyphen sign	__	Hyphen

***N/B**: ToggleKeys are designed for people who have vision impairment or cognitive disabilities. When ToggleKeys are turned on, your computer will provide sound cues when the locking keys (CAPSLOCK, NUMLOCK, or SCROLLLOCK) are pressed. Hold the num lock for five seconds to activate.*

2. Pointing devices

-these are devices used to control the pointer/cursor on the screen. *Examples:* mouse, joystick, trackball, light pen etc

Mouse- there are different types of mice namely: ps/2, optical, wireless/cordless etc

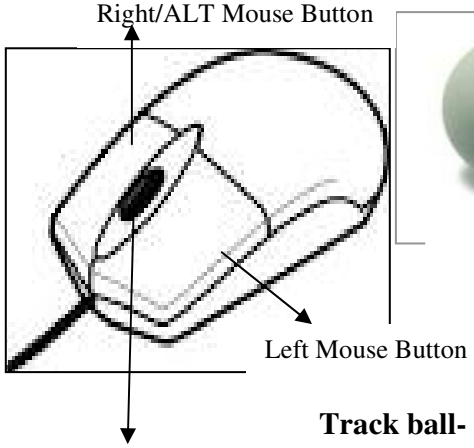
Mouse skills- as the mouse moves on a flat surface, it moves a ball beneath or a photosensitive signal that corresponds by moving the pointer/cursor on the screen.

Mouse terminologies

-Clicking- this is pressing the left button of the mouse once to execute a command

-Double clicking- clicking the left button of the mouse twice in quick succession. Used to start an icon

-**Drag and drop**-this involves clicking on an icon, dragging it, and releasing the button. Used to move and resize objects




Mouse ball

-**Pointing**-moving the mouse pointer to the designated target

-**Scrolling wheel**- used to move hidden text up and down the screen of an active window.


Mouse Joy stick Track ball

Track ball- this is just like a mouse whose ball is located at the top. The pointer on the screen is moved as the user moves the ball with a finger.


Light pen

Joy stick- looks like a car gear. When the lever like part is moved, the pointer moves on the screen. Mostly used to play games.

Some keyboards/pads can be used as pointing devices

Light pen and stylus- A **light pen**, also called a **selector pen**, is a computer input device in the form of a light-sensitive wand 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

2. Scanning devices

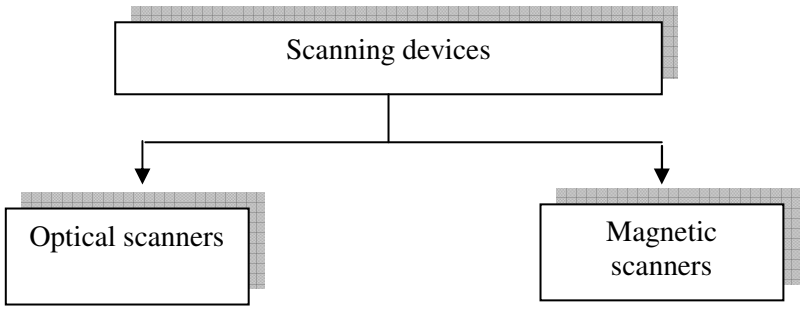
-These are devices that capture data directly into the computer.
-They can also be defined as devices that use a magnetic or photo-electric source to scan and convert images into electric signals that can be processed by an electronic apparatus, such as a computer.

Uses of Scanning Devices

Scanning devices are commonly used to:

-Convert a text document into an electronic file;
-Convert a photograph into an electronic graphic file;
-Sense an image to be sent over a voice frequency
-Circuit, such as a fax machine;
-Reproduce text and images, as with a copier.

Classification of scanning devices



Scanners are classified according to technology used to capture data namely: *optical* and *magnetic* scanners.

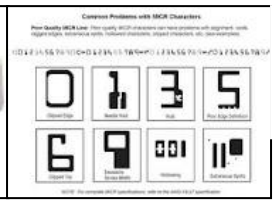
Optical scanners- these scanners capture data using optical or light technology.

Examples of optical scanners

Scanner	Technology	Uses
Optical mark recognition (OMR) 	They capture inked marks on paper by passing infrared light over them	Marking multiple choice questions
Optical bar recognition (OBR) 	Used to capture barcodes 	Supermarkets for transactions
Optical character recognition (OCR) 	Converts handwritten, typewritten and printed text and images into machine readable form. .e.g. flat bed scanner	Schools, libraries, banks to scan photos and documents

Magnetic scanners **-** these scanners use magnetic technology to capture handwritten and magnetic strip data. E.g. MICR (magnetic ink character recognition), card readers etc

MICR



Inked characters

MICR- these scanners are used to read characters written using magnetic ink as shown left. Mostly used in banks to read cheques

Digitizers

Digitizers
also known as **graphic tablet**, allows a user to draw an image using a stylus

Digital camera

Digital camera
Also known as a digicam. Is a camera that takes video or still photographs by recording images on an electronic image sensor.

Touch screen

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

Voice input

Voice input
-also known as *speech recognition* (SR). Is the translation of spoken words into text.

An interactive whiteboard (IWB)
is a large interactive display that connects to a computer and projector. A projector projects the computer's desktop onto the board's surface where users control the computer using a pen, finger, stylus, or other device. The board is typically mounted to a wall or floor stand.

they are used in a variety of settings, including classrooms at all levels of education, in corporate board rooms and work groups, in training rooms for professional sports coaching, in broadcasting studios and others.

Interactive white board

Microfilm

Microfilm is a special type of photographic film which can store images at greatly reduced sizes (about 1/50th of original sizes). Data stored on microfilm can be viewed using a special reader that magnifies the images and projects them onto a screen. Computers can output information directly to microfilm for long-term storage. This is known as **Computer Output on Microfilm (COM).** Microfilm is rarely used today. Documents which need to be stored are usually scanned and saved electronically on high capacity storage media. Its either input or output device.

Microfilm

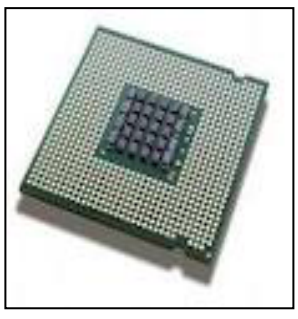
Review questions

1. How does a computer differ from a calculator?
2. List any three safety precautions one should observe when entering a computer lab
3. Describe any two practices that can cause fire in the computer laboratory.
4. The keyboard has …….. groups of keys
5. Which key will press to:
    I. Erase a letter just typed
    II. Change case
    III. Use numeric keypad keys
    IV. Double spacing
    V. Single spacing
    VI. Close a pop up window
    VII. Activate start menu
    VIII. Display a dropdown list
6. What is the difference between UPS and AVS?
7. Explain the functions of the following keys on the keyboard?
    I. F1
    II. Shift key
    III. Control key
    IV. Alternate key
    V. Return key
    VI. Home key
8. Which key will you use to overwrite the text in a sentence?
9. Define the following words
    I. clicking
    II. double clicking
    III. drag and drop
    IV. cursor
    V. pointer
    VI. scrolling wheel
10. Which of these devices are input devices: *Mouse, keyboard, screen, CPU, Modem, Scanner, Trackball, Joy stock, IWB, Digitizer, Camera and light pen*
11. What is the use of a dehumidifier?
12. Why should computer lab seats designed with a straight backrest?
13. Name two preventive measures you can take to avoid loss of data.

PROCESSING DEVICES

THE CENTRAL PROCESSING UNIT(CPU)

Top view of CPU

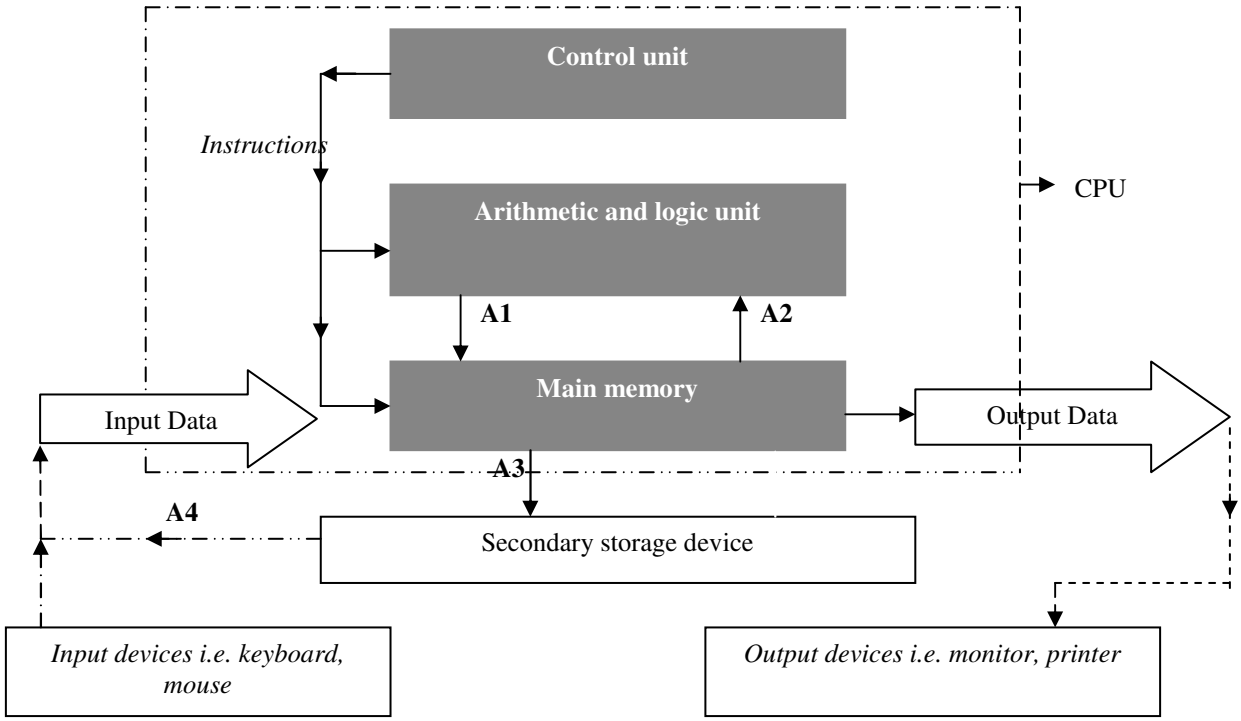


Bottom view of CPU

The CPU also known as the **processor** is mounted on the system board (mother board) inside the system unit. It's regarded as the brain of the computer because it does all the processing activities in the computer. The figures left and right shows the top and bottom view of a the CPU respectively

Parts of the CPU

The CPU consists of three main elements as shown in the diagram below.



Functional elements of the CPU

***A1**-processed task A* ***A3**-task A to be stored*
***A2**-unprocessed task A* ***A4**-retrived task A as input data*

Control unit

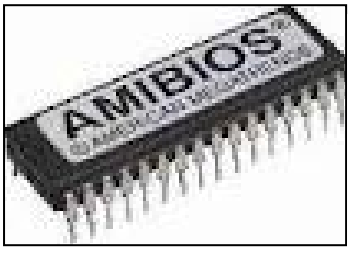
-coordinate all the processing activities in the CPU as well as input, storage and output operations. The CPU uses a system clock to coordinate these activities. The system clock also determines the speed of the CPU. The higher the number of cycles/pulses per second which is also called ***frequency*** the faster the CPU.

Arithmetic and logic unit

-this is a unit in the CPU where all the logical and arithmetic operations are carried out. It does this by decoding instructions from the control unit to processes data. Some of the arithmetic operations include: addition, subtraction, division, multiplication etc. logical operations include: less than, equal to, greater than, sorting, filtering etc

Main memory

- The main memory is also called primary storage. It stores data that is directly accessible by the CPU. The main memory of a computer can be classified as *RAM (random access memory)* and *ROM (read only memory)*



ROM chip

Read only memory (ROM)

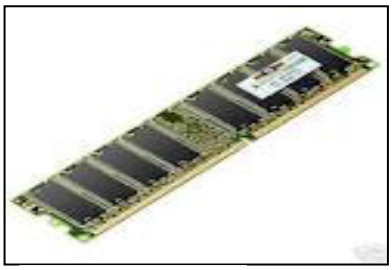
- is a class of storage medium used in computers and other electronic devices. Data stored in ROM cannot be modified, or can be modified only slowly or with difficulty

It is mainly used to distribute firmware (software that is very closely tied to specific hardware and unlikely to need frequent updates)

Types of ROM

ROM	Characteristics
Mask ROM	Once the contents have been programmed (written) in it by the manufacturer, they can never be erased.
Programmable ROM (PROM)	This is a read-only memory (ROM) that can be modified once by a user. PROM is a way of allowing a user to tailor a microcode program using a special machine called a *PROM programmer*. This machine supplies an electrical current to specific cells in the ROM that effectively blows a fuse in them. The process is known as *burning the PROM*
Erasable Programmable ROM (EPROM)	EPROM can be erased by exposing it to strong ultraviolet light source (such as from a mercury-vapor light). this is done through a transparent fused quartz window in the top of the package
Electrically Erasable Programmable ROM (EEPROM)	This is a user-modifiable read-only memory (ROM) that can be erased and reprogrammed (written to) repeatedly through the application of higher than normal electrical voltage.

Random Access Memory (RAM)



RAM module

RAM (random access memory)

- is the place in a computer where the operating system, application programs, and data in current use are kept so that they can be quickly reached by the computer's processor. RAM is much faster to read from and write to than the other kinds of storage in a computer, the hard disk, floppy disk, and CD-ROM..

However, the data in RAM stays there only as long as your computer is running. When you turn the computer off, RAM loses its data. When you turn your computer on again, your operating system and other files are once again loaded into RAM, usually from your hard disk

Type of RAM

Static RAM (SRAM) - SRAM (Static RAM) is random access memory (RAM) that retains data bits in its memory as long as power is being supplied. Static RAM provides faster access to data and is more expensive than DRAM. SRAM is used for a computer's cache memory and as part of the random access memory digital-to-analog converter on a video card.

Dynamic RAM (DRAM) - Dynamic random access memory (DRAM) is the most common kind of random access memory (RAM) for personal computers and workstations. It needs to have its storage cells refreshed or given a new electronic charge every few milliseconds. DRAM stores each bit in a storage cell consisting of a capacitor and a transistor. Capacitors tend to lose their charge rather

Static RAM vs. Dynamic

Static RAM	Dynamic RAM
Faster	Slower
Expensive	Cheaper
Does not refresh contents	Refresh contents over time
Less memory per chip	More memory per chip

RAM vs. ROM

	RAM	ROM
Stands for:	Random Access Memory	Read-only memory
Volatility:	RAM is volatile i.e. its contents are lost when the device is powered off.	It is non-volatile i.e. its contents are retained even when the device is powered off.
Types:	The two main types of RAM are static RAM and dynamic RAM.	The types of ROM include PROM, EPROM and EEPROM.
Use:	RAM allows the computer to read data quickly to run applications. It allows reading and writing.	ROM stores the program required to initially boot the computer. It only allows reading.
Definition:	Random Access Memory or RAM is a form of data storage that can be accessed randomly at any time, in any order and from any physical location.	Read-only memory or ROM is also a form of data storage that can not be easily altered or reprogrammed.

Special purpose memories

These are types of memories housed in the CPU, system board, input and output devices to enhance performance.

Types of special purpose memories:

Cache memory- A **CPU cache** is a cache used by the central processing unit of a computer to reduce the average time to access memory. The cache is a smaller, faster memory which stores copies of the data from the most frequently used main memory locations. As the microprocessor processes data, it looks first in the cache memory and if it finds the data there (from a previous reading of data), it does not have to do the more time-consuming reading of data from larger memory. Cache memory is sometimes described in levels of closeness and accessibility to the microprocessor. An **L*1*** cache is on the same chip as the microprocessor.

Buffers- a **buffer** is a region of physical memory storage used to temporarily hold data while it is being moved from one place to another. Typically, the data is stored in a buffer as it is retrieved from an input device (such as a mouse) or just before it is sent to an output device (such as speakers). However, a buffer may be used when moving data between processes within a computer. Like a cache, a buffer is a "midpoint holding place" but exist not so much to accelerate the speed of an activity as to support the coordination of separate activities.

Registers- a **processor register** is a small amount of storage available as part of a CPU or other digital processor. Such registers are (typically) addressed by mechanisms other than main memory and can be accessed more quickly. Almost all computers, load-store architecture or not, load data from a larger memory into registers where it is used for arithmetic, manipulated, or tested, by some machine instruction. Manipulated data is then often stored back in main memory, either by the same instruction or a subsequent one.

Types of registers

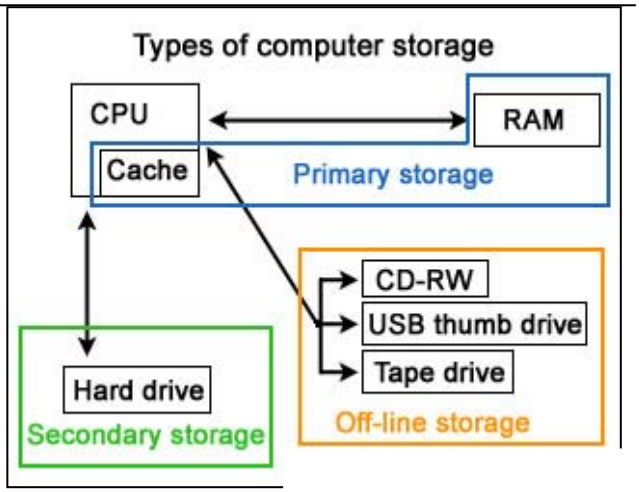
Type	Uses
Accumulator	An **accumulator** is a register for short-term, intermediate storage of arithmetic and logic data in a computer's CPU (central processing unit).
Instruction Register	**Instructions register (IR)** is used to store the instruction currently being executed or decoded.
Address Register	The **Memory Address Register (MAR)** is a CPU register that either stores the memory address from which data will be fetched to the CPU or the address to which data will be sent and stored.
Storage Register	Holds a piece of data that is on its way to and from the CPU and the main memory.

Memory capacities

The SI unit for measuring memory and storage capacity is called **bytes.** A byte is a single character which can either be from 0-9, a-z, symbols and spaces.

Memory quantities can be expressed in:

Byte	approx	8-bits
Kilobyte (KB)	approx	1000 bytes
Megabyte (MB)	approx	10^6 bytes
Gigabyte (GB)	approx	10^9 bytes
Terabytes	approx	10^{12} bytes



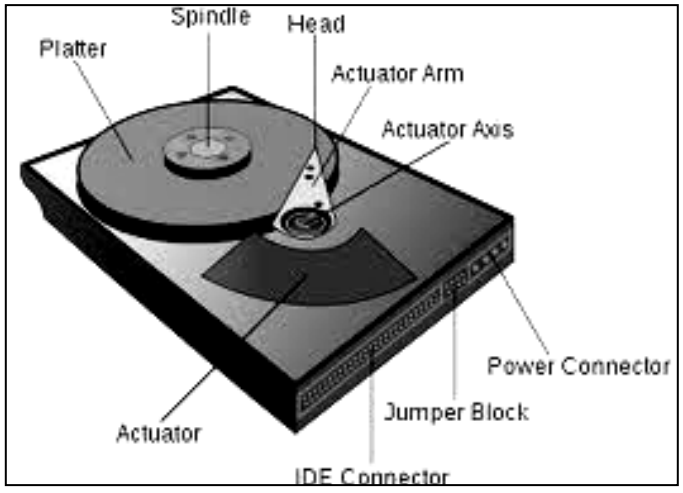
Hierarchy of storage

Hierarchy of storage

Primary storage (or main memory or internal memory), often referred to simply as *memory*, is the only one directly accessible to the CPU. *Examples include*: RAM, ROM, Cache memory, Registers and buffers.

Secondary storage (also known as external memory or auxiliary storage), these memory permanently store data for future reference. Secondary storage does not lose the data when the device is powered down—it is *non-volatile. Example:* Hard disk, Floppy disk.

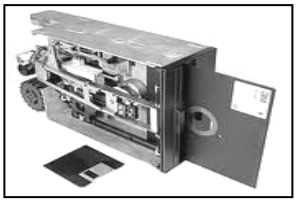
Off- line storage- In modern personal computers, most secondary and tertiary storage media are also used for off-line storage. *Off-line storage* is computer data storage on a medium or a device that is not under the control of a processing unit. The medium is recorded, usually in a secondary or tertiary storage device, and then physically removed or disconnected. *Example:* CD, DVD, Tapes, Floppy disk, Zip and Jazz disks etc.



Secondary storage devices

The Hard Disk/HDD -A hard disk is part of a unit, often called a "*disk drive*," "*hard drive*," or "*hard disk drive*," that store and provides relatively quick access to large amounts of data on an electromagnetically charged surface or set of surfaces. A hard disk is really a set of stacked "disks," each of which, like *phonograph/ gramophone* records, has data recorded electromagnetically in concentric circles or "tracks" on the disk. A "head" (something like a phonograph arm but in a relatively fixed position) records (writes) or reads the information on the tracks. Two heads, one on each side of a disk, read or write the data as the disk spins. Each read or write operation requires that data be located, which is an operation called a "seek." (Data already in a disk cache, however, will be located more quickly.)

Off-line/removable storage devices

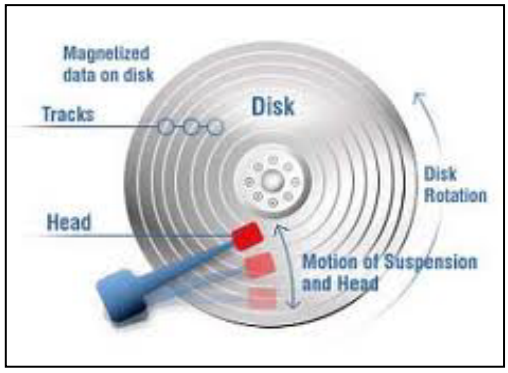


Floppy drive

Floppy disk

Magnetic disks

Floppy disk- The term usually refers to the magnetic medium housed in a rigid plastic cartridge measuring 3.5 inches square and about 2millimeters thick. Also called a "3.5-inch diskette," it can store up to 1.44 megabytes (MB) of data. Although many personal computers today come with a 3.5-inch diskette drive pre-installed, some notebooks and centrally-administered desktop computers omit them. Floppy disk requires floppy drives (shown below) to read and write.



Disk platter - A **hard-disk platter** (or disk) is a component of a hard-disk drive: it is the circular disk on which the magnetic data is stored. The rigid nature of the platters in a hard drive is what gives them their name (as opposed to the flexible materials which are used to make floppy disk). Hard drives typically have several platters which are mounted on the same spindle. A platter can store information on both sides, requiring two heads per platter.

Compact Disc

The **Compact Disc**, or **CD** for short, is an optical disc used to store digital data. It was originally developed to store and play back sound recordings only, but the format was later adapted for storage of data (CD-ROM), write-once audio and data storage (CD-R), rewritable media (CD-RW), Video Compact Discs (VCD), Super Video Compact Discs (SVCD), PhotoCD, PictureCD, CD-i, and Enhanced CD. Audio CDs and audio players have been commercially available since October 1982. Have a storage capacity of 700MB or 80 minutes of continuous play.

Blu ray DVD

HD DVD

DVD/Digital Versatile/Video Disk

Is an optical disc storage format, invented and developed by Philips, Sony, Toshiba, and Panasonic in 1995, DVDs offer higher storage capacity than Compact Discs while having the same dimensions: Have a storage capacity of 4.7 GB or 2 hours of continuous play, up to 20 GB.

The modern DVDs are called ***a Blu-Ray Disk and HD DVD-*** In 2006; two new formats called HD DVD and Blu-ray Disc were released as the successor to DVD. HD DVD competed unsuccessfully with Blu-ray Disc in the format war of 2006–2008. A dual layer *HD (high definition) DVD* can store up to 30GB and a dual layer *Blu-ray disc* can hold up to 50GB

Optical tape

Is a medium for optical storage generally consisting of a long and narrow strip of plastic on to which patterns can be written and from which the patterns can be read back. It can host at least 100 MB of data. Mostly used by cameras to store images, sounds and data.

Optical tape

Optical card and reader

Optical Cards

Optical memory cards use a technology similar to the one used for music CDs or CD ROMs. A panel of the "gold colored" laser sensitive material is laminated in the card and is used to store the information. Can store from 4 - 6.6 MB

Flash disks- A **USB flash drive** is a data storage device that includes flash memory with an integrated Universal (USB) interface. USB flash drives are typically removable and rewritable, and physically much smaller than a floppy disk. Most weigh less than 30 g. As of September 2011 drives of 256 gigabytes (GB) are available. Storage capacities as large as 2 terabytes are planned, with steady improvements in size and price per capacity expected.

Memory card- A **memory card** or **flash card** is an electronic flash memory data storage device used for storing digital information. They are commonly used in many electronic devices, including digital cameras, mobile phones, laptop computers, MP3 players and video game consoles. They are small, re-recordable, and able to retain data without power. Their storage capacities range from 32MB up to 2TB (terabytes). Memory cards are classified according to physical sizes, storage capacity and speed classes called **SD**- **Secure Digital** this is a non-volatile memory card format for use in portable devices. There is the Full SD, Mini SD and Micro SD.

The CPU Speed, Links, History, Speed and Types

- The speed of the CPU is measured in *HERTZ (HZ). i.e.,* number of operations that can be done per second. Heat is released when CPUs run. High temperature, however, decrease the performance of CPU. You, therefore, need a fan to cool down the CPU. You can change the speed of CPU in BIOS of your computer. Some people change the speed of their CPU to a very high MHz. This can increase the speed of the computer but would make the CPU overload and overheat. Finally, the whole computer may break down. Therefore, it is not recommend doing so.

Quantities of Scale

1 KHZ = 1000HZ

1 MHZ = 1000KHZ

1 GHZ = 1000MHZ

1 THZ = 1000MHZ

KHZ– Kilohertz
MHZ-Megahertz
GHZ-Gigahertz
THZ-Terahertz

-Links/ Pathways- the ALU, the main memory and the control unit use electrical pathways/links called ***buses*** to communicate to one another.

These buses include:

Control bus- it's a pathway for all timing and controlling functions sent by the control unit to other parts of the system.

Address bus- it's a pathway used to locate the storage position in memory where the next instruction data to be processed is held

Data bus- it's a pathway where the actual data transfer takes place.

History of the CPU

Processor	Year	Manufacturer	Speed/ comment
Intel 4004	Nov 1971	Intel	a 4-bit processor meant for a calculator
TMS 1000	1972	Texas Instruments	was the first microprocessor to include enough RAM, and space for a program ROM, to allow it to operate without multiple external support chips
Intel 8080	April 1972	Intel	The 8080 had a 16 bit address bus and an 8 bit data bus.
6800	1975	Motorola	It became the CPU of choice for many early home computers because it was sold cheaply.

Processor	Year	Manufacturer	Speed/ comment
Intel 8085	1976	Intel	Its 8080 compatibility, and CP/M, the first standard microprocessor operating system, made it the first choice of many systems.
Intel 8086	1978	Intel	5MHZ-10MHZ
Intel 8088	1979	Intel	5MHZ-10MHZ
Intel 80186	1980	Intel	25MHZ
Intel 80286	1982	Intel	12MHZ
Intel 80386	1985	Intel	33MHZ
Intel 80486	1990	Intel	UPGRADEABLE
Pentium	1993	Intel	60MH2-200MHZ
Pentium pro	1995	Intel	200MHZ
AMD K5	1995	AMD	116MHZ
Pentium MMX	1997	Intel	233MHZ
Pentium II	1997	Intel	Plugged t a single edged contact
AMD K6	1997	AMD	266 MHZ
Cyrix 6x86	1997	Cyrix	187 MHZ
Pentium III	1999	Intel	1.13 GHZ
AMD Athron	1999	AMD	2.33 GHZ
AMD Duron	2000	AMD	1.8GHZ
Pentium 4	2000	Intel	3.2GHZ
Intel core 2 Duo	2006	Intel	1.6 GHZ BY 2
AMD Athron dual core	2005	AMD	2.0 GHZ BY 2

-Types of the CPU

There aren't really different types of CPU, but there are some major differences between CPUs. Like Bus Sizes - we have 32 & 64 bits. But there are different processor architectures namely:

CISC: Complex Instruction Set Computers
RISC: Reduced instruction Set Computers
MISC: Minimal Instruction Set Computers

CISC (Complex Instruction Set Computers)

This is a computer where single instructions can execute several low-level operations. Examples of CISC instruction set architectures are *System/360 through z/Architecture, PDP-11, VAX, Motorola 68k, and x86*.

RISC (Reduced instruction Set Computers)

This is a CPU design strategy that uses fewer instructions set compared to CISC. Well known RISC families include *DEC Alpha, AMD 29k, ARC, ARM, Atmel AVR, Blackfin, MIPS, PA-RISC, Power (including PowerPC), SuperH, and SPARC.*

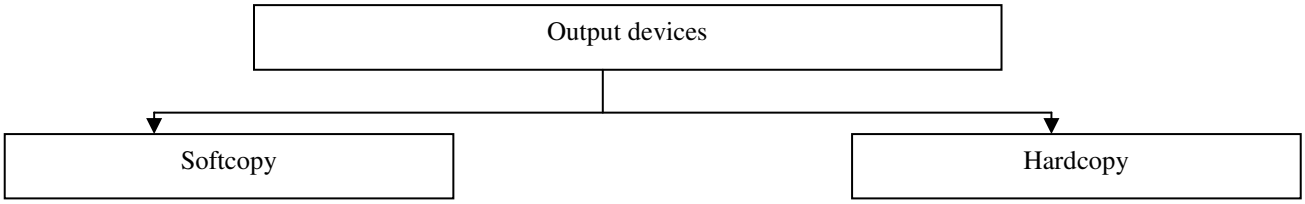
MISC (Minimal Instruction Set Computers)

This is processor architecture with a very small number of basic operations and corresponding opcodes. Probably the most commercially successful MISC was the *INMOS transputer*.

Output devices

An **output device** is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) which converts the electronically generated information into human-readable form.

Classification of output devices



Softcopy devices

Softcopy refers to intangible to intangible output that can be seen or heard i.e. screen display or sound. Examples include: monitors, LCD projectors, and speakers.

Monitors

A **monitor** or **display** (also called **screen** or **visual display unit** (VDU)) is an electronic peripheral device used to display information in the form of text, pictures and video, enabling the user to monitor what is going on in the computer. Examples of monitors include: CRT-cathode ray tube, LCD-liquid crystal display, GPD- gas plasma display.

A cathode ray tube or CRT

CRT is traditionally used in most computer monitors and the advent of plasma screens, LCD, DLP, OLED displays, and other technologies. As a result of CRT technology, computer monitors continue to be referred to as "The Tube". A CRT works by moving an electron beam back and forth across the back of the screen. Each time the beam makes a pass across the screen, it lights up phosphor dots on the inside of the glass tube, thereby illuminating the active portions of the screen. By drawing many such lines from the top to the bottom of the screen, it creates an entire screenful of images.

A Liquid crystal display (LCD)

LCD is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. It uses very small amounts of electric power, and is therefore suitable for use in battery-powered electronic devices. Example: TFT-thin film transistor

A plasma display

A plasma display is an emissive flat panel display where light is created by phosphors, excited by a plasma discharge between two flat panels of glass. The gas discharge contains no mercury a mixture of noble gases (neon and xenon) is used instead. This gas mixture is inert and entirely harmless. The glass panels seem to be vacuum sealed, because when they are broken the plasma breaks up, seemingly from the addition of air to the space.

Surface-conduction electron-emitter display (SED)
SED is a flat-panel, high-resolution display. Some SEDs have a diagonal measurement exceeding one meter (approximately 40 inches).
The SED consists of an array of electron emitters and a layer of phosphor, separated by a small space from which all the air has been evacuated. Each electron emitter represents one pixel. The SED requires no electron-beam focusing, and operates at a much lower voltage than a CRT. The brightness and contrast compare favorably with high-end CRTs. Prototype electron emitters have been developed with diameters of a few nanometers. SED technology can offer unprecedented image resolution.

SED

Digital Light Processing (DLP) is a technology used in projectors and video projectors. In DLP projectors, the image is created by microscopically small mirrors laid out in a matrix on a semiconductor chip, known as a Digital Micromirror Device (DMD). Each mirror represents one pixel in the projected image. The number of mirrors corresponds to the resolution of the projected image: 800x600, 1024x768, 1280x720, and 1920x1080 (HDTV) matrices are some common DMD sizes. These mirrors can be repositioned rapidly to reflect light either through the lens or on to a heat sink.

An organic light-emitting diode (OLED)
is a thin-film light-emitting diode (LED) in which the emissive layer is an organic compound OLED technology is intended primarily as picture elements in practical display devices. These devices promise to be much less costly to fabricate than traditional LCD displays. When the emissive electroluminescent layer is polymeric, varying amounts of OLEDs can be deposited in rows and columns on a screen using simple "printing" methods to create a graphical color display, for use as computer displays, portable system screens, and in advertising and information board applications. OLED may also be used in lighting devices. OLEDs are available as distributed sources while the inorganic LEDs are point sources of light.

Common names used with screen display

- **Pixel**

- stands for picture elements. These are tiny dots which form images displayed on the screen.

- **Color depth**

-in computer graphics, *color depth* or bit depth is the number of bits used to indicate the color of a single pixel in a bitmapped image or video frame buffer.

- **Resolution**

-this is the number of pixels per inch on the screen usually measured in dots per inch (dpi) or bits. The higher the resolution, the more the number of pixels per square inch, hence clearer the images.

- **Refresh rate**

-The **refresh rate** (most commonly the "vertical refresh rate", "vertical scan rate" for CRTs) is the number of times in a second that a display hardware draws the data. If a screen has a low refresh rate, images tend to flicker hence causing eye strain.

- **Display size**

- is the measure in inches as the diagonal length of the screen measured from top right to bottom left.

- **DirectX**

- This is a software that enhances the multimedia capabilities of your computer. DirectX provides access to the capabilities of your display and audio cards, which enables programs to provide realistic three-dimensional (3-D) graphics and immersive music and audio effects.

Video Graphic Adaptors (VGA) or Video Card

It is the standard monitor or display interface used in most PCs. Therefore, if a monitor is VGA-compatible, it should work with most new computers. The VGA standard was originally developed by IBM in 1987 and allowed for a display resolution of 640x480 pixels. Since then, many revisions of the standard have been introduced. The most common is Super VGA (SVGA), which allows for resolutions greater than 640x480, such as 800x600 or 1024x768. A standard VGA connection has 15 pins and is shaped like a trapezoid.

Examples of video adaptors include:

- **Color Graphic Adaptor (CGA)-**display text and images up to 16 colors
- **Enhanced Graphic Adaptor (EGA)-** an improvement of CGA but also displays in 16 colors
- **Video Graphic Array (VGA)-**display text, graphics and video using 256 colors
- **Super Video Graphic Array (SVGA)-** displays text and graphics using more than 16 million colors, has a minimum resolution of 800x 600 pixels
- **Extended Graphic Array (XGA)-** has a resolution of up to 1024 x 1280 pixels and is popular with 17 and 19 inch monitors.
- **Super Extended Graphic Array (SXGA)-**has a resolution of 1280 x 1024 pixels and is popular with 19 and 21 inch monitors.
- **Ultra Extended Graphic Array (UXGA)-** is the latest and highest standard

Sound output devices

Produce sounds such as peeps, audio or digital. Examples include: speakers. Further, the sounds from the computer can be heard from the built-in case speaker, or the speakers which are plugged into the sound card.

Light emitting diodes (LED)

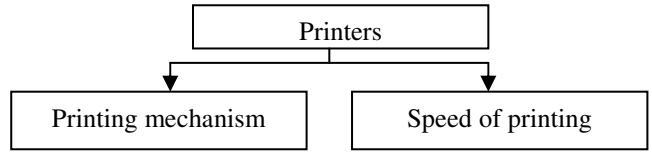
These are indicators that display light when electric current is passed through them. They are used to give warnings the same way a motorist would use signals to indicate when he/ she is over taken or taking a turn.

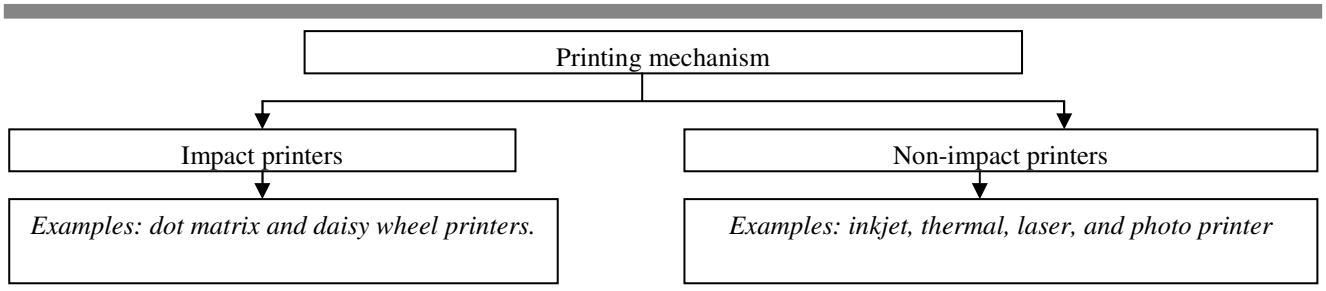
Hard copy output devices

Hardcopy refers to tangible output that can be felt such as paper. Examples include: printers, plotters and facsimile (fax).

Printers

Printers are used to produce information on a piece of paper. Printers are classified according to the way their printing mechanism/technology and also according to their speed of printing.





Classification according to printing mechanism

1. Impact printer

They print using striking mechanism. They strike on a piece of paper in order to form an imprint on it.
Examples:

- **Dot matrix printers**

A **dot matrix printer** or **impact matrix printer** is a type of computer printer with a print head that runs back and forth, or in an up and down motion, on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like the print mechanism on a typewriter.

- **Daisy wheel printers**

This is an impact printing technology invented in 1969 by David S. Lee at Diablo Data Systems. It uses interchangeable pre-formed type elements, each with typically 96 glyphs (an element of writing: an individual mark on a written medium that contributes to the meaning of what is written.), to generate high-quality output comparable to premium typewriters such as the IBM Selectric, but two to three times faster. Daisy wheel printing was used in electronic typewriters, word processors and computers from 1972. According to Webster's, the daisy wheel is so named because of its resemblance to the daisy flower.

2. Non-impact printers

Inkjet printer

These printers are faster and quieter than the impact printers. They print using ink, thermal or laser mechanisms. *Examples:*

- **Inkjet printers- Inkjet printer** is a type of computer printer that creates a digital image by propelling droplets of ink onto paper.
- **Thermal printer/direct thermal printer** is a digital printing process which produces a printed image by selectively heating coated *thermochromic paper*, or *thermal paper* as it is commonly known, when the paper passes over the thermal print head. The coating turns black in the areas where it is heated, producing an image. Two-color direct thermal printers can print both black and an additional color (often red) by applying heat at two different temperatures. They are mostly found in super markets to produce receipts.

Thermal printer

- **Laser printers -** Laser printers have excellent print quality, low noise levels, high speed and the ability to print both graphics and text. Computer sends the data/image information to a processor within the laser printer which has photo-sensitive components which causes negatively charged ions to be produced which acts as hold-ups for ink drops. Light is then reflected, with the use of mirrors for accuracy and precision, onto where toner will be applied. This allows the toner to stick to the precise positions on the paper.

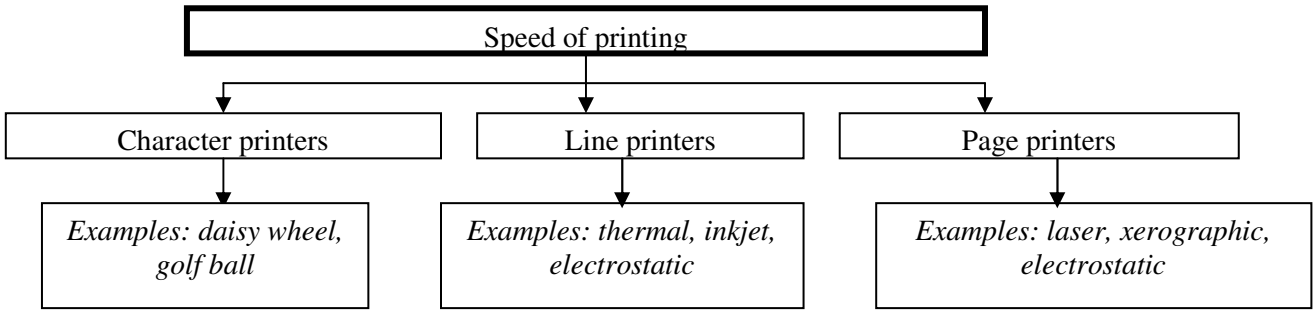
- **Photo printer-** Different from inkjet and laser printers in their printing mechanism. Whilst inkjet printers use a painting method for printing, thermal printers use heat to imprint the image on paper.

Thermal photo printers use stencils or color panels called dye panels. These dye panels only have one color each, so for every print, there are four dye panels used: black, cyan, yellow, and magenta. The printing process involves individual dye sublimation on paper. For instance, when a photo is currently being printed, the color panels will be individually imprinted on the paper.

Impact vs. non-impact printers

Impact	Non-impact
Slow	Faster
Use inked ribbons	Use thermal, photo and electrostatic principles
Multiple copy production possible	Multiple copy production impossible
Cheaper	Costly
Noisy	Quiet

Classification of printers according to the speed of printing



Character printers- provide one character at a time and are hence comparatively slow and less costly than the line or page printers.
Line printers- provide one whole line of print at a time. Hence they are more expensive than the character printers.
Page printers- page printers provide one whole page of print at a time, hence faster than both line and character printers, relatively more expensive and produce high quality printouts.

Factors to consider when purchasing a printer

- **Hardware cost-**this is the initial cost of buying a printer. I.e. desk jets are cheaper than laser jets.
- **Running cost-** this involves maintenance costs i.e. consider the cost of buying cartridges and toners and also the printing mechanisms.
- **Software and networking features-** is your printer compatible with the features of your computer. Most modern printers require higher memory and a higher computer speed.
- **Printing Speed –** which kind of printer do you want? Character, Line or page printers? If you handle large volumes of data? Then a page printer will serve you better
- **Printing quality and reliability-** presentable work and reliability are vital for the general output of a printer. Check whether it supports different paper sizes
- **User needs-** user's expectations and needs are vital in any printer purchase i.e. card printers, photo printers, receipt printers, publishing etc.
- **Availability of running materials-** do some feasibility study on the availability of running materials in the market for they should be readily available.

Plotters

The plotter

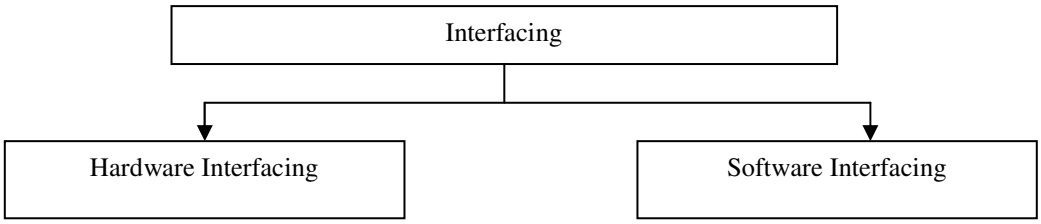
- is a computer printer for printing vector graphics. In the past, plotters were used in applications such as computer-aided design, th7ough they have generally been replaced with wide-format conventional printers. Pen plotters print by moving a pen or other instrument across the surface of a piece of paper. This means that plotters are restricted to line art, rather than raster graphics as with other printers.

Exercise Questions

1. What are the main differences between a daisy wheel printer and a laser printer
2. Differentiate between impact and non-impact printers
3. What are video adaptors? And what are they used for?
4. Draw and label the surface of a disk platter of the hard disk
5. Differentiate between a flash disk and a memory card
6. List the three types of softcopy output
7. Discuss the four types of registers
8. What are platters? What are they used for?
9. List six factors to consider when purchasing a printer
10. List any four types of flat display monitors

Power lines and interfacing in a computer

An **interface** is a tool and concept that refers to a point of interaction between components, and is applicable at the level of both hardware and software. Most computer interfaces are bi-directional, but the mouse or graphics adapter are uni-directional.

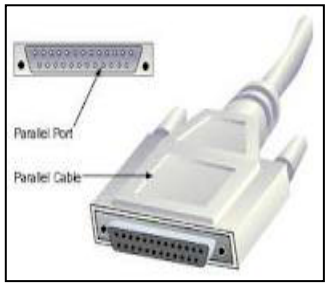


Hardware Interfacing

-Hardware interfaces exist in computing systems between many of the components such as the various buses, storage devices, other I/O devices, etc. A hardware interface is described by the mechanical, electrical and logical signals at the interface and the protocol for sequencing them (sometimes called signaling)

Peripheral devices interfacing

– This refers to connecting a peripheral device to a computer through ports using either cables or wireless connectivity.



Parallel Interface

Parallel cables transmit information simultaneously using a set of many conductors (wires). The advantage of using such cables is that they transmit data faster over a short distance.

A parallel cable connects to a parallel interface port commonly referred to as line printers (LPT). Parallel cables are used to connect printers, optical scanners and some removable storage devices such as a zip drive.

Serial interface

Serial ports also known as COM or RS232 ports, support transmission of data one bit at a time, hence it is slower than the parallel ports, However they are good than parallel cables because they can transmit data over a larger distance. They are used to connect devices such as the mouse and some printers.

COM

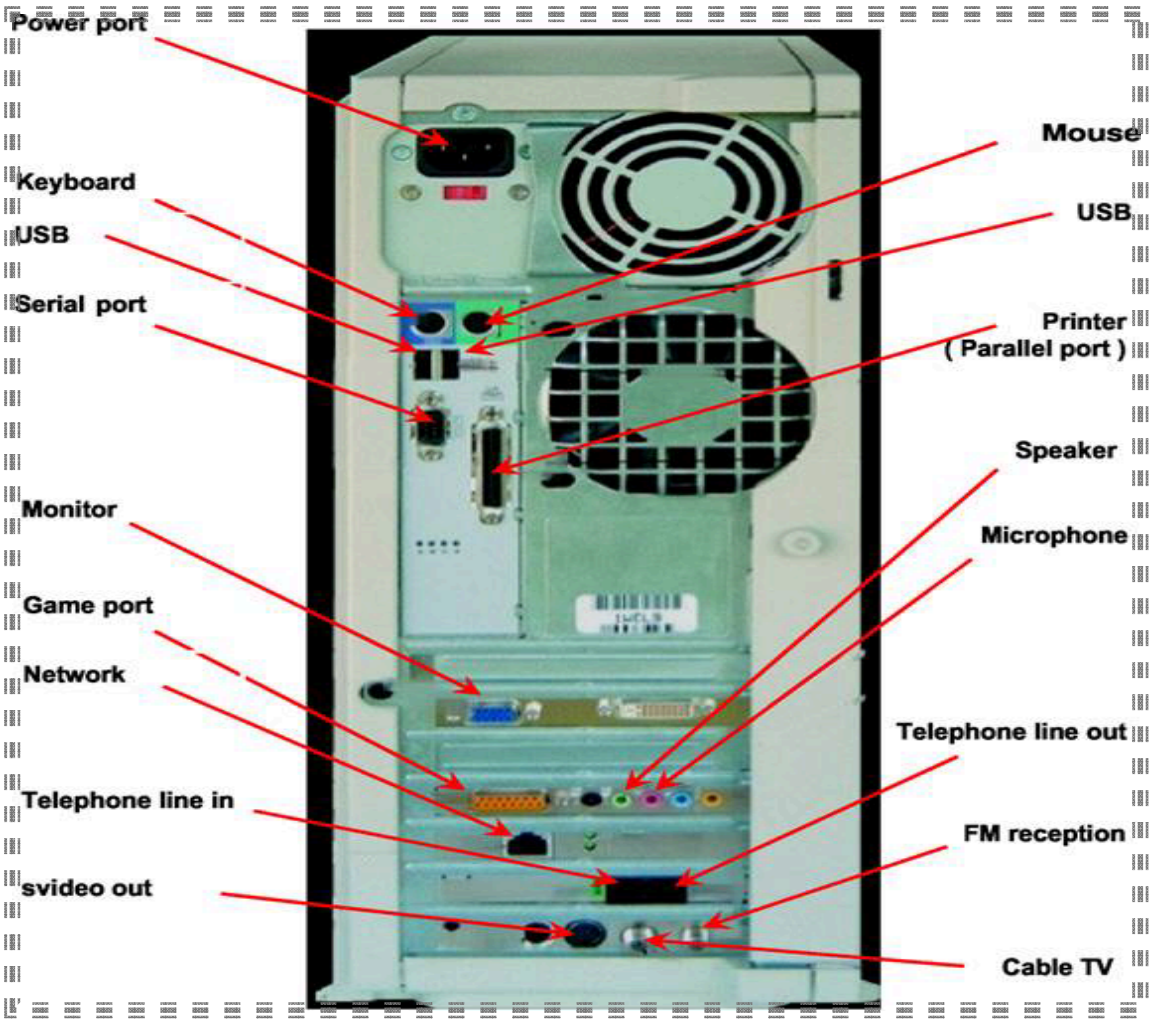
Is not an acronym unlike many of the other ports; it simply stands for the "com" in communications. It is commonly known as the serial port because it was the first port to use that type of communication. Widely used since personal PCs became a common tool.

Are cheap and can be used with longer cables than parallel ports. Like the LPT port it is shaped like a trapezoid, but smaller, with the short end in the bottom and has 9 pins divided in 2 rows, one with 5 and other with 4 (be careful not to confuse it with the monitor port which is similar in size and shape but it has more pins and it is used only for monitors.) Commonly used to connect the mouse, keyboard, modems, cameras, and PDAs, especially before USB ports appeared. There are usually more than one COM ports in a computer and to differentiate them they are labeled with a number after COM. Commonly there are COM 1 and COM2 available. A typical COM port reaches speeds of 115Kb/sec.

Pictures

	
COM Port - Socket	COM Port - Plug

Advantages-COM ports are very versatile. Many types of peripherals have used the COM port traditionally. Though, with the advent of USB, the use of COM ports is dwindling.
Common Peripherals-As mentioned above, COM ports are extremely versatile. They have be used to connect mice, keyboards, modems, cameras, and PDAs, to name a few.

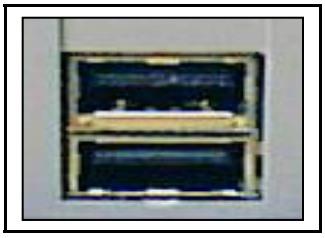


Ports on a PC

USB-Universal Serial Bus

-is a serial and female port that can be use for any peripheral available in both Macs and PCs. It is one of the newest and faster computers available. It is slower than a FireWire port but is more than adequate for the type of peripherals for which it was designed for. In many ways have come to replace the standard parallel (LPT) and Serial (COM) ports, including printer, keyboard and mouse ports, having a much faster communication capabilities. Its speed goes upto 12 mbits/sec. The socket (and proper plug) in the computer has the shape of a thin a rectangle (called "Series A") measuring about 1/2 inch by 1/8 inch and are usually located on the back of your computer. Some computers also have USB ports located on their fronts (MAC in the side). When given a choice, it is suggested that the ports on the back be used so the ones in the front are available to plug a mobile device like a camera.

Pictures: *Notice that USB ports have 4 pins and the shape of a thin a rectangle*



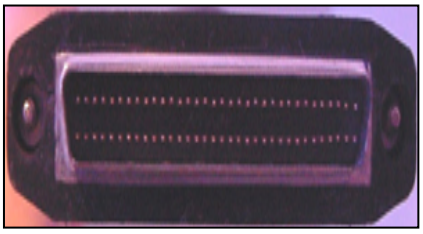
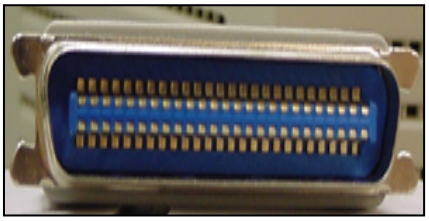
Advantages: It has the capability of "hot plugging" which is the ability for plugging and unplugging a device without powering down. Now there are many motherboards that came with 2 USB ports available, being common in both Mac and PCs. USB devices are self-identifying, and USB is Plug-and-Play compliant, which means that installation and configuration of USB peripherals will be relatively easy.

USB cables also carry power, so you don't need extra cables or transformers. · USB ports on your computer will work with any USB peripheral that you want to plug into it. USB is also "hot-swappable": you can plug stuff in or out without turning off the computer. **One disadvantage** is that is has to use a Windows98 or higher operative system and Windows NT doesn't support USB.
Common Peripherals: Even though USB supports any peripheral so far the most common ones that come with a connection for these ports are printers, digital cameras and mice.

Small Computer System Interface (SCSI)

SCSI stands for "Small Computer System Interface" and is usually known by the way it's pronounced "**scuzzy"**. It's a general-purpose male and parallel port for connecting many different devices to a computer. It's a fast port that was available before USB and FireWire. Usually used with CD-ROM drives and scanners. Commonly present in older Macs, if you want to use it on a PC they require an additional card that rarely comes on a regular PC. A common SCSI port reaches between 5 and 10 mbits/sec. SCSI usually is more used in big computers like servers and mainframes. When it is used in desktop PCs it is because you can add a scanner and several other drives (CD, DVD or Zip drives) to one SCSI cable chain. However this is less important now that alternate multi purposes flexible ports such as USB and FireWire are more popular.

Pictures:

Port	
Plug	

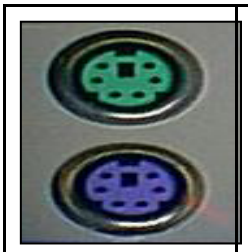
Advantages: SCSI ports are very fast and could in theory be used with any peripheral and with many of them at the same time. However really they are used mostly for scanners and external drives especially on Macs and big PC servers.
Disadvantages-One of the problems is that there is not a real standard for manufacturers so there are some different types of SCSI ports in the market. Also they are quiet expensive and so are the peripherals, cables and adapters associated with it. That is why they are more common in professional setting rather than for home use.
Common Peripherals: Even though theoretically they could be used with almost peripheral they are commonly used with scanners and external drives.

Personal System 2 (*PS/2*) Interfaces

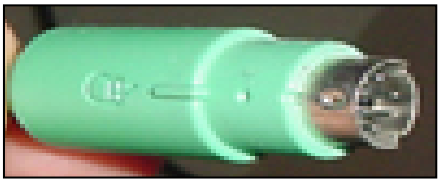
-PS2 is a port that was specially designed to use with mice and keyboards. It is also known as the standard mouse port. It's circular in shape about 1/2" and has six metal pins on the inside (Not to confuse with the old keyboard 5 pin bigger round connector.) This type of connection is common on all computers since 1997 and among other things it can serve to the purpose of freeing up a COM port to be used with other devices.

Advantages -PS2 ports are always available in every computer. And it is fairly cheap compared to other ports. It is especially standardized for mice and keyboards.
Common Peripherals: Mice and Keyboards are commonly connected to computers by PS2 ports.
Audio Interface-Audio interface is used to connect speakers and microphone.

Pictures:



PS2 ports



Plugs for PS2 Ports

Firewire Interface

FireWire is the newest and fastest serial computer port (bus) known also as i.Link (Sony) or IEEE-1394 by its technical name. It was developed by Apple and Texas Instruments mainly for use with video and audio demands in both Macs and PCs, but can be used for connecting many different peripherals. It reaches speeds of 400mbits/sec or even more in newer versions. FireWire is an Apple trademark but it has become the more commonly used name referring to IEEE-1394. It has 6 pins. The female or socket in the computer has a rectangular shape and the connector that goes on the peripheral is round. It has the capability of "hot plugging" which is the ability for plugging and unplugging a device without powering down. In many ways has come to replace SCSI as an external port. There are still only few motherboards that come with a FireWire port, being more common in Mac computers.

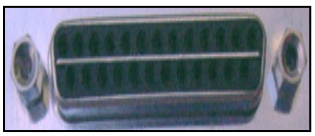
Pictures

Advantages FireWire transmits data very fast (400mbits/sec or more). FireWire is also capable of "hot plugging", which allows users to plug and unplug peripherals without restarting their computers.
Common Peripherals Currently FireWire is almost entirely used to connect digital video cameras to computers, though it is possible that many more audio and video media will utilize FireWire in the near future.

LPT

- *LPT (line print terminal or local printer terminal)* is commonly known as the parallel port and typically used as the printer connection device. It can transmit signals for distances limited to 20 feet or less. It's Faster than serial COM ports but more expensive. A typical LPT port reaches a speed of 150kb/sec. There can be more than one LPT ports in a computer and to differentiate them they are labeled with a number after LPT. It is most common to have only one for the printer called LPT1. It is shaped as a trapezoid with the short end in the bottom and 2 rows of pins, one 13 and other with 12 pins.

Pictures



LPT Port

A Plug for LPT Ports

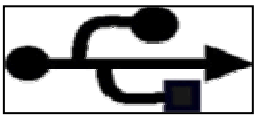
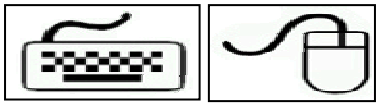
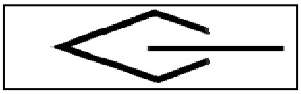
Advantages-It is faster than serial ports. It is available in every computer. Also, it is a port that is specially standardized for a printer to connect to a computer.
Common Peripherals-Commonly a printer uses LTP1 port.

Wireless peripheral interface

-A wireless peripheral interface is used for coupling with a Universal Serial Bus (USB) port for connecting a wireless peripheral with a host computer or controller. Wireless peripheral devices (e.g., keyboard, mouse, trackball, touch pad, joysticks, and game controllers) transmit communication signals, e.g., radio frequency (RF) signals, to the peripheral interface, which are received and processed into formats suitable for transmission to the host computer or controller via USB, either alone or in combination with other standard external bus systems, such as serial and PS/2. Other technologies for wireless interface include: Bluetooth, Wi-Fi *(derived from playing with words I.e. from Hi-Fi which stands for high fidelity)* and Infrared.

Infrared is a wireless interface that uses infrared to connect to infrared-enabled devices**. Bluetooth** is also a wireless interface that uses short-range radio broadcast to connect to any Bluetooth-enabled device.

Commonly used interfacing symbols

Port	Symbol
USB	
PS2	keyboard Mouse 
LPT	
FireWire symbol	
COM	
SCSI	

Basic computer setup cabling

Before attempting to carry any setup activity, the following precautions should be observed:

1. Disconnect all drives from power source before starting to work on them.
2. Do not work on peripheral device without the guidance of a teacher.
3. Never work alone because, you may need help incase of an emergency.
4. Discharge any static electricity that might build upon the hands by touching an earthen metallic object and then wearing an antistatic *wrist member*. This is because your body can hold as much as 200 volts of static charge that can damage sensitive components on the mother board.
5. Avoid touching metal conductors with wet hands. This may cause short circuiting thus damaging chipsets.
6. Don't force a component to open/eject. There are laid procedures for every opening/ejection. Force can break or destroy a component makeup.

Tools and other requirements

The following tools are necessary in any setup:

1. Screw drivers
2. Antistatic wrist member
3. Pliers
4. Devices manual
5. Devices software (drivers)
6. Fuse testers
7. Gloves etc

Mounting internal devices

External devices are connected to the motherboard via special sockets known as *ports* whilst internal devices are connected through *slots* and *sockets*. It's recommended to study the manufacturer's manual before connecting devices.

Mounting hard drives and optical drives

Internal devices are connected to the motherboard using special ribbon cables. Hard disks and optical drives are connected to the motherboard through interface connectors commonly referred to as controllers. Three types of controllers are:

EIDE- enhanced Integrated Drive Electronics
SCSI- Small Computer Systems Interface
SATA- Serial Advanced Technology Attachment

EIDE are more efficient and supports *hot-swapping*. Hot-swapping means that a drive can be removed or inserted while the computer is still on. Each EIDE supports up to two drives on a single ribbon cable. This type of setup is called a *master/slave configuration* because one controller directs the activities of both drives. To mount an EIDE drive, proceed as follows:

1. Wear antistatic wrist member to discharge any static charge on the body.
2. Determine which drive will be the master and use the drive label information to determine which jumper settings to use for a master or a slave.
3. Check that a free drive bay is available, slide the disk into that bay and screw it into place.
4. Ensure that there is free power connector from the power supply unit and connect it to the drive. Notice that it is designed to fit in its socket in only one direction.
   5.Identify pin 1 as labeled on the drives socket and match it with the red or brown continuous line of the ribbon cable. Most cables will only fit in one direction.
6. Connect the interface cable to the drive, then into the controller slot on the motherboard. If installation is complete, replace the casing power.

Connecting external devices

To connect a device to the system unit, you need to identify its port and interface cable.

1. Gently and carefully connect the interface cable of each device to the correct port and to the device if it is not already fixed permanently.
2. Connect the computer to the power source and switch it on.
3. Observe boot up information on the screen to see whether Power-On-Self-Test (POST) displays any error message.
4. A successful boot means that the computer was properly set up

Group Discussion for Revision questions on topics

1. What are:
   a. input devices
   b. processing devices
   c. output devices
2. Discuss the following terms
   a. data
   b. information
3. Name four main parts that make up a computer
4. What are peripheral devices?

5. Name such devices in question 4 above
6. With the aid of an organizational chart, show how computers are classified.
7. In which classification do the school computers belong? Why?
8. Discuss classification of computers according to:
    a. Size
    b. Purpose
    c. Functionality
9. With an aid of a diagram show how digital and analogue signals are represented.
10. Name at least six microcomputers available in the Kenyan market today.
11. Name 10 areas where computers are used and what they are they used for?
12. What are the main functions of a computer?
13. What is the main purpose of a computer?
14. Briefly discuss evolution of computers since ages before Christ to date?
15. Discuss causes of computer damage in the computer lab and how to avoid them?
16. List six safety precautions in the computer lab. Why are they necessary?
17. Discuss classification of keyboard keys and give examples for each classification.
18. Draw symbols for each keyboard key listed below and indicate their uses?
    a. SysRq
    b. Escape key
    c. Spacebar
    d. Backspace
    e. Home
    f. End
    g. Insert
    h. Tab Key
    i. Shift key
    j. Control
    k. Num Lock
    l. Caps Lock
    m. Scroll Lock
    n. Windows logo key
    o. Menu Key
19. Indicate whether the following devices listed below are pointing, scanning or keying devices.
    a. Joy Stick
    b. Keypad
    c. Flatbed
    d. MICR
    e. Keyboard
    f. Mouse
    g. Trackball
    h. OBR
    i. OCR
    j. Stylus
    k. Light pen
    l. Touch screen
    m. Camera
20. ……is regarded as the brain of the computer and also known as a microprocessor.
21. Using a well labeled diagram, show parts of the Microprocessor.
22. ……..is used to input voice in the computer.
23. By the use of a well labeled diagram, show all the events that '*task A'* go through to be processed into information.
24. Differentiate between a computer, a system and a computer system.

25. This is a gadget mounted on the motherboard, drives or HDD used as a ROM, hosts a number of other electrical gadgets like capacitors, resisters and transistors. Even the microprocessor belongs to this gadget. What is this gadget?
26. Kwamboka went into a shop to buy a RAM for her desktop computer and she encountered problems in interpreting the following abbreviations: DDR, SDR, DIMM, SIMM, SRAM and DRAM. Can you help her understand these terms?
27. The speed of a computer is measured by the frequency of computers processing signals. *True/false?* If true, explain how?
28. Draw a well labeled diagram for:
    a. HDD
    b. HDD-disk platter
29. Name six softcopy display devices available in the Kenyan market today. How do they differ from each other?
30. Discuss:
    a. Pixel
    b. Color depth
    c. Resolution
    d. Refresh rate
    e. Display size
31. By the use of organizational chart, discuss classification of printers.
32. …… is a special type of printer used to produce bill boards, engineering drawings, maps etc
33. Discuss:
    a. RAM vs. ROM
    b. Firewire vs. USB
    c. PS/2 vs. Wireless
    d. SCSI vs. Firewire
    e. COM vs. LPT
34. Disconnect all computer parts and reassemble them again. Write a report on every activity observed. The report should feature:
    a. Tools used
    b. Safety precautions observed
    c. Disconnecting procedure
    d. Procedure for connecting the CPU, HDD, Drives, Cards, CMOS battery, peripheral devices and which interface was used to connect which device
    e. A successful booting procedure.
35. Discuss numerous factors to consider when purchasing a printer.
36. Nyambura bought a brand new desktop computer with a warranty but upon reaching home, the computer could not boot. List numerous reasons that may have caused the computer not to boot. What will you advice her to do if the computer failed completely to start?
37. Discuss:
    a. Wi-FI vs. Bluetooth
    b. Keypad vs. Keyboard
    c. SMS vs. MMS
    d. Memory Card vs. Flash Disk
    e. CD vs. LS Super Disk
    f. Optical Tape vs. Optical Card
    g. Gramophone Disk vs. DVD
    h. Live disk vs. HDD
38. Discuss and analyze all video adaptors
39. What are these devices used for:
    a. LED
    b. Speakers
40. What are the advantages of tower computers over desktop computer models
40. Give reasons why mobile phones are regarded as computers

Basic Computer Practices and Maintenance Skills for Starters –Part one

Starting up a Computer

The process of starting up a computer is referred to as *booti*ng. **Booting** can also be defined as the initial set of operations that a computer system performs when electrical power is switched on.
There are two types of booting namely: cold and warm booting
Cold booting-is the process of starting a computer the was originally off
Warm booting-is the process of restarting a computer.

How Computers Boot Up

Powering on the computer

When you first press the power button the computer sends a signal to the computer power supply (shown below), which converts the alternating current (AC) into a direct current (DC) to supply the computer and its components with the proper amount of voltage and electricity.

Once the computer and its components have received ample power and the power supply reports no errors it sends a signal (using transistors) to the motherboard and the computer processor (CPU). While this is happening, the processor will clear any leftover data in the memory registers and give the CPU program counter that tells the CPU it's ready to process the instructions contained in the basic input/output system (BIOS).

BIOS and the POST

When the computer first looks at the BIOS, it begins the power-on self-test (POST) sequence to make sure the components in the computer are present and functioning properly. If the computer does not pass any of these tests, it will encounter an irregular POST. An irregular POST is a beep code that is different from the standard one or two beeps. For example, an irregular POST could generate no beeps at all or a combination of different beeps to indicate the cause of the failure.
If the computer passes the initial POST, it will next look at the memory located in the complementary metal oxide semiconductor (CMOS) chip, which is kept alive by the CMOS battery even when the computer is turned off. This chip contains information such as the system time and date and information about all the hardware installed in your computer.
After loading the CMOS information, the POST will begin inspecting and comparing the system settings with what is installed in the computer. If no errors are found it will then load the basic device drivers and interrupt handlers for hardware such as the hard drive, keyboard, mouse, floppy drive. These basic drivers allow the CPU to communicate with these hardware devices and allow the computer to continue its boot process.
Next, the POST will check the real-time clock (RTC) or system timer and the computer system bus to make sure both of these are properly working on the computer. Finally, you'll get a picture on your display after the POST has loaded the memory contained on the display adapter and has made it part of the overall system BIOS.
Next, the BIOS will check to see if it's currently performing a cold boot or warm boot (reboot) by looking at the memory address 0000:0472, if it sees 1234h the BIOS knows that this is a reboot and will skip the remainder of the POST steps.
If 1234h is not seen, the BIOS know that this is a cold boot and will continue running additional POST steps. Next, it tests the computer memory (RAM) installed in the computer by writing to each chip. With many computers, you'll know it's performing this step if you see the computer counting the total installed memory as its booting.
Finally, the POST will send signals to the computer floppy, optical, and hard drive to test these drives. If all drives pass the test, the POST is complete and instructs the computer to start the process of loading the operating system.

Booting the operating system

After the computer has passed the POST, the computer will start the boot process. This process is what loads the operating system and all of it's associated files. Because Microsoft Windows is the most commonly used operating system, this section will cover the process of loading Microsoft Windows. The BIOS first hands control over to the bootstrap loader, which looks at the boot sector of the hard drive. If your boot sequence in CMOS setup is not setup to look at the hard drive first, it may look at the boot sector on any inserted floppy disk drive or optical disc first before doing this.
In this example, the Microsoft Windows XP NT Loader (NTLDR) is found on the boot sector and tells the computer where to find the remaining code on the hard drive. Next, Windows loads the ntdetect.com file, which displays the Windows splash screen and loads the Windows registry. After loading the registry, Windows begins to load dozens of low-level programs that make up the operating system into memory. Many of the initially loaded programs are what allow Windows to communicate with the essential hardware and other programs running on the computer.
After the registry has loaded the initial basic hardware devices, it begins to load Plug and Play devices, PCI, and ISA devices. After loading all these devices, Windows then moves to loading full support of the hard drive, partitions, and any other disk drives and then moves to all other drivers that have been installed.
Finally, after successfully completing the above steps any additional required services are loaded and Windows starts.

Hardware devices communicating with the computer

After the computer has loaded the operating system, hardware attached to the computer must be able to communicate with the CPU. Hardware communication is done by using an interrupt request (IRQ). Each time a hardware device needs the attention of the computer the interrupt controller sends the request (INTR) to the CPU so it temporarily stop what it is doing to process the request of the hardware device. Anything that was being currently done by the CPU is put on hold and stored as a memory address in the memory stack and is returned to after the interrupt request is processed. All these processes make computers take time before they are ready for use.

Factors that slow boot up process

1. **Startup Programs**-Some programs installed on your computer are automatically set to run on startup. They use a lot of memory which is required elsewhere. Such programs include: computer anti virus/virus, application software and networking software.
   Solution: from start menu, click on **run** command. In the dialog box labeled run, type **msconfig** command on the open *text box* then click **ok**. In the system utility interface box that appears click the startup tab then *uncheck* those programs you don't need at startup and click ok. Restart your computer for changes to take effect.
2. **Damaged MBR (master boot record**) this is a memory storage area in the hard disk that keeps startup files. If damaged or corrupted by unprocedural shut down, viruses, dust and smoke, the computer fails or slows startup process.
   Solution: run the disk defragmenter utility, scandisk and chkdsk commands or system registry repair software.
3. **Low (RAM) memory**-insufficient memory in the RAM causes the CPU to fetch one program after another from the virtual memory in the HDD (virtual memory is a memory location in the HDD set aside by the operating system to be used as if it's a RAM). This process delays the CPU in caching start up files.
   Solution: upgrading your computer memory by adding higher modules.
3. **Scattered system files**- As files get used daily, they get scattered in the hard disk storage thus taking the CPU a lot of time to fetch them into the RAM. This slows the start up process.
   Solution: run disk defragmenter utility and system registry repair utility
4. **Full hard disk**– Clear some space in the HDD by deleting unnecessary files

N/B: running the disk defragmenter will be explained later in the topics.

Shutting down a computer

Always follow the correct procedure when shutting down a computer. Failure to do so can result to loss of unsaved information, damaging the hard disk surface and computer programs.

To shut down a computer proceed as follows:

i. *Save all your work and close all active windows*
ii. *Click on start button and choose* **turn off computer** *command*
iii. *On the prompt window that occurs click:*

- **Turn off**-*to turn off the computer*
- **Standby/hibernate**-*to make your computer sleep/idle (this command saves power when a computer is idle)*
- **Restart**- *for warm booting which is mostly used when a computer hangs or for software changes to take effect.*

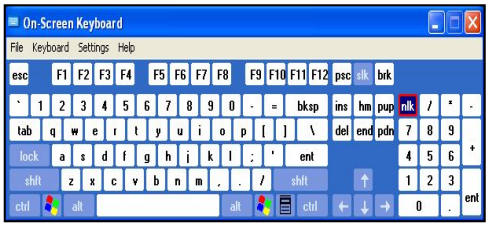
The keyboard

Keyboard setup can be classified in a number of ways including: language setting, country setting, technology, disability, size, manufacturer's preferences etc. but here, the keyboard will be classified according to what is mostly available in Kenyan computer labs.

QWERTY keyboard described according to the arrangement of letters on the keys, is the most commonly used keyboard in Kenya. This keyboard exists in two interfaces namely: actual and virtual keyboard.

Actual keyboard is used by majority of people who are not disabled.

Virtual keyboard-is a software component that allows a user to enter characters. A virtual keyboard can usually be operated with multiple input devices, which may include a touch screen, an actual keyboard and a computer mouse. On a computer, one purpose of a virtual keyboard is to provide an alternative input mechanism for users with disabilities who cannot use a physical keyboard. Another major use for an on-screen keyboard is for bi- or multi-lingual users who switch frequently between different character sets or alphabets. Virtual keyboards are commonly used as an on-screen input method in devices with no physical keyboard,



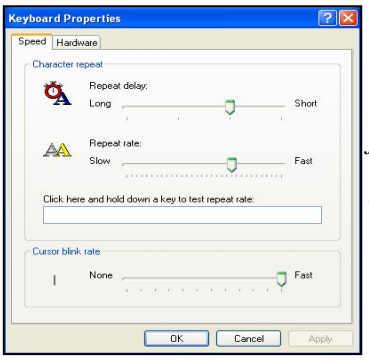
To use an on-screen keyboard on your windows powered PC, proceeds as follows:

i. *Click on start menu, all programs, accessories then accessibility*
ii. *On the last side kick menu that appears, click on-screen keyboard. The keyboard will appear on your screen. Reposition and use by clicking on keys using the left mouse button.*

How to use actual/physical keyboard effectively

1. Sit upright and maintain an alert posture
2. Place the material to be typed in a position you can read without straining
3. Put feet flat on the floor
4. Arch your wrist
5. Keep a good eye line
6. Position hands on home row (left hands: a, s, d, f, right hand: j, k, l,;,)
7. Use your left index finger to hit the g, t, r, v, b, 5, and 6 keys.
8. Use your left middle finger to hit the e, c, and the 3 keys
9. Use your left ring finger to hit the w, x, and 2 keys
10. Use your left ring finger to hit the w, x, and 2 keys
11. Use your left pinky to hit the q, z, and the 1 key.
12. Use your right index finger to hit the y, u, h, n, m, 6, 7, and 8 keys.
13. Use your right middle finger to hit the u, <, and 9 keys.
14. Use your right ring finger to hit the o, ., and the 0 keys.
15. Use your thumbs to strike the space bar.
16. Use your right hand on the num pad. Place your index finger on the 4. Your middle finger on the 5. Your ring finger on the 6, and your pinky on the enter key. Place your thumb on the 0. Strike the 7 and 1 with your index finger. Strike the 8 and 2 with your middle finger. Strike the 9 and 3 with your ring finger. Strike the - and + with your pinky.

Customizing keyboard settings



Speed- *the rate at which a letter repeats itself can be changed depending on the user needs. The speed at which the cursor blinks can also be changed as follows:*

a. *Click on* **start** *menu and select the* **control panel** *option.*
b. *On the* **control panel window**, *open* **printers and other hardware** *icon*
c. *click* **keyboard** *icon from the printers and other hardware window on the* **keyboard properties** *dialog box that appears, customize the character repeat and cursor blink rate of your choice*

The Mouse

This is a pointing device that moves the pointer on the screen when pushed/pulled on a flat surface courtesy of the mouse ball and infrared rays as used by actual and optical mice respectively.

How the mouse works

The movement of the mouse on a flat surface corresponds with the direction on the movement of the pointer on the screen. The pointer can change into a cursor when editing text or any other shape depending, which part the pointer is placed on an active window.

Cursor

A cursor is used to enter text in a computer. Where its blinking, is the place where text and graphics are inserted including space.

Pointer

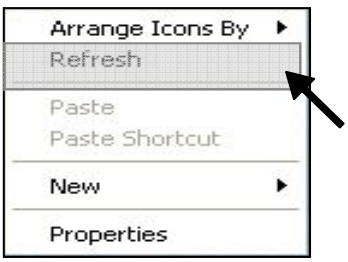
A pointer is used to select icons, controls, graphs that the user wants to work on. It can also be used to reposition objects on the screen when placed on the title bar of an active window.

When the pointer is placed on an icon, the left button of the mouse is pressed/ clicked to execute a command. A **command** can either be opening, selecting, running etc. some icons need pressing the left button twice in quick succession for a command to take effect depending on how the computer is set. This process is called **double clicking**.

To eliminate double clicking, proceed as follows:

a. *Open my computer icon from the* **start menu**
b. *Click* **tools** *menu from the window that appears and select* **folder options** *command.*
c. *On the* **click items as follows** *drop down list, check on* **single-click to open an item (point to select)** *then click* **ok**.

The right mouse button is used to provide a dropdown list of commands to choose from. This list is a shortcut for what is available in the menu bar.



Drag and drop is used to drag windows, pictures and graphs from one position to another and resizing objects. This is possible by clicking on an item using the left button, hold down the button as you move the mouse and then drop the item upon reaching the destination by releasing the button. Its challenging to new computer users but it's the easiest event to do with a mouse.

Customizing the mouse settings

Unlike like the keyboard, the following functions can be changed in mouse settings.

- Switching buttons
- Double clicking speed
- Click lock-enables you to highlight or drag without holding down the mouse button
- Changing the scheme-predefined list of mouse pointers
- Pointer motion
- Scrolling wheel settings etc

To change these settings, proceed as follows:

- *On the* **control panel** *from the start menu, click* **printers and other hardware**
- *Click on* **mouse** *command icon and customize settings on the dialog box that appears*

NB/ *press f1 key for more details.*

Monitor/screen

The screen is supported by a special gadget called a video card/adaptor which is mounted or connected to the motherboard. Since the monitor and an adaptor are hardware devices, they require drivers to support their functionality. A **driver** is a piece of firmware that acts as an interface between software and hardware systems.

To check weather your video card is working properly, proceed as follows:

- *Right click* **my computer** *icon from start menu and select* **manage***.*
- *Select* **device manager** *from the computer* **management window displayed.**
- *Click* **on display adaptors** *and an option for the current adaptor will appear i.e. Intel (R) 82815 graphics controller.*
- *Right click on that option and select* **properties.**
- *On the dialog box that appears, the* **device status message** *should show 'this device is working properly'*

Adjusting the appearance of a screen

On front/side or beneath your screen are buttons/wheels used to adjust brightness, contrast, geometry, H (horizontal)- size, V (vertical size)-size, V-position, H-position, language, pincushion (A common type of distortion in CRT monitors in which horizontal and vertical lines bend inwards toward the center of the display.) etc

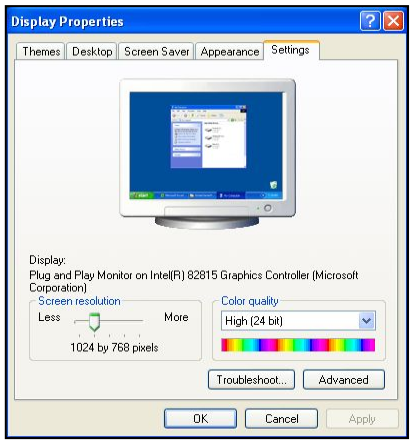
Enhancing the screen resolution and customizing the appearance of the desktop.

Customizing display properties on the desktop

You can customize display settings of your desktop using the following procedure:

- Right click on the desktop and select **properties.**
- A dialog box like the one shown below will appear.
- Do any of the following actions:

Display properties dialog box



Changing themes

- A theme is background plus a set of sounds, icons, and other elements to help you personalize your computer with one click.

To change the theme:

- *click on the '***themes tab'** *from the* **display properties** *dialog box and select from* **theme drop down** *list of themes i.e. modified, windows XP, windows classic, my theme etc.*
- *Click-* **apply command** *to save changes*

Changing desktop background

This is changing the background picture on your desktop

- *from* **display properties** *dialog box, click* **desktop** *tab and choose any background picture from* **background** *combo box. If the picture is located somewhere in the computer, click the* **browse** *button and locate the picture from the* **browse** *dialog box that appears.*

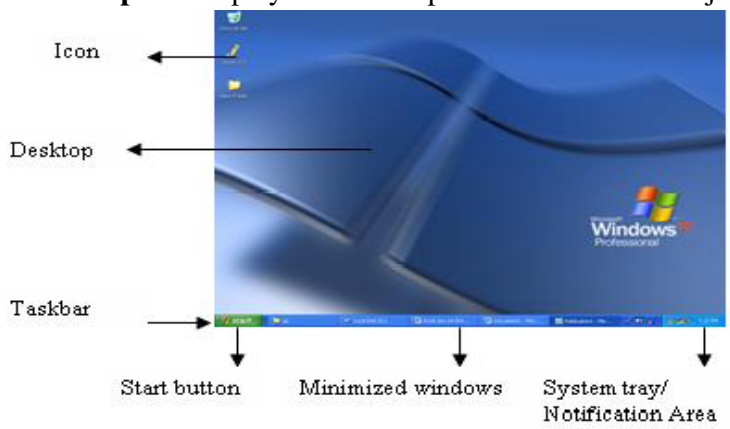
Changing screen saver

- A screen saver is an animated image that is activated on a personal computer display when no user activity has been sensed for a certain time.

To change screen saver, proceed as follows:

- *from the* **display properties** *dialog box, click* **screen saver** *tab. Change the screen saver from* **screen saver** *dropdown list, customize the settings from the* **settings** *button, adjust time between the CPU idle time and the emerging on the screen saver from* **wait** *option list and click* **preview** *button to see changes.*
- *To save power after a given period of time, click on* **Power** *button and choose a power scheme i.e. minimal power management will switch off the monitor after 15 minutes of CPU idle status. -Click-* **apply** *to save changes*

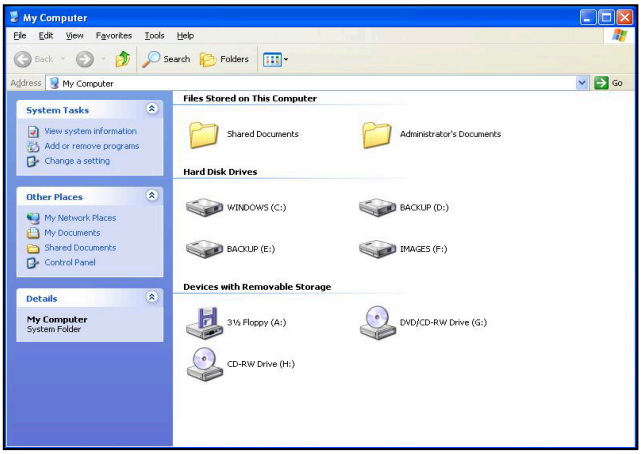
A desktop is a display area that represents the kind of objects one might find on the desktop folder



Appearance display properties
This changes the style, color scheme and font size of windows and dialog boxes on your screen. To change appearance:
-click on **appearance** *tab from display properties dialog box and customize style from* **style and buttons** *drop down list, color scheme from color scheme from* **color scheme** *drop down list and font size from* **font size** *drop down list. Then click* **apply** *to save change.*

Display resolution or **display device** is the number of distinct pixels in each dimension that can be displayed.
- To change screen resolution, click on settings from the display properties window and adjust the sliding option from screen resolution control. 1024 by 768 pixels is the most preferred resolution by most computer users and good for internet access.
Color quality (is a quantitative measure of the ability of a light source to reproduce colors of illuminated objects).
-To change the color quality scheme, click on color quality dropdown list and select either medium 16 bit or high 24 bit depending on which video graphic adaptor your computer uses.

Using My Computer



My Computer shows you the contents of your floppy disk, hard disk, CD-ROM drive, and network drives. You can also search for and open files and folders, and gain access to options in Control Panel to modify your computer's settings. To open My Computer:
- Click **Start**, and then click **My Computer**.
Once My Computer is open you'll see all available drives on your computer. For most users, you'll only be concerned with the Local Disc (C :) drive, which is the hard drive and what stores all your files. Double-click this drive icon to open it and view of its contents.

Tip: If you're looking for a document such as a word processor file you've created, music file, picture, or other personal file it's likely that it's contained in your documents folder. This folder is displayed in **My computer** as a folder and usually contains your name. For example, if your username was John, this folder would be named John's Documents.

Finding files in My Computer

If you're having trouble finding where one of your files is stored, use the Windows find feature to find the file. To do this from within My Computer either click on File and then Search or right---click on the C: drive or other folder you wish to search and click Search.
-In the Search window, type the name or part of the name of the file you're trying to find.

Adjust system settings with your computer

If you wish to manage your computer or view other settings and information about your computer instead of double-clicking the **My Computer** icon to open it:
-Right-click on the **My Computer** *icon and click* **Properties**. *Performing these steps will open your System Properties (the same window is accessible through the Control Panel).*

The start menu

Windows XP includes a new **Start** menu to provide quick access to frequently used programs and common system areas like My Computer, Control Panel, and Search. This area describes the function of the different areas of the new **Start** menu.

The left side of the **Start** menu contains the programs list, which is divided into two sections, the **"pinned list"** (at the top) and the **Most Frequently Used (MFU**) list. The two sections are separated by a line. The functions of these lists are as follows:

Pinned list:

The pinned list allows users to place shortcuts to programs and other items in the **Start** menu. It will be pre-populated with the user's default Web browser and e-mail program (these can be removed).

A program (.exe file) or a shortcut to a program can be "pinned" to the **Start** menu by right-clicking the item and clicking **Pin to Start Menu**. Any other item can be added to the pinned list by dragging and dropping it to the **Start** button or the **Start** menu. An item can be removed from this list by right-clicking it and clicking **Unpin from Start Menu** or **Remove from This List**. The order of the items in this list can be arranged by dragging and dropping them to the preferred position.

NOTE: If the program or shortcut that was pinned to the **Start** menu is moved or deleted, the link to it on the **Start** menu will no longer works.

MFU list:

The list of most frequently used programs (MFU list) appears below the Pinned list on the **Start** menu. This list keeps track of how often programs are used and displays them in order of most used (top) to least used (bottom). Programs can be removed from this list by right-clicking them and clicking **Remove from This List**. The order of the items in this list cannot be manually arranged (they are arranged according to how often they are used). At the bottom of the MFU list is the **All Programs** menu, which displays other programs that are installed.

To configure the settings for the Programs list, follow these steps:

1. *Right-click an empty area in the **Start** menu and select **Properties**.*
2. *Click **Customize**.*

*Configuration options for the Programs list are on the **General** tab.*

The right side of the **Start** menu displays links to special folders (My Documents, My Pictures, My Music) and system areas (My Computer, Search, Control Panel). To configure this area, follow *these steps:*

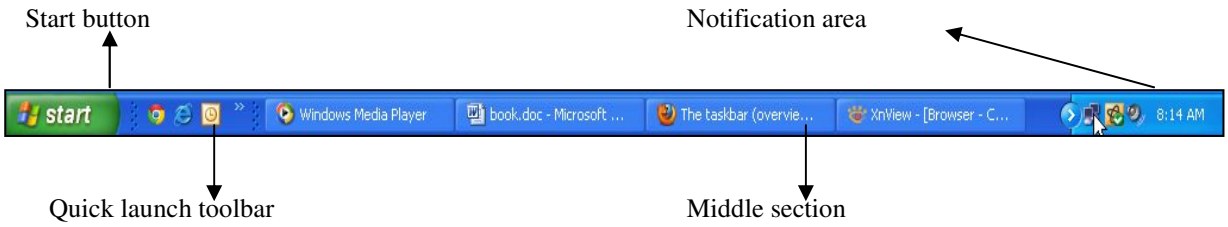
1. *Right-click an empty area in the **Start** menu and click **Properties**.*
2. *Click **Customize**.*
3. *Configuration options for the right side of the **Start** menu are on the **advanced** tab.*

The task bar

The taskbar is the long horizontal bar at the bottom of your screen. Unlike the desktop, which can get obscured by the windows on top of it, the taskbar is visible almost all the time. It has four main sections:

The **Start button**, which opens the Start menu. See The Start menu (overview).

- The **Quick Launch toolbar**, which lets you start programs with one click.
- The **middle section**, which shows you which programs and documents you have opened and allows you to quickly switch between them.
- The **notification area**, which includes a clock and icons (small pictures) that communicate the status of certain programs and computer settings.



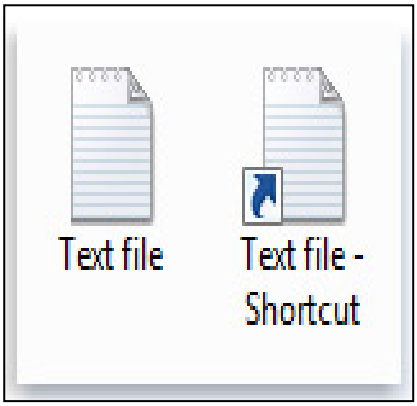
Icons

Icons are small pictures that represent files, folders, programs, and other items. When you first start Windows, you'll see at least one icon on your desktop. The figure below shows a list of icons.

Adding and removing icons from the desktop

You can choose which icons appear on the desktop—you can add or remove an icon at any time. Some people like a clean, uncluttered desktop with few or no icons. Others place dozens of icons on their desktop to give them quick access to frequently used programs, files, and folders.

If you want easy access from the desktop to your favorite files or programs, you can create shortcuts to them. A **shortcut** is an icon that represents a link to an item, rather than the item itself. When you double-click a shortcut, the item opens. If you delete a shortcut, only the shortcut is removed, not the original item. You can identify shortcuts by the arrow on their icon as shown in the figure below:

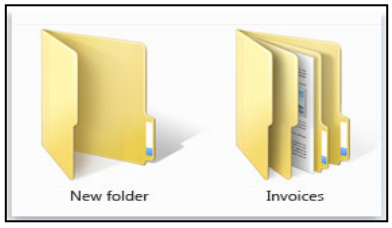


Moving icons around

Windows stacks icons in columns on the left side of the desktop. But you're not stuck with that arrangement. You can move an icon by dragging it to a new place on the desktop.

You can also have Windows automatically arrange your icons. Right-click an empty area of the desktop, click **View** and then click **Auto arrange** icons. Windows stacks your icons in the upper-left corner and locks them in place. To unlock the icons so that you can move them again, click Auto arrange icons again, clearing the check mark next to it.

Folder /Directory



A **folder** is a container you can use to store files in. If you had thousands of paper files on your desk, it would be nearly impossible to find any particular file when you needed it. That's why people often store paper files in folders inside a filing cabinet. On your computer, folders work the same way. Folders can also store other folders. A folder within a folder is usually called **a subfolder/ sub-directory**. You can create any number of subfolders, and each can hold any number of files and additional subfolders.

An empty folder (left); a folder containing files (right)

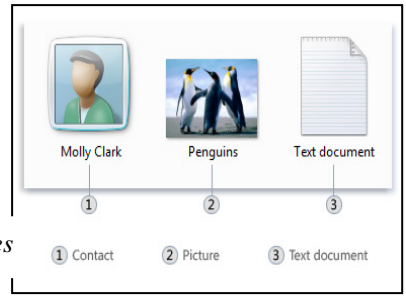
Using libraries to access your files and folders

When it comes to getting organized, you don't need to start from scratch. You can use libraries, a feature new to this version of Windows, to access your files and folders, and arrange them in different ways. Here's a list of the four default libraries and what they're typically used for:

- **Documents library**. Use this library to organize and arrange word-processing documents, spreadsheets, presentations, and other text-related files. *By default*, files that you move, copy, or save to the Documents library are stored in the My Documents folder.
- **Pictures library**. Use this library to organize and arrange your digital pictures, whether you get them from your camera, scanner, or in e-mail from other people. *By default*, files that you move, copy, or save to the Pictures library are stored in the My Pictures folder.
- **Music library**. Use this library to organize and arrange your digital music, such as songs that you rip from an audio CD or that you download from the Internet. *By default*, files that you move, copy, or save to the Music library are stored in the My Music folder.
- **Videos library**. Use this library to organize and arrange your videos, such as clips from your digital camera or camcorder, or video files that you download from the Internet. *By default*, files that you move, copy, or save to the Videos library are stored in the My Videos folder.

File

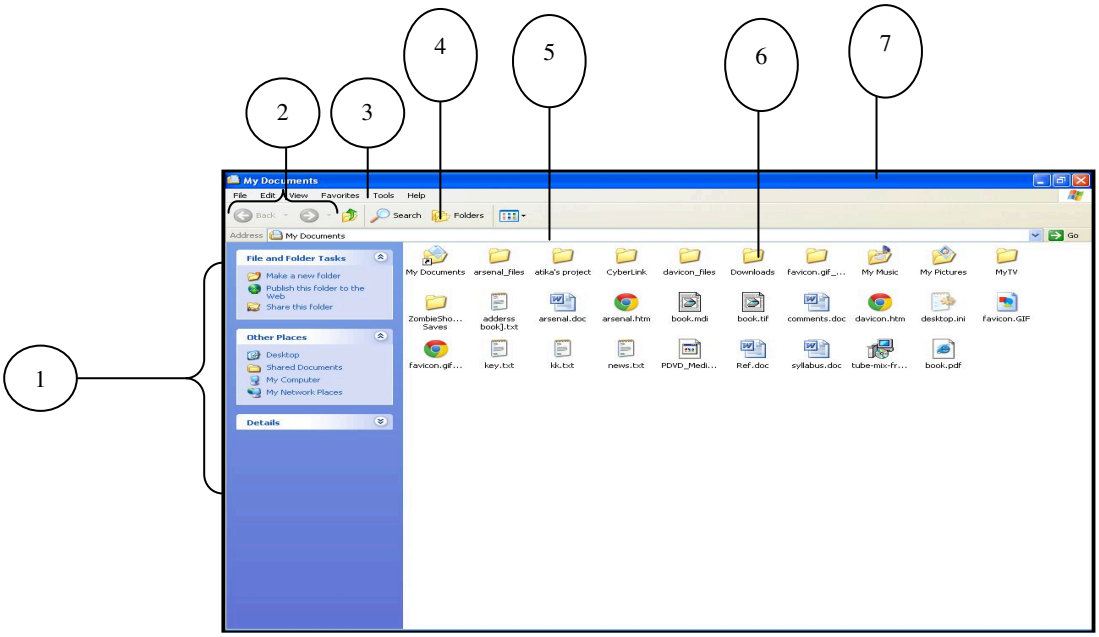
A **file** is an item that contains information—for example, text or images or music. When opened, a file can look very much like a text document or a picture that you might find on someone's desk or in a filing cabinet. On your computer, files are represented with icons; this makes it easy to recognize a type of file by looking at its icon.
Here are some common file icons:



Icons for a few types of files

Understanding Parts of a Window

When you open a folder or library, you see it in a window. The various parts of this window are designed to help you navigate around Windows or work with files, folders, and libraries more easily. Here's a typical window and each of its parts:

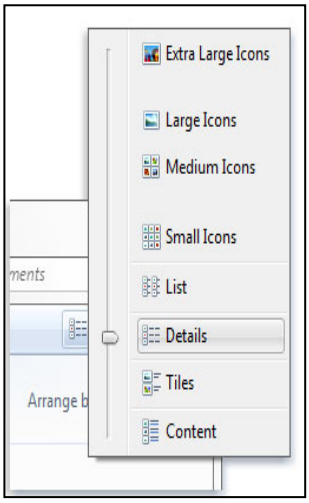


1. Navigation pane
2. Back and forward buttons
3. Menu bar
4. Tools bar
5. Address bar
6. Icons
7. Title bar

Window part	What it's useful for
Navigation pane	Use the navigation pane to access libraries, folders, saved searches, and even entire hard disks. Use the Favorites section to open your most commonly used folders and searches; use the Libraries section to access your libraries. You can also expand Computer to browse folders and subfolders.
Back and Forward buttons	Use the Back button and the Forward button to navigate to other folders or libraries you've already opened without closing the current window. These buttons work together with the address bar; after you use the address bar to change folders, for example, you can use the Back button to return to the previous folder.
Menu bar	Use menu bar to select commands from dropdown list
Toolbar	Use the toolbar to perform common tasks, such as changing the appearance of your files and folders, burning files to a CD, or starting a digital picture slide show. The toolbar's buttons change to show only the tasks that are relevant. For example, if you click a picture file, the toolbar shows different buttons than it would if you clicked a music file.
Address bar	Use the address bar to navigate to a different folder or library or to go back to a previous one.
Title bar	Contains the file name and the close, restore and minimize buttons.

Viewing and arranging files and folders

When you open a folder or library, you can change how the files look in the window. For example, you might prefer larger (or smaller) icons or a view that lets you see different kinds of information about each file. To make these kinds of changes, use the Views button in the toolbar.



Each time you click the left side of the Views button, it changes the way your files and folders are displayed by cycling through five different views: Large Icons, List, a view called Details that shows several columns of information about the file, a smaller icon view called Tiles, and a view called Content that shows some of the content from within the file.

If you click the arrow on the right side of the Views button, you have more choices. Move the slider up or down to fine-tune the size of the file and folder icons. You can see the icons change size as you move the slider.

The Views options:

1. *In libraries, you can go a step further by arranging your files in different ways*

The procedure can be retrieved from the ***view*** *menu then select* ***arrange icons by:***

The search box

Finding files

Depending on how many files you have and how they are organized, finding a file might mean browsing through hundreds of files and subfolders—not an easy task. To save time and effort, use the search box to find your file from start menu.

The search box is also located at the top of every window. To find a file, open the folder or library that makes the most sense as a starting point for your search, click the search box, and start typing. The search box filters the current view based on the text that you type. Files are displayed as search results if your search term matches the file's name, tags or other properties, or even the text inside a text document.

If you're searching for a file based on a property (such as the file's type), you can narrow the search before you start typing by clicking the search box, and then clicking one of the properties just below the search box. This adds a search filter (such as "type") to your search text, which will give you more accurate results.

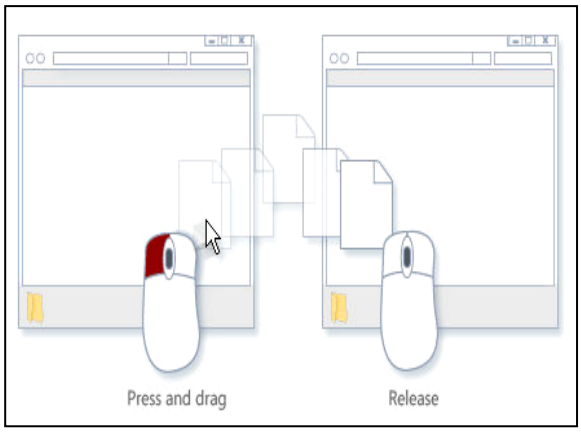
If you aren't seeing the file you're looking for, you can change the entire scope of a search by clicking one of the options at the bottom of the search results. For example, if you search for a file in the Documents library but you can't find it, you can click Libraries to expand the search to the rest of your libraries.

Copying and moving files and folders

Occasionally, you might want to change where files are stored on your computer. You might want to move files to a different folder, for example, or copy them to removable media (such as CDs or memory cards) to share with another person.

Most people copy and move files using a method called drag and drop. Start by opening the folder that contains the file or folder you want to move. Then, open the folder where you want to move it to in a different window. Position the windows side by side on the desktop so that you can see the contents of both.

Next, drag the file or folder from the first folder to the second folder. That's all there is to it



To copy or move a file, drag it from one window to another

When using the drag-and-drop method, you might notice that sometimes the file or folder is copied, and at other times it's moved. If you're dragging an item between two folders that are stored on the same hard disk, then the item is moved so that two copies of the same file or folder aren't created in the same location. If you drag the item to a folder that's in a different location (such as a network location) or to removable media like a CD, then the item is copied.

Tips

The easiest way to arrange two windows on the desktop is to use Snap.

To arrange windows side by side (snap)

- Right click a blank space on the task bar and click cascade windows, tile windows horizontally, tile windows vertically.
- If you copy or move a file or folder to a library, it will be stored in the library's default save location.
- Another way to copy or move a file is to drag it from the file list to a folder or library in the navigation pane so you don't need to open two separate windows.

Creating and deleting files

The most common way to create new files is by using a program. For example, you can create a text document in a word-processing program or a movie file in a video-editing program.

Some programs create a file as soon as you open them. When you open WordPad, for example, it starts with a blank page. This represents an empty (and unsaved) file. Start typing, and when you are ready to save your work, click the **Save button** . In the dialog box that appears, type a file name that will help you find the file again in the future, and then click Save.

When you no longer need a file, you can remove it from your computer to save space and to keep your computer from getting cluttered with unwanted files. **To delete** a file, open the folder or library that contains the file, and then select the file. Press Delete on your keyboard and then, in the Delete File dialog box, click **yes.**

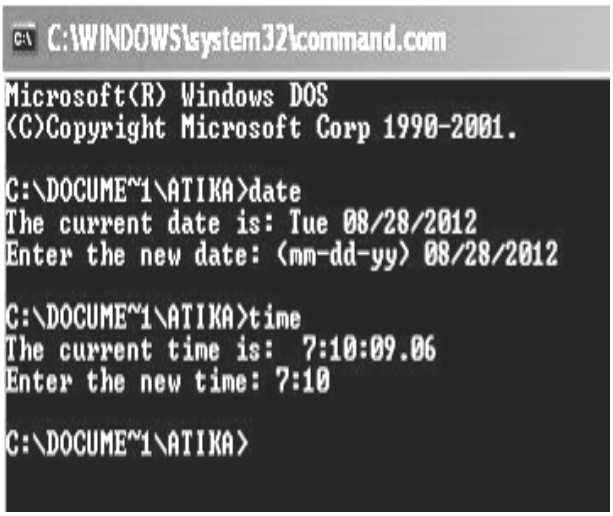
When you delete a file, it's temporarily stored in the **Recycle Bin**. Think of the Recycle Bin as a safety net that allows you to recover files or folders that you might have accidentally deleted. Occasionally, you should empty the Recycle Bin to reclaim all of the hard disk space being used by your unwanted files.

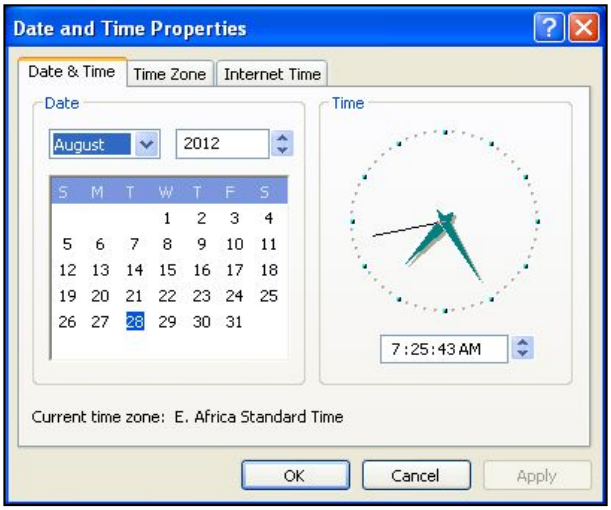
Opening an existing file

To open a file, double-click it. The file will usually open in the program that you used to create or change it. For example, a text file will open in your word-processing program.

That's not always the case, though. Double-clicking a picture file, for example, will usually open a picture viewer. To change the picture, you need to use a different program. Right-click the file, **click Open with**, and then click the name of the program that you want to use.

Setting date and time





Setting date and time in your computer is easy. There are three ways of setting date and time as listed below:

- Using CMOS when the computer starts
- Using **command prompt** tool from run command on start menu as shown below:
- Via control panel
- Using the task bar

Setting date and time using the task bar

This is the easiest method of setting date and time in your computer. To set date, proceed as follows:

1. Right click on time at the notification are of the task bar and click adjust date and time and the dialog box like the one shown below will appear.
2. Set month, date and time using the mouse by clicking on the down and up arrows in their respective positions
3. Click on time zone tab and choose your area of location i.e. (GMT+03:00) Nairobi
4. Time synchronization can occur automatically so as long as your computer is connected into the internet through the internet time server from windows website. Click on internet time tab to view.
5. Click apply to save change

Synchronizing your computer clock

If your computer is a member of a domain, your computer clock is probably synchronized automatically by a network time server. If your computer is not a member of a domain, you can synchronize your computer clock with an Internet time server.

If synchronization is enabled, your computer clock is synchronized with an Internet time server once a week. However, if you don't have a continuous Internet connection through a cable modem or DSL modem, the automatic synchronization might not always occur. In that case, you can force an immediate synchronization by clicking the **Update Now** button on the **Internet Time** tab in Date and Time in Control Panel. This tab is only available if your computer is not a member of a domain.

Using shortcut keys to manage windows

In computing, a **keyboard shortcut** is a finite set of one or more keys that invoke a software or operating system operation when triggered by the user. A meaning of term "keyboard shortcut" can vary depending on software manufacturer. For instance, Microsoft differentiates keyboard shortcuts from **hotkeys** (mnemonics) whereby the former consists of a specific key combination used to trigger an action, and the latter represents a designated letter in a menu command or toolbar button that when pressed together with the Alt key, activates such command.

General keyboard shortcuts

- CTRL+C (Copy)
- CTRL+X (Cut)
- CTRL+V (Paste)
- CTRL+Z (Undo)
- DELETE (Delete)
- SHIFT+DELETE (Delete the selected item permanently without placing the item in the Recycle Bin)
- CTRL while dragging an item (Copy the selected item)
- CTRL+SHIFT while dragging an item (Create a shortcut to the selected item)
- F2 key (Rename the selected item)
- CTRL+RIGHT ARROW (Move the insertion point to the beginning of the next word)
- CTRL+LEFT ARROW (Move the insertion point to the beginning of the previous word)
- CTRL+DOWN ARROW (Move the insertion point to the beginning of the next paragraph)
- CTRL+UP ARROW (Move the insertion point to the beginning of the previous paragraph)
- CTRL+SHIFT with any of the arrow keys (Highlight a block of text)
- SHIFT with any of the arrow keys (Select more than one item in a window or on the desktop, or select text in a document)
- CTRL+A (Select all)
- F3 key (Search for a file or a folder)
- ALT+ENTER (View the properties for the selected item)
- ALT+F4 (Close the active item, or quit the active program)
- ALT+ENTER (Display the properties of the selected object)
- ALT+SPACEBAR (Open the shortcut menu for the active window)
- CTRL+F4 (Close the active document in programs that enable you to have multiple documents open simultaneously)
- ALT+TAB (Switch between the open items)
- ALT+ESC (Cycle through items in the order that they had been opened)
- F6 key (Cycle through the screen elements in a window or on the desktop)
- F4 key (Display the Address bar list in My Computer or Windows Explorer)
- SHIFT+F10 (Display the shortcut menu for the selected item)
- ALT+SPACEBAR (Display the System menu for the active window)
- CTRL+ESC (Display the Start menu)
- ALT+ Underlined letter in a menu name (Display the corresponding menu)
- Underlined letter in a command name on an open menu (Perform the corresponding command)
- F10 key (Activate the menu bar in the active program)
- RIGHT ARROW (Open the next menu to the right, or open a submenu)
- LEFT ARROW (Open the next menu to the left, or close a submenu)
- F5 key (Update the active window)
- BACKSPACE (View the folder one level up in My Computer or Windows Explorer)
- ESC (Cancel the current task)
- SHIFT when you insert a CD-ROM into the CD-ROM drive (Prevent the CD-ROM from automatically playing)
- CTRL+SHIFT+ESC (Open Task Manager)

Dialog box keyboard shortcuts

If you press SHIFT+F8 in extended selection list boxes, you enable extended selection mode. In this mode, you can use an arrow key to move a cursor without changing the selection. You can press CTRL+SPACEBAR or SHIFT+SPACEBAR to adjust the selection. To cancel extended selection mode, press SHIFT+F8 again. Extended selection mode cancels itself when you move the focus to another control.

- CTRL+TAB (Move forward through the tabs)
- CTRL+SHIFT+TAB (Move backward through the tabs)
- TAB (Move forward through the options)
- SHIFT+TAB (Move backward through the options)
- ALT+ Underlined letter (Perform the corresponding command or select the corresponding option)
- ENTER (Perform the command for the active option or button)
- SPACEBAR (Select or clear the check box if the active option is a check box)
- Arrow keys (Select a button if the active option is a group of option buttons)
- F1 key (Display Help)
- F4 key (Display the items in the active list)

BACKSPACE (Open a folder one level up if a folder is selected in the Save As or Open dialog box)

Microsoft natural keyboard shortcuts

- Windows Logo (Display or hide the Start menu)
- Windows Logo+ BREAK (Display the **System Properties** dialog box)
- Windows Logo+ D (Display the desktop)
- Windows Logo+ M (Minimize all of the windows)
- Windows Logo+ SHIFT+ M (Restore the minimized windows)
- Windows Logo+ E (Open My Computer)
- Windows Logo+ F (Search for a file or a folder)
- CTRL+ Windows Logo+ F (Search for computers)
- Windows Logo+F1 (Display Windows Help)
- Windows Logo+ L (Lock the keyboard)
- Windows Logo+ R (Open the **Run** dialog box)
- Windows Logo+ U (Open Utility Manager)

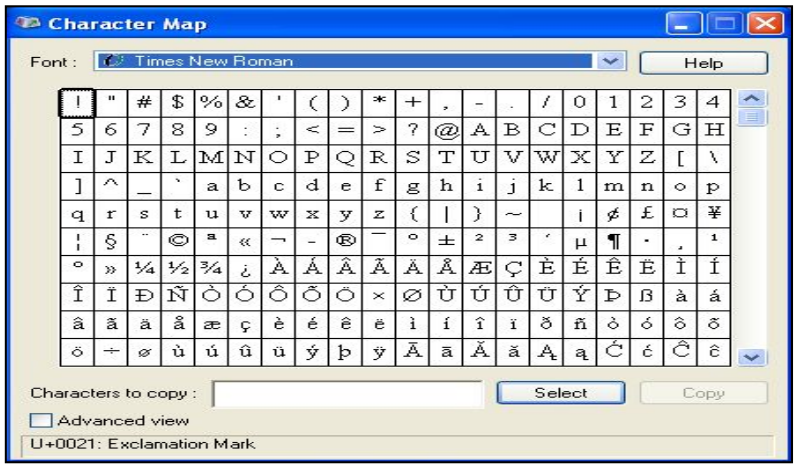
Accessibility keyboard shortcuts

- Right SHIFT for eight seconds (Switch Filter Keys either on or off)
- Left ALT+ left SHIFT+PRINT SCREEN (Switch High Contrast either on or off)
- Left ALT+ left SHIFT+NUM LOCK (Switch the MouseKeys either on or off)
- SHIFT five times (Switch the Sticky Keys either on or off)
- NUM LOCK for five seconds (Switch the Toggle Keys either on or off)
- Windows Logo +U (Open Utility Manager)

Windows Explorer keyboard shortcuts

- END (Display the bottom of the active window)
- HOME (Display the top of the active window)
- NUM LOCK+ Asterisk sign (*) (Display all of the subfolders that are under the selected folder)
- NUM LOCK+ Plus sign (+) (Display the contents of the selected folder)
- NUM LOCK+ Minus sign (-) (Collapse the selected folder)
- LEFT ARROW (Collapse the current selection if it is expanded, or select the parent folder)
- RIGHT ARROW (Display the current selection if it is collapsed, or select the first subfolder)

Shortcut keys for Character Map



Character Map
is a utility included with Microsoft Windows operating systems and is used to view the characters in any installed font, to check what keyboard input (Alt code) is used to enter those characters, and to copy characters to the clipboard in lieu of typing them. The tool is usually useful for entering *special characters*. It can be opened via the command line or Run Command dialog using the '**charmap**' command.

After you double-click a character on the grid of characters, you can move through the grid by using the keyboard shortcuts:

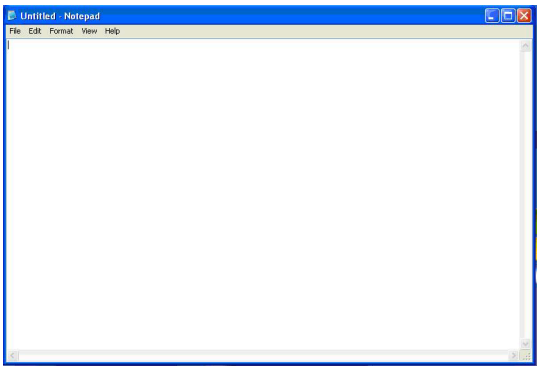
- RIGHT ARROW (Move to the right or to the beginning of the next line)
- LEFT ARROW (Move to the left or to the end of the previous line)
- UP ARROW (Move up one row)
- DOWN ARROW (Move down one row)
- PAGE UP (Move up one screen at a time)
- PAGE DOWN (Move down one screen at a time)
- HOME (Move to the beginning of the line)
- END (Move to the end of the line)
- CTRL+HOME (Move to the first character)
- CTRL+END (Move to the last character)
- SPACEBAR (Switch between Enlarged and Normal mode when a character is selected)

Microsoft Internet Explorer navigation

- CTRL+B (Open the **Organize Favorites** dialog box)
- CTRL+E (Open the Search bar)
- CTRL+F (Start the Find utility)
- CTRL+H (Open the History bar)
- CTRL+I (Open the Favorites bar)
- CTRL+L (Open the **Open** dialog box)
- CTRL+N (Start another instance of the browser with the same Web address)
- CTRL+O (Open the **Open** dialog box, the same as CTRL+L)
- CTRL+P (Open the **Print** dialog box)
- CTRL+R (Update the current Web page)
- CTRL+W (Close the current window)

Text Editing

A **text editor** is a type of program used for editing plain text files.
Text editors are often provided with operating systems or software development packages, and can be used to change configuration files and programming language source code.



Notepad

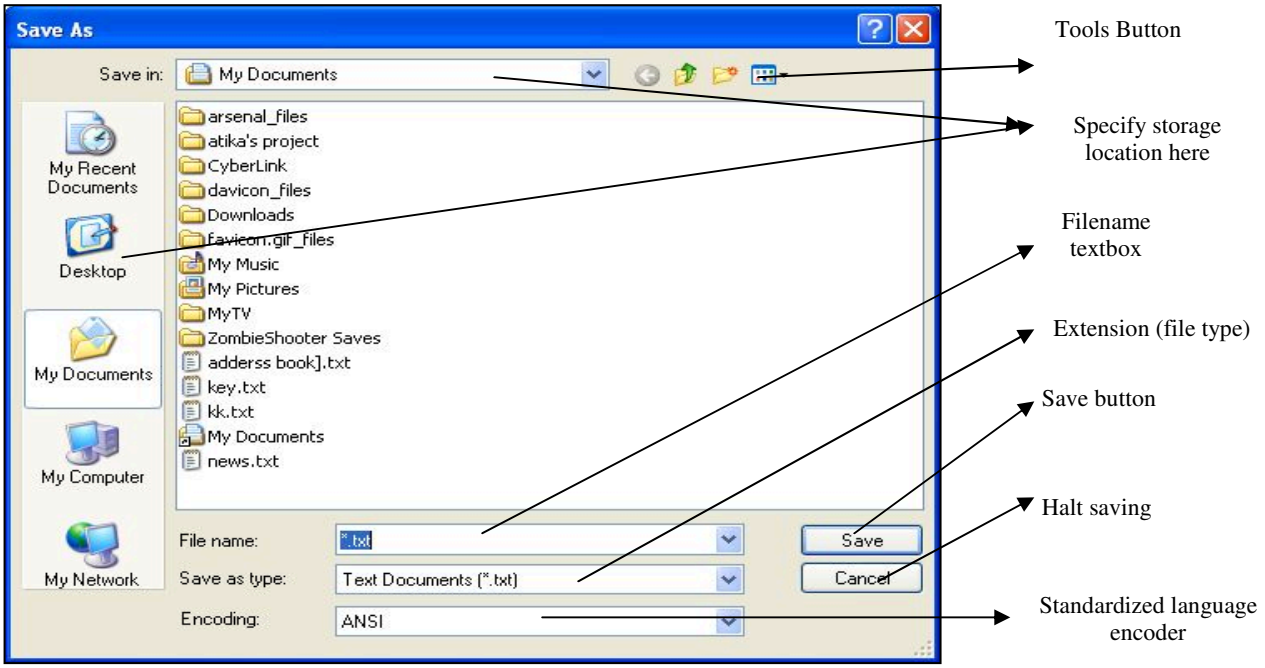
Using Notepad

Notepad is a basic text editor you can use for simple documents or for creating Web pages. To create or edit files that requires formatting, use WordPad.

- To open Notepad, click **Start**, point to **All Programs**, point to **Accessories**, and then click **Notepad**.
- For information about using Notepad, click the **Help** menu in Notepad.
- For more information, click **Related Topics**.

Saving text files

To save a file means to copy data to a more permanent form of storage. Initially/by default, all files are stored in my document folder which is a storage area in the hard drive. However the user can change the storage location as provided by the save/save as command.



To save a file:

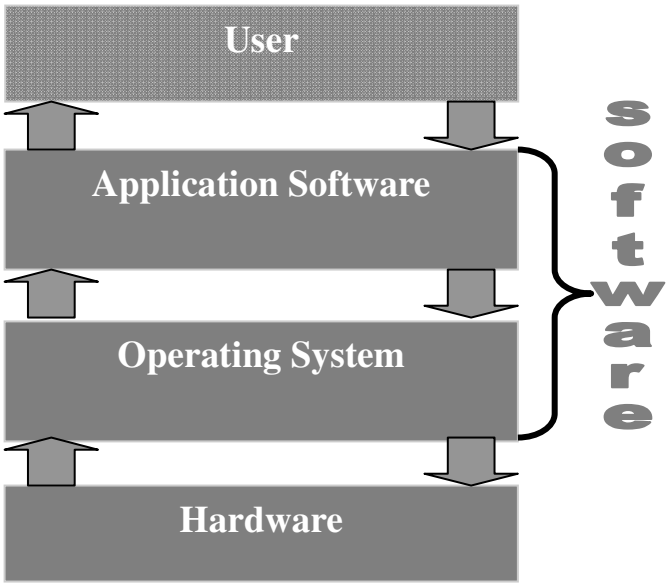
A. *From file menu, click* **save or save as** *command. A save As dialog box appears*
B. *Choose from these options:*
   - *change location in the* **save in** *drop down list*
   - *type the file name in the* **file name** *textbox*
   - *change the file type in the* **save as type** *dropdown list*
   - *click* ***save*** *button to apply*

Computer software

Computer software, or just **software**, is a collection of computer programs and related data that provides the instructions for telling a computer what to do and how to do it.

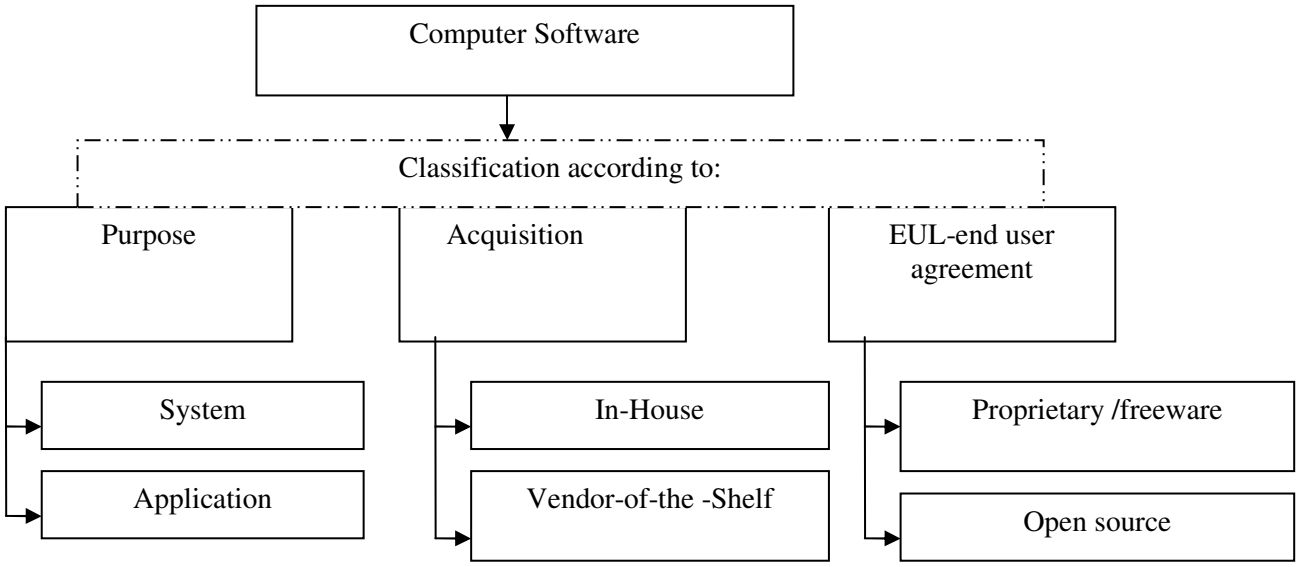
Software does nothing more than tell the computer how to accept some type of input, manipulate that input, and spit it back out again in some form that humans find useful.

Below is a layer structure showing where the operating system software and application software are situated while running on a typical desktop computer



Classification of computer software

Software can be classified as shown in the organizational chart below:



Classification according to purpose

Software can be classified in regard to what they are used for. *i.e. system software and application software*

System Software

System software is a program that manages and supports the computer resources and operations of a computer system while it executes various tasks such as processing data and information, controlling hardware components, and allowing users to use application software. That is, systems software functions as a *bridge* between computer system hardware and the application software.

Three Kinds of System Software

Systems software consists of three kinds of programs. The system management programs, system support programs, and system development programs are they. These are explained briefly.

1. System Management Programs

These are programs that manage the application software, computer hardware, and data resources of the computer system. These programs include operating systems, operating environment programs, database management programs, and telecommunications monitor programs. Among these, the most important system management programs are operating systems.

2. System Support Programs

These are the programs that help the operations and management of a computer system. They provide a variety of support services to let the computer hardware and other system programs run efficiently. The major system support programs are system utility programs, system performance monitor programs, and system security monitor programs (virus checking programs).

3. System Development Programs

These are programs that help users develop information system programs and prepare user programs for computer processing. These programs may analyze and design systems and program itself. The main system development programs are programming language translators, programming environment programs, computer-aided software engineering packages.

Operating Systems

An *operating system* is a collection of integrated computer programs that provide recurring services to other programs or to the user of a computer. These services consist of disk and file management, memory management, and device management. In other words, it manages CPU operations, input/output activities, storage resources, diverse support services, and controls various devices.
Operating system is the most important program for computer system. Without an operating system, every computer program would have to contain instructions telling the hardware each step the hardware should take to do its job, such as storing a file on a disk. Because the operating system contains these instructions, any program can call on the operating system when a service is needed. Examples include:
DOS - Disk Operating System - one of the first operating systems for the personal computer. When you turned the computer on all you saw was the command prompt which looked like **c:\ >**. You had to type all commands at the command prompt which might look like **c:\>wp\wp.exe**. This is called a **command-line interface**. It was not very "user friendly"

- **Windows** - The Windows operating system, a product of Microsoft, is a **GUI** (graphical user interface) operating system. This type of "user friendly" operating system is said to have **WIMP** features:
  - **W**indows
  - **I**cons
  - **M**enus
  - **P**ointing device (mouse)
- **MacOS -** Macintosh, a product of Apple, has its own operating system with a GUI and WIMP features.
- **UNIX - Linux** (the PC version of UNIX) - UNIX and Linux were originally created with a command-line interface, but recently have added GUI enhancements.

Firmware /stored logic

This is the combination of persistent memory and program code and data stored permanently on electronic chips. The firmware contained in these devices provides the control program for the device. Firmware is held in non-volatile memory devices such as ROM, EPROM, or flash memory. They hold operating systems, utility programs, language processors etc.

Utility software

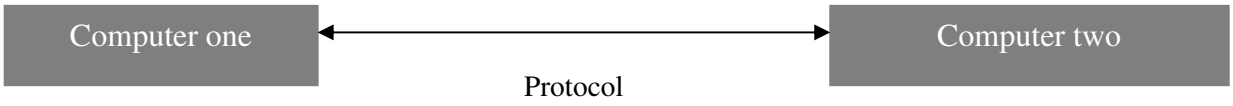
Utility software is designed to help analyze, configure, optimize or maintain a computer. A single piece of utility software is usually called a **utility** or **tool**. Utility software usually focuses on *how* the computer infrastructure (including the computer hardware, operating system, data storage and application software operates)

Utility software categories

- **Anti-virus** utilities scan for computer viruses.
- **Archive** utilities output a stream or a single file when provided with a directory or a set of files.
- **Backup** utilities can make a copy of all information stored on a disk, and restore either the entire disk (e.g. in an event of disk failure) or selected files (e.g. in an event of accidental deletion).
- **Cryptographic** utilities encrypt and decrypt streams and files.
- **Data compression** utilities output a shorter stream or a smaller file when provided with a stream or file.
- **Data synchronization** utilities establish consistency among data from a source to target data storage and vice versa. There are several branches of this type of utility:
- **File synchronization** utilities maintain consistency between two sources. They may be used to create redundancy or backup copies but are also used to help users carry their digital music, photos and video in their mobile devices.
- **Revision control** utilities are intended to deal with situations where more than one user attempts to simultaneously modify the same file.
- **Disk checkers** can scan operating hard drive.
- **Disk cleaners** can find files that are unnecessary to computer operation, or take up considerable amounts of space. Disk cleaner helps the user to decide what to delete when their hard disk is full.
- **Disk compression** utilities can transparently compress/uncompress the contents of a disk, increasing the capacity of the disk.
- **Disk defragmenters** can detect computer files whose contents are broken across several locations on the hard disk, and move the fragments to one location to increase efficiency.
- **Disk partitions** can divide an individual drive into multiple logical drives, each with its own file system which can be mounted by the operating system and treated as an individual drive.
- **Disk space analyzers** for the visualization of disk space usage by getting the size for each folder (including sub folders) & files in folder or drive. Showing the distribution of the used space.
- **Disk storage** utilities
- **File managers** provide a convenient method of performing routine data management tasks, such as deleting, renaming, cataloging, un-cataloging, moving, copying, merging, generating and modifying data sets.
- **Hex editors** directly modify the text or data of a file. These files could be data or an actual program.
- **Memory testers** check for memory failures.
- **Network utilities** analyze the computer's network connectivity, configure network settings, check data transfer or log events.
- **Registry cleaners** clean and optimize the Windows registry by removing old registry keys that are no longer in use.
- **Screensavers** were desired to prevent phosphor burn-in on CRT and plasma computer monitors by blanking the screen or filling it with moving images or patterns when the computer is not in use. Contemporary screensavers are used primarily for entertainment or security.
- **System monitors** for monitoring resources and performance in a computer system.
- **System profilers** provide detailed information about the software installed and hardware attached to the computer.

Networking software

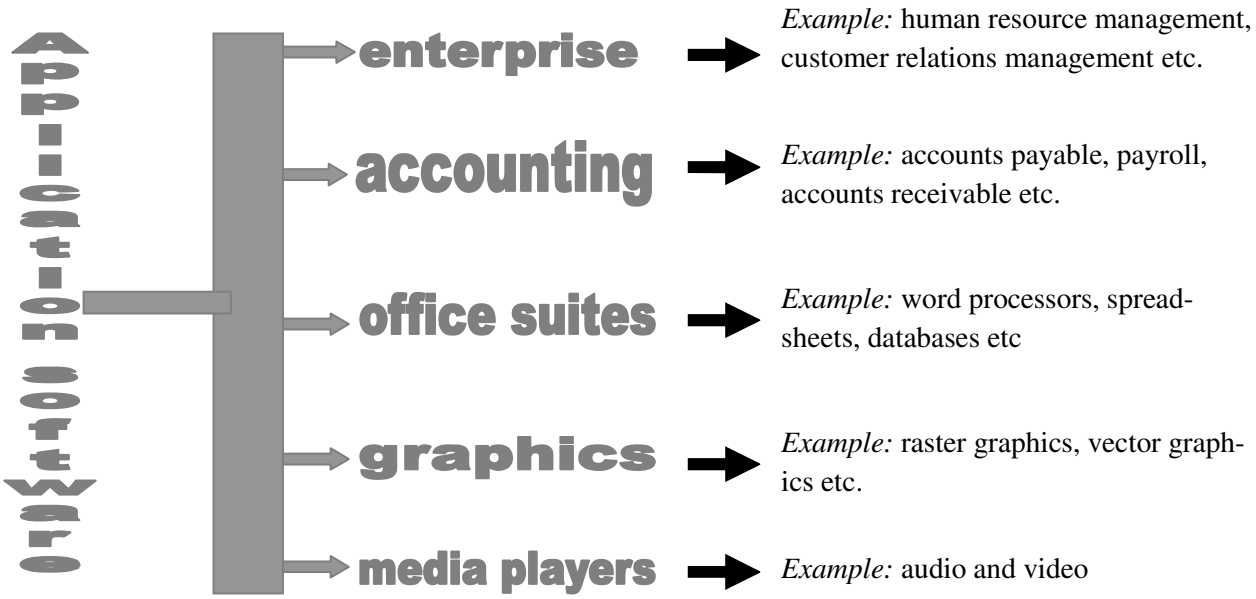
This software is used to establish communication between two or more computers by linking them using a communication channel like cables to create a *computer network.* It enables the exchange of data in a network as well as providing data security. Networking software may come as independent software or integrated in an operating system. Examples include: novel Netware, windows NT etc.



When computers communicate to one another, they need networking software often referred to as a ***protocol.*** *A protocol is a set of rules that govern how data packets move from one computer to another on a network connection.*

Application software

This is computer software designed to help the user perform a specific task. Examples include *enterprise software, accounting software, office suites, graphics software and media players*. This book will mostly feature office suites.



Office suites

Existing office suites contain wide range of various components. Most typically, the base components include:

- **Word processor-**allows users to create edit and save documents. *Examples: Ms Word, open office.org, lotus word pro, word pad, libreoffice writer etc.*
- **Spreadsheet-** allows users to create documents and perform calculations. *Examples: Ms Excel, Lotus 1-2-3, open office.org, VisiCalc etc.*
- **Computer Aided Design-** is the use of computer systems to assist in the creation, modification, analysis, or optimization of a design or he process of creating a technical drawing with the use of computer software. It can also be classified as a vector graphic under graphics suite. *Example: AutoCAD, PLaSM, NCLab etc.*
- **Presentation program-**allows users to create visual presentations. *Example: Ms Power Point, Corel Presentations, Google Docs etc.*

- **Database-**allows users to store and retrieve vast amount of data. *Example: Ms Access, MySQL, Oracle etc.*
- **Graphics suite (raster graphics editor, vector graphics editor, image viewer**- allows users to manipulate visual images on a computer. *Example: Corel Draw, Photoshop, Graphic Art, Xnview, Picasa, Ms Movie maker etc.*
- **Desktop publishing software-**allows users to create printed materials using page layout on a personal computer. *Example: Ms Publisher, Adobe PageMaker, Adobe InDesign, Corel Ventura, Adobe FrameMaker etc.*
- **Formula editor**- allows users to typeset mathematical works or formulae. *Example: Aurora, Ms Equation Editor, MathMagic, EqualX etc.*
- **Email client-**allows users to access and manage their Email accounts. *Example: GNUmail, Opera mail, Ms Outlook, Apple mail etc.*
- **Web browsers-** used for retrieving, presenting, and traversing information resources on the World Wide Web. *Examples: Firefox, Opera, Google Chrome, Safari, Internet explorer etc.*
- **Personal information manager (PIM)-** used to organize personal information. a PIM tool's purpose is to facilitate the recording, tracking, and management of certain types of "personal information". *Example: Windows calendar, windows contacts, Chandler, OpenIRIS etc.*

Classification according to acquisition

In-house developed software

These are programs designed to meet a specific user's needs. In this situation, a system analyst studies an existing system (most likely manual) and together with a programmer, they make a new computerized system to fit the needs of their client. For example, a school can hire a computer analyst to design a program that can be used to produce report cards.

Vendor off-the-shelf software

This kind of software is developed by software engineers, packaged and then made available for purchase through a vendor, a distributor or directly from the developer. Several applications may be bundled together to form a suite e.g. Microsoft office, Lotus suite, Corel word perfect, quick books etc.

Advantages of standard software over in-house developed programs are:

- *They can easily be installed and run.*
- *They are cheaper.*
- *They can do a variety of tasks*
- *They are reliable because they have minor errors in them.*
- *They can easily be modified or customized to fit user needs.*
- *They are compatible to a large variety of computer hardware*

Disadvantages of Off-the-Shelf software

1. *Are expensive*
2. *Not compatible to a variety of hardware setup*
3. *Require large computer memories to run*
4. *Require extra training from basic training*
5. *Prone to errors*
6. *Have a limited number of controls therefore not so user friendly.*

Classification according to End-User-License:

Freeware

This is software that is available for use at no cost or for an optional fee, but usually with one or more restricted usage rights.
Example: Adobe reader, Adobe flash player, Ubuntu operating system, Rising Antivirus, VLC media player etc. This software is sourced for free but they are vulnerable to computer viruses or can carry a virus unto your computer.

Shareware (also termed **trialware** or **demoware**) is proprietary software that is provided to users without payment on a trial basis and is often limited by any combination of functionality, availability (it may be functional for a limited time period only), or convenience (the software may present a dialog at startup or during usage, reminding the user to purchase it; "nagging dialogs"). Shareware is often offered as a download from an Internet website or as a compact disc included with a periodical such as a newspaper or magazine. The rationale behind shareware is to give buyers the opportunity to use the program and judge its usefulness before purchasing a license for the full version of the software. Firms with superior software thus have an incentive to offer samples, except if their product is already well known, or if they do not want to be listed in direct competition with other products on shareware repositories.

Proprietary software is computer software licensed under exclusive legal right of the copyright holder. The licensee is given the right to use the software under certain conditions, while restricted from other uses, such as modification, further distribution, or reverse engineering.

Free and open-source software (**FOSS**) or **free/libre/open-source software** (**FLOSS**) is software that is both free software and open source. It is liberally licensed to grant users the right to use, copy, study, change, and improve its design through the availability of its source code. This approach has gained both momentum and acceptance as the potential benefits have been increasingly recognized by both individuals and corporations.

Open-source software (**OSS**) is computer software that is available in source code form: the source code and certain other rights normally reserved for copyright holders are provided under an open -source license that permits users to study, change, improve and at times also to distribute the software.
Example: Linux

Criteria for selecting a computer system

When purchasing a computer hardware or software, consider a number of requirements necessary to fit your needs and costs.

Hardware considerations

1. **Microprocessor type and speed**- the speed and processing power of a computer depends on the type of CPU and its clock speed. Consider microprocessors with high cache memory and faster clock speeds since they can be able to run a variety of tasks without strain. Intel Duo Core and AMD Duron are the latest for PCs.
2. **Memory capacity**- Consider the capacity of your memory since higher memories creates good performance of your computer. Check whether it's static or dynamic, DDR or SDR, empty memory slots on the motherboard and whether they are up gradable with other installed modules.

3. **Warranty**- A warranty is an agreement between the buyer and the seller that spells terms and conditions of, after selling a product incase of failure or malfunction. A good warranty should cover the following:
    - *Scope of cover i.e. one year*
    - *Callout response and liability agreement*
    - *Preventive performance.*
4. **Cost-** The cost of a computer system depends on:
    - *Processing power*
    - *Whether it's a Branded or a clone- a clone is a hardware or software system that is designed to mimic another system whilst a branded computer is a computer whose parts are made by one company copyrighted and standardized, they are more expensive than clones but are of high quality. Examples: Dell, Acer, Compaq, HP, Apple etc.*
    - *Size- Portable computers are more expensive than desktops because of the complexity of technology used to make them.*
5. **Upgradeability and Compatibility-** *Upgradeability* is the ability of a system to embrace to new forms of technology available in the market and *Compatibility* is the ability of a system to run in more than one different system families. For example: a computer that can run on windows, MAC, Ubuntu, etc operating systems.
6. **Portability-** Consider your user needs and decide whether you need a computer that you can easily carry from one place to another or fixed in one place. In this case, a palmtop or a laptop and a desktop are convenient respectively.
7. **User Needs-** Value your user needs and any other needs you will use this computer for. If you want a variety of tasks, then try a general purpose computer.
8. **Monitors-** Check for video adaptors, resolution, power consumption and saving, technology used to manufacture them (TFT, Gas Plasma, CRT etc)
9. **Multimedia Capabilities –** This is the ability to support multimedia functions like: sound card, TV card, SVGA monitor, CD/DVD drives etc.
10. **Cabling-** check whether the ports are user friendly, wireless or bound and strategically positioned on the system unit which might be a tower or a desktop type.

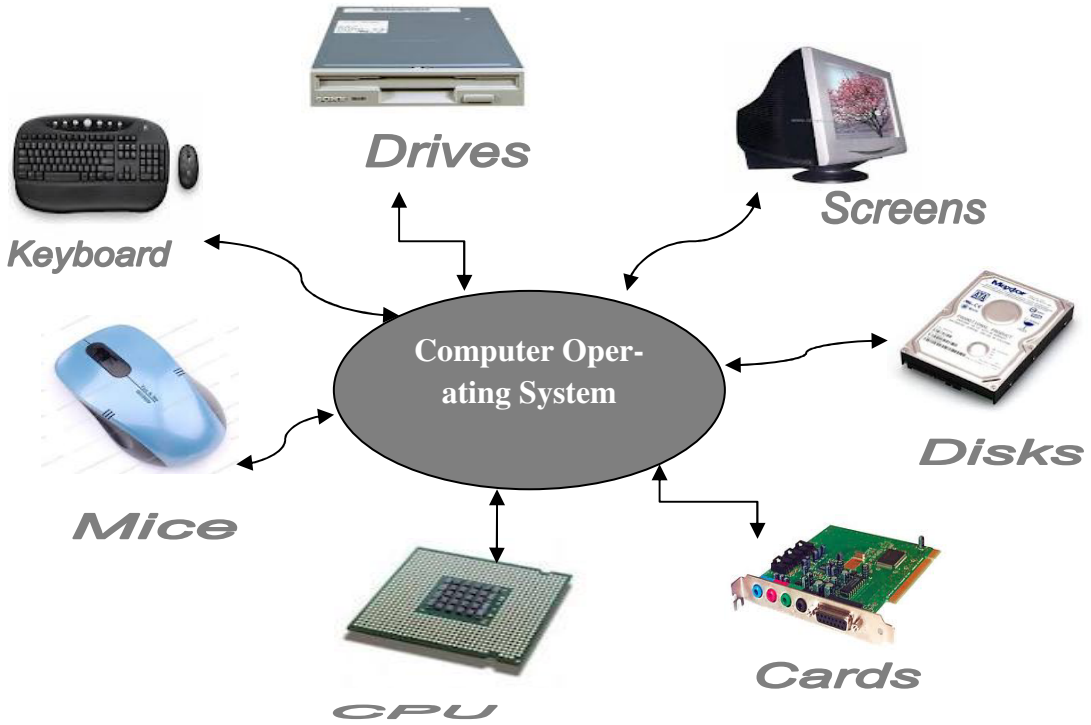
Software considerations

1. **Authenticity –**this is the genuineness, validity and legitimacy of an item.
2. **Documentation-** Availability of user manuals prepared by the developer with details on how to install, use and maintain the software. i.e. installation guide, maintenance guide and a user guide.
3. **User needs-** User needs dictates the type of software to purchase. For example: if the user wants to type letters, memos, CVs etc. the word processors are valid.
4. **Portability-** This is the ability of the acquired software to be installed in more than one family of computer hardware. For example: if it can accept MAC computers, 32-bit, 64-bit computers etc.
5. **Compatibility and system configuration-** A software product should be compatible with the existing hardware, operating system or application programs and should be readily upgradeable.
6. **User friendliness-** this is the measure of how easily the users can be able to operate the computer. User friendly software should have **WIMP- W**indows **I**cons **M**enus and **P**ointing devices.
7. **Cost-** Consider cost effective software. I.e. the benefits should outweigh the costs.

Operating systems (OS)

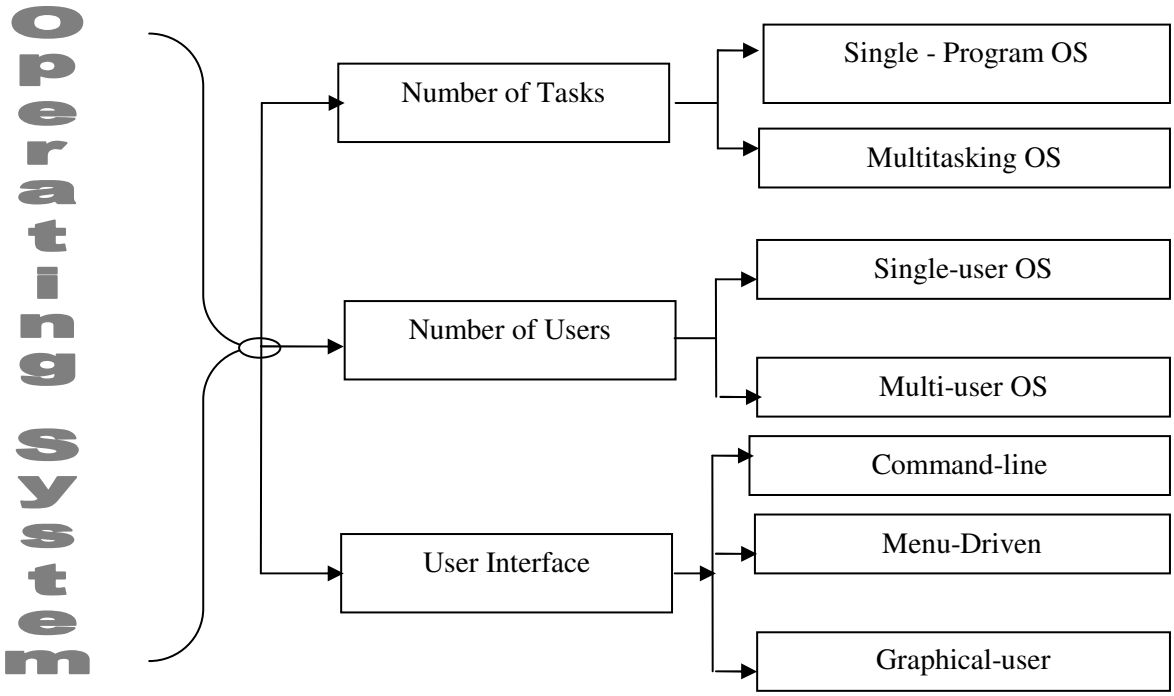
An **operating system** (**OS**) is a collection of software that manages computer hardware resources and provides common services for computer programs. The operating system is a vital component of the system software in a computer system. Application programs require an operating system to function.

How the operating system works



For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware, although the application code is usually executed directly by the hardware and will frequently make a system call to an OS function or be interrupted by it. Operating systems can be found on almost any device that contains a computer—from cellular phones and video game consoles to supercomputers and web servers.

Operating system types



As computers have progressed and developed so have the operating systems. Below is a basic list of the different operating systems and a few examples of operating systems that fall into each of the categories. Many computer operating systems will fall into more than one of the below categories.

Single program OS

-also known as single tasking OS allows processing of one application program in the main memory at a time. Below are some examples of single program operating systems.

-Ms Dos

Multitasking

- An operating system that is capable of allowing multiple software processes to run at the same time. Below are some examples of multitasking operating systems.

UNIX

Windows 2000

Single user OS

-is designed for use by only one person. Below are some examples of single user operating systems.

-Ms Dos

Multi-user

- A multi-user operating system allows for multiple users to use the same computer at the same time and different times. Below are some examples of multi-user operating systems.

-Linux

-UNIX

-Windows 2000

Multiprocessing

- An operating system capable of supporting and utilizing more than one computer processor. Below are some examples of multiprocessing operating systems.

-Linux

-UNIX

-Windows 2000

Multithreading

- Operating systems that allow different parts of software program to run concurrently. Operating systems that would fall into this category are:

Linux

UNIX

Windows 2000

GUI

- Short for Graphical User Interface, a GUI Operating System contains graphics and icons and is commonly navigated by using a computer mouse. Below are some examples of GUI Operating Systems.

-System 7.x

-Windows 98, XP, Vista

-Windows CE

Menu-driven

- provides the user with a list of options to choose from. Example: Dos shell/Dos editor

Command-line

- lets the user type command at a prompt. The computer reads the typed command from the command line and executes it. Example: Ms Dos

Functions of operating systems in resource management

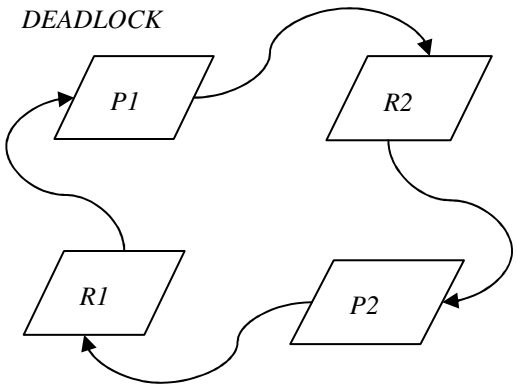
The major functions of an OS are:

1. **Processor Scheduling**

- The operating system allocates each job waiting for execution, processor time at each give interval. The OS schedules jobs according to priorities.

2. **Resource allocation**

- Each available resource is given a unique identification number called an *interrupt request (IRQ).* The OS uses the IRQ number to identify the resources being requested. Poor resource allocation would result to an undesirable condition referred to as *deadlock.* **Deadlock** is a situation which occurs when a process enters a waiting state because a resource requested by it is being held by another waiting process, which in turn is waiting for another resource.



Both processes need resources to continue executing. P1 requires additional resource R1 and is in possession of resource R2, P2 requires additional resource R2 and is in possession of R1; neither process can continue.

3. **Memory management**

- The operating system determines which task remains can be held by the memory and which one can be suspended to the secondary storage devices , output and to the processor.

4. **Input/output management**

–The OS coordinates between various I/O (input/output) and other peripheral devices such as auxiliary storage devices, making sure that data is transmitted securely.

5. **Communication control and management**

- This involves management of various communication devices and providing an environment within which communication channels operate.

6. **Error handling**

- The OS has many ways of alerting the user of errors that may arise out of illegal operations, hardware or software failure. Most OS express what the error is, and where possible make suggestions on how to correct the error.

7. **Process management**

-all processes from start to shut down
-booting, open, save, install, copy, print

8. **File management**

- this involves naming of file and folders, locations, attributes (size, type, modified, protection, password etc.

9. **Security management**

-this involves Virus management, Alert messages, Dialogue boxes, Firewall, passwords/Access protection etc.

10. **Interrupt handling**

- *An interrupt is a break from the normal sequential processing of instructions in a program.* A critical request causes the processor to stop executing the current process to attend to it, before returning the control back to the process that was initially interrupted.

Typical Day-to-Day Uses of an Operating System:

-Executing application programs.

-Formatting floppy diskettes.

-Setting up directories to organize your files.

-Displaying a list of files stored on a particular disk.

-Verifying that there is enough room on a disk to save a file.
-Protecting and backing up your files by copying them to other disks for safekeeping.

Factors to consider when choosing an operating system:

When choosing and operating system, similar factors as those of choosing software can be considered as listed below:

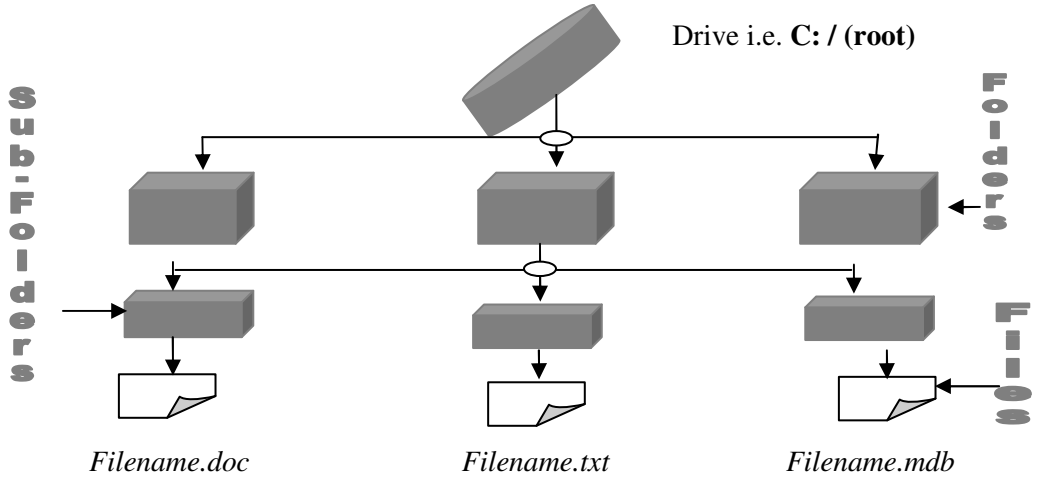
1. Hardware configuration i.e. speed, capacity, memory etc.
2. Make, size and nature of the computer i.e. laptop, desktop, phone, mainframe etc
3. Application software intended for the computer
4. User-friendliness
5. Documentation
6. Cost
7. Reliability and security
8. Number of processors and hardware available
9. Number of users.
10. upgradeability

How an operating system organizes information

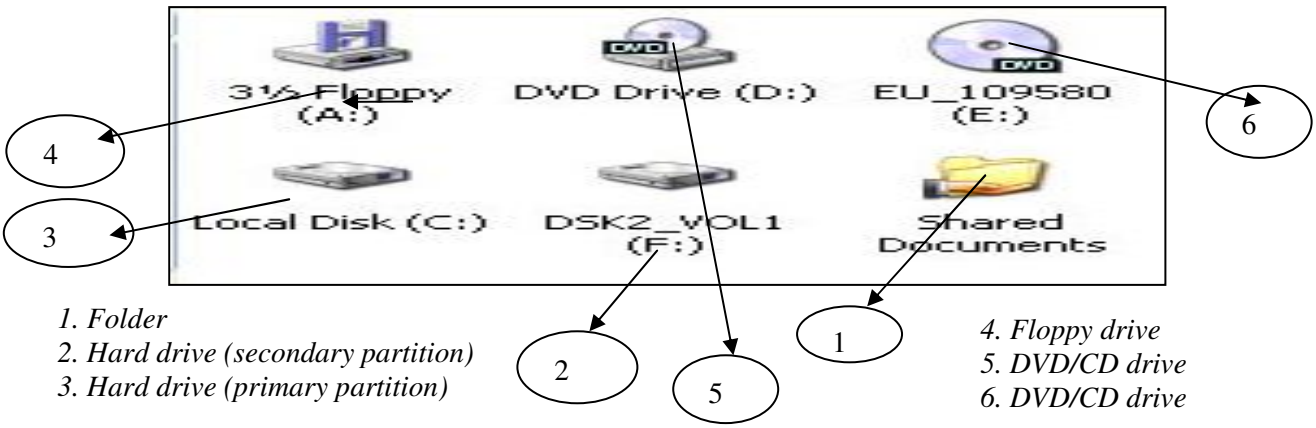
Operating systems store information almost in a similar way. OS manufacturers consider a number of factors when designing an OS which is user friendly. This includes:

1. **Rapid access**: this method allows quick access to stored data.
2. **Ease of update**: the organization should allow quick and easy updating of files
3. **Keep track of changes**: the organization should be able to keep track of change as they un-fold. I.e. date, size, format, type etc.
4. **Reliability**: the organization should be relied upon by maintaining higher standards of data integrity.
5. **Economy of storage**: the organization should be able to utilize the available storage.
6. **Simplicity of maintenance**: the organization method should enable quick navigation through the file system and make it easy to maintain.

How the OS organizes information in drives, folders/directories and files



Hierarchical organization of drives, folders and files



1. Folder
2. Hard drive (secondary partition)
3. Hard drive (primary partition)
4. Floppy drive
5. DVD/CD drive
6. DVD/CD drive

Description of drive icons

Drives

- a drive is a general term used to refer to any device that can be used to write/read disk storage of any category i.e. floppy drive, CD drive, Hard disk drive etc. To differentiate from one drive to another, the OS system assigns each drive a unique letter and icon as shown in the diagram below.

Assigning of letters by the OS

Drive letter assignment

-is the process of assigning alphabetical identifiers to physical or logical disk drives or partitions (drive volumes) in the root file system namespace; this usage is now mostly found in Microsoft operating systems.

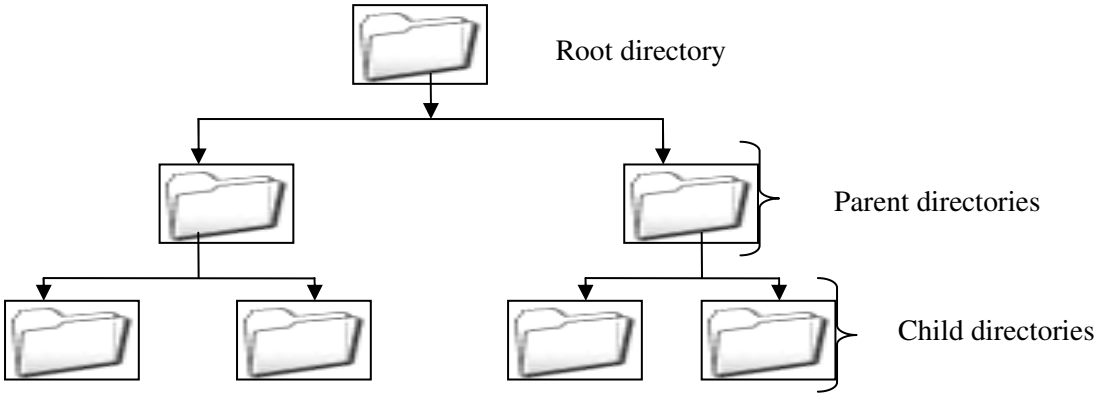
Most OS assign letters according to the number of available drives in your computer. *Example*:

- **A:** — Floppy disk drives, 3.5" or 5.25", and possibly other types of disk drives, if present.
- **B:** — Reserved for a second floppy drive, if present.
- **C:** — First hard disk partition.
- **D:** to **Z:** — other disk partitions get labeled here. The letter D: or E: are often assigned to CD-ROM, DVD drives but not always. In fact, Windows assigns the next free drive letter to the next drive it encounters while enumerating the disk drives on the system during installation. Drives can be partitioned, thereby creating more drive letters. This applies to MS-DOS, as well as all Windows operating systems. Windows offers other ways to change the drive letters, either through the Disk Manager (Windows NT, 2000, XP and later) or through the Device Manager found in the Control Panel. MS-DOS typically uses parameters on the line loading device drivers inside the CONFIG.SYS file.
- **F:** — first network drive if using Novell NetWare.
- **H:** — "Home" directory on a network server.

Folders

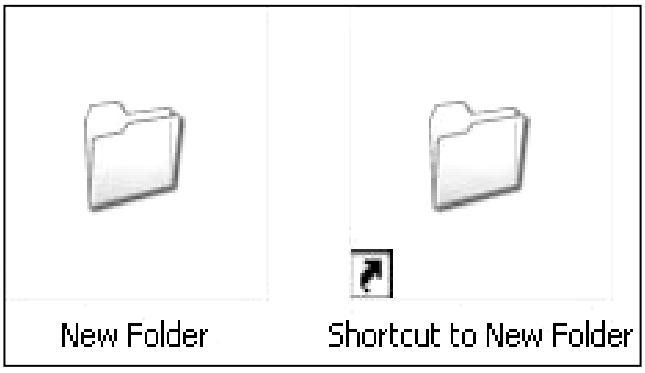
a **directory**, also referred to as a **folder**, **catalog** or **drawer**, is a virtual container within a digital file system, in which groups of computer files and possibly other directories can be kept and organized. The technically correct name for such a file cataloging structure is **directory**, although names such as folder and drawer were adopted to provide some relevancy to the traditional office file cabinet.

Files are kept organized by storing related files in the same directory. In a hierarchical file system (that is, one in which files and directories are organized in a manner that resembles an inverted tree), a directory contained inside another directory is called a **subdirectory**. The terms **parent** and **child** are often used to describe the relationship between a subdirectory and the directory in which it is cataloged, the latter being the parent. The top-most directory in such a file system, which does not have a parent of its own, is called the **root** directory.



Shortcut folders

This is a link to the original folder for quicker access. Most of these links are available on the desktop. These links don't have contents of their own and therefore should not be created on a removable media (most people loss data in this way). To identify the link, check for an **arrow** for the shortcut folder as shown below



To create a new folder

1. *Open My Documents.*
2. *Under **File and Folder Tasks**, click **Make a new folder**.*
   *A new folder is displayed with the default name, **New Folder**, selected.*
3. *Type a name for the new folder, and then press ENTER.*

To make a shortcut in a folder

1. *Open My Documents.*
   *If the folder where you want to place the shortcut is not located in My Documents or its subfolders, use Search to find it. To open Search, click **Start**, and then click **Search**.*
2. *Double-click the folder where you want to place the shortcut.*
3. *On the **File** menu, point to **New**, and then click **Shortcut**.*
4. *Follow the instructions in the Create Shortcut Wizard.*

Compressed (zipped) Folders overview

Folders that are compressed using the Compressed (zipped) Folders feature use less drive space and can be transferred to other computers more quickly. You can work with a compressed folder and the files or programs it contains just as you would an uncompressed folder.
Once you have created a compressed folder (identified by the zipper on the folder icon), you can compress files, programs, or other folders by dragging them to it. You can open files directly from compressed folders, or you can extract files before opening them.
You can run some programs directly from zipped compressed folders, without decompressing them. However, to run programs that are dependent on other files, you must first extract them.
Compressed folders can be moved to any drive or folder on your computer. You can also share zipped compressed folders with other users, even if they use a different file compression program.
You can protect zipped compressed folders with a password. This protects your data if you save it in a shared network folder, attach it to an e-mail message, or move it between work and home on floppy disks.

To create a zipped compressed folder

1. *Open My Computer.*
2. *Double-click a drive or folder.*
3. *On the **File** menu, point to **New**, and then click **Compressed (zipped) Folder**.*
4. *Type a name for the new folder, and then press ENTER.*

Moving and Files/Folders

You can move your files and folders in Windows XP. Moving a file or an entire folder (including its contents) allows you to organize your files better or create a more logical structure of files to navigate through. Windows XP makes it a simple process to move files or folders to a different location.

To move a file or folder

1. *Open My Documents.*
   *If the file or folder you want to move is not located in My Documents or its subfolders, use Search to find it. To open Search, click **Start**, and then click **Search**.*
2. *Click the file or folder you want to move.*
3. *Under **File and Folder Tasks**, click **Move this file** or **Move this folder**.*
4. *In **Move Items**, click the new location for the file or folder, and then click **Move**.*

Copying files and Folders

When you copy a file or folder, you are making a duplicate of the original item that you can then modify, delete, or store independently of the original.

1. *Open the location that contains the file or folder you want to copy.*
2. *Right-click the file or folder you want to copy, and then click Copy.*
3. *Open the location where you want to store the copy.*
4. *Right-click within the location, and then click Paste.*
   The copy of the original file or folder appears in the new location.

Files

A **computer file** is a resource for storing information, which is available to a computer program and is usually based on some kind of durable storage or a **computer file,** can be described as a collection of data or information that has a name, called the *filename*. Almost all information stored in a computer must be in a file. There are many different types of files: *data files, text files, program files, directory files,* and so on. Different types of files store different types of information. For example, program files store programs, whereas text files store text.

Computer file types can be characterized in a few major groups:

- **System File** - is a computer file important to the operating system.
- **Application File** –hold programs and are executable
- **Data Files** – contain user's specific data.

Every file has the following details:

1. Size, date, and time the file was created or modified
2. A unique name and an optional extension. The name and extension are separated by a period (.) e.g. **filename.exe**.
   To see details of any file, proceed as follows:
   - *Right click on file icon and choose* **properties**
   - *Click the* **general** *tab to see properties*

   The table below shows a match between programs and extensions.

Computer File Types by Extension

Extension	Associated Program	Extension	Associated Program	Extension	Associated Program
BAT	DOS Batch File	MP3	Audio	PT3	PageMaker 3 Template
BMP	Bitmap Graphic	MPC	Microsoft Project Calendar	PT4	PageMaker 4 Template
CAB	Compressed Archive	MPG	Media	PT5	PageMaker 5 Template
CH3	Harvard Graphics	MPP	Microsoft Project	PWL	Password List
COM	Program	MPV	Microsoft Project View	RAW	24-bit Graphic
DAT	Data file	OCX	Microsoft Object Linking and Embedding	REG	Windows Registry Data
DLL	Dynamic Link Library	OST	Microsoft Outlook Offline folder	RM	Real Media
DOC	Microsoft Word Document	XLS	Microsoft Excel Spreadsheet	RTF	Rich Text Format
DOT	Microsoft Word Template	XLT	Microsoft Excel Template	SAV	Backup File
DWG	Auto AD Drawing File	XLW	Microsoft Excel Workspace	SCR	Screen Saver
EXE	Program	ZIP	Compressed Archive of Files	SWF	Flash Player Movie
FLA	Flash Movie	PAB	Microsoft Outlook Personal Address Book	SWP	Swap File
GIF	Image	PCX	Graphic	SYS	System Files
HTM	HTML Hyper Text Markup Language	PDF	Adobe Acrobat Portable Document	TIF	Image
ICO	Icon	PIC	Bitmap Graphic	TMP	Temporary File
INI	Windows Initialization	PIF	Windows Program Information File	TTF	Image
JPG	Image	PM3	PageMaker 3	TXT	ASCII Text
LDB	Microsoft Access Lock File	PM4	PageMaker 4	WPD	WordPerfect Document
LOG	Text Log	PM5	PageMaker 5	VBS	Visual Basic Script
MAX	Paper Port Scanned Image	PNG	Graphic	VSD	Visio Drawing
MDB	Microsoft Access Database	PPS	Microsoft PowerPoint Slide Show	VXD	Virtual Device Driver
MID	MIDI	PPT	Microsoft PowerPoint	WAV	Audio File
MOV	QuickTime Movie	PST	Microsoft Outlook Personal folder		

Renaming files and folders

This means giving a folder a new name from the previous.
To rename, proceed as follows:

1. Select the files/folders you want to **rename.**
2. On the **File** menu, click **Rename**.
3. Type the new name, and then press **ENTER.**

Deleting files and folders

Deleting is getting rid of a file/folder in their current storage location. Deleted files/folders never disappear completely but are temporarily placed in the recycle bin to avoid permanent disappearance of a file/folder if it was deleted by mistake.
To delete a file, proceed as follows:

1. *Click the file or folder you want to **delete.***
2. *Under **File and Folder Tasks**, click **Delete this file** or **Delete this folder**.*
    - *You can also delete files or folders by right-clicking the file or folder and then clicking **Delete**.*
    - *To **retrieve** a file you have deleted, double-click the **Recycle Bin** icon on your desktop. Right-click the file you want to retrieve, and then click **Restore**.*
    - *To **permanently delete a file**, press and hold down **SHIFT** and drag it to the Recycle Bin. The item is permanently deleted and cannot be retrieved from the Recycle Bin.*

Sorting files/folders

Sorting is arranging files/folders in a particular order i.e. alphabetically, by date, modification date, type and size.
Windows provides several new ways for you to arrange and identify your files when viewing them in folders, such as My Documents. When a folder is open, you can access each of the following view options on the **View** menu.

Show in Groups

Show in Groups allows you to group your files by any detail of the file, such as name, size, type, or date modified. For example, if you group by file type, image files appear in one group, Microsoft Word files appear in another group, and Excel files in another. Show in Groups is available in the Thumbnails, Tiles, Icons, and Details views. To show your files in groups, on the **View** menu, point to **Arrange Icons by**, and then click **Show in Groups**.

Thumbnails-Thumbnails view displays the images a folder contains on a folder icon so you can quickly identify the contents of the folder. For example, if you store pictures in several different folders, in Thumbnails view, you can tell at a glance which folder contains the pictures you want. Windows displays up to four images on a folder background, by default. Or, you can choose one picture to identify a folder in Thumbnails view. The complete folder name is displayed under the thumbnail.

Tiles-Tiles view displays your files and folders as icons. The icons are larger than those in Icon view, and the sort information you select is displayed under the file or folder name. For example, if you sort your files by type, "Microsoft Word document" appears under the file name for a Microsoft Word document.

Filmstrip-Filmstrip view is available in picture folders. Your pictures appear in a single row of thumbnail images. You can scroll through your pictures using the left and right arrow buttons. If you click a picture, it is displayed as a larger image above the other pictures. To edit, print, or save the image to another folder, double-click the picture.

Icons-Icons view displays your files and folders as icons. The file name is displayed under the icon; however, sort information is not displayed. In this view you can display your files and folders in groups.

List-List view displays the contents of a folder as a list of file or folder names preceded by small icons. This view is useful if your folder contains many files and you want to scan the list for a file name. You can sort your files and folders in this view; however, you cannot display your files in groups.

Details-In Details view, Windows lists the contents of the open folder and provides detailed information about your files, including name, type, size, and date modified. In Details view you can also show your files in groups.

To choose the details you want to display, on the **View** menu, click **Choose Details**.

Selecting files/folders

Selecting is highlighting files/folders for manipulation.

- *To select consecutive files or folders, click the first item, press and hold down SHIFT, and then click the last item.*
- *To select nonconsecutive files or folders, press and hold down CTRL, and then click each item.*
- *To select all the files and folders in the window, on the **Edit** menu, click **Select All**.*
- *If you have selected all files or folders and then want to clear the selection, click in a blank area in the folder window.*

Refresh command

To refresh means to reload a window for better performance or to update displayed information with current data.

To refresh:

1. ***right click** on a blank area in a folder or desktop window*
2. ***on the dropdown menu that appears click refresh command***

Recycle Bin

This is the place in which Windows stores deleted files. You can retrieve files you deleted in error, or you can empty the Recycle Bin to create more disk space.

Basic Computer Practices and Maintenance Skills for Starters –Part two

Adjusting system volume

To adjust the volume for multimedia playback devices

1. *Open **Sounds and Audio Devices** in **Control Panel**.*
2. *On the **Audio** tab, under **Sound playback**, click **Volume**.*
3. *In the **Master Out** dialog box, drag the **Volume** slider for the appropriate device up or down to increase or decrease the output volume*

Installing drivers

A **device driver** or **software driver** is a computer program allowing higher-level **computer programs** to interact with a **hardware device.** A driver typically communicates with the device through the computer bus or communications subsystem to which the hardware connects. When a calling program invokes a routine in the driver, the driver issues commands to the device, once the device sends data back to the driver, the driver may invoke routines in the original calling program. Drivers are hardware-dependent and operating-system-specific.

Installing a new device

To install a new device, plug the device into the system unit and proceed as follows:

1. *Open Windows **Device Manager**.*

Microsoft Windows XP and 2000 users

- On the desktop right-click on **My Computer** and click **Properties** or open the **Control Panel** and **double-click the System icon.**
- In the **System Properties** window click the **Hardware tab.**
- In the Hardware tab click the **Device Manager Button**.

2. *In the **Device Manager** make sure the device you're attempting to install is not already listed from past install attempts. If the device is found highlight it and remove it from **Device Manager** to prevent any conflicts during the install.*
3. *Once **Device Manager** looks ok reboot the computer.*
4. *As the computer is rebooting an **install new hardware wizard** should appear if Windows detects the new hardware using this wizard you should be able to point Windows to the folder containing your drivers either on the CD, diskette, or the folder containing the files you downloaded.*

   If Windows does not detect any new hardware open Control Panel and double-click the Add hardware icon to run the hardware detection wizard. During the steps you will have an option to tell Windows you have a disk containing the drivers for your new hardware device, at this point Windows to the directory containing the drivers for your device.

   Once drivers have been installed **reboot.**

Upgrading drivers for pre-existing device

1. *Open Windows **Device Manager**.*
2. *In the **Device Manager** locate the device you wish to update the drivers for.*
3. *Right-click the device and click **Properties**.*
4. *In the Properties window click the **Driver tab**.*
5. *Click the **Update Driver button**.*
6. *In the Hardware Update Wizard point Windows to the location of* the *updated drivers on your hard drive*
7. *Once drivers have been installed **reboot.***

Using Plug and Play tool

Plug and Play (PnP) is a capability developed by Microsoft for its Windows 95 and later operating systems that gives users the ability to plug a device into a computer and have the computer recognize that the device is there.

How to Install Windows XP Operating System

This procedure demonstrates how to install Windows XP Professional. The procedure to install Windows XP home edition is very similar to the professional edition. Since Windows XP Pro is more advanced operating system, it will be used to demonstrate the installation procedure.

The best way to install Windows XP is to do a clean install. It is not difficult to perform a clean installation. Before you perform the installation I recommend that you check Windows XP Compatibility List to ensure that your hardware is supported by XP. If your hardware is not on the compatibility list you can check your hardware manufactures website to download the drivers for Windows XP. Save all the necessary drivers onto floppy disks or CD before you start the installation.

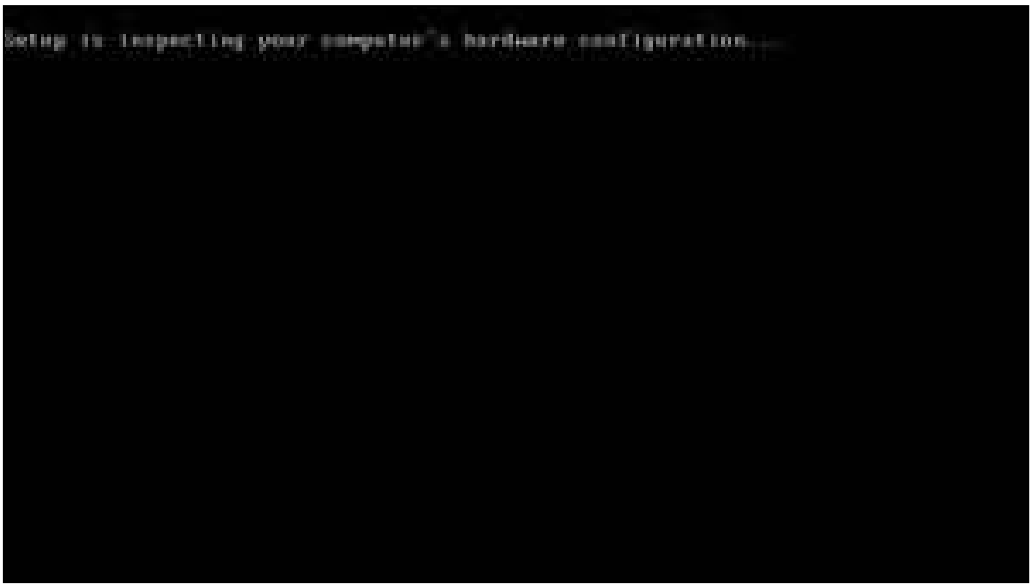
All versions of Windows XP CD are bootable. In order to boot from CD/DVD -ROM you need to set the boot sequence. Look for the boot sequence under your BIOS setup and make sure that the first boot device is set to CD/DVD-ROM. You can then perform the following steps to install Windows XP:

Step 1

- Start your PC and place your Windows XP CD in your CD/DVD ROM drive. Your PC should automatically detect the CD and you will get a message saying **"Press any key to boot from CD".** Soon as computer starts booting from the CD your will get the following screen:

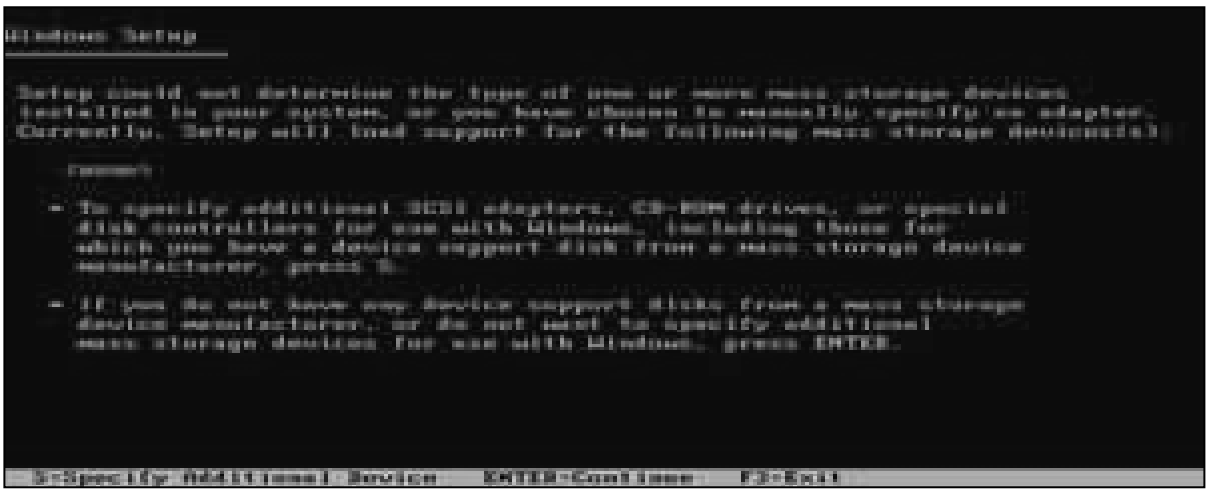
Step 2

- At this stage it will ask you to press F6 if you want to install a third party Raid or SCSI driver. If you are using an IDE Hard Drive then you do not need to press F6. If you are using a SCSI or SATA Hard drive then you must press F6 otherwise Windows will not detect your Hard Drive during the installation. Please make sure you have the Raid drivers on a floppy disk. Normally the drivers are supplied on a CD which you can copy to a floppy disk ready to be installed. If you are not sure how to do this then please read your motherboard manuals for more information.



Step 3

- Press S to specify that you want to install additional device.



Step 4

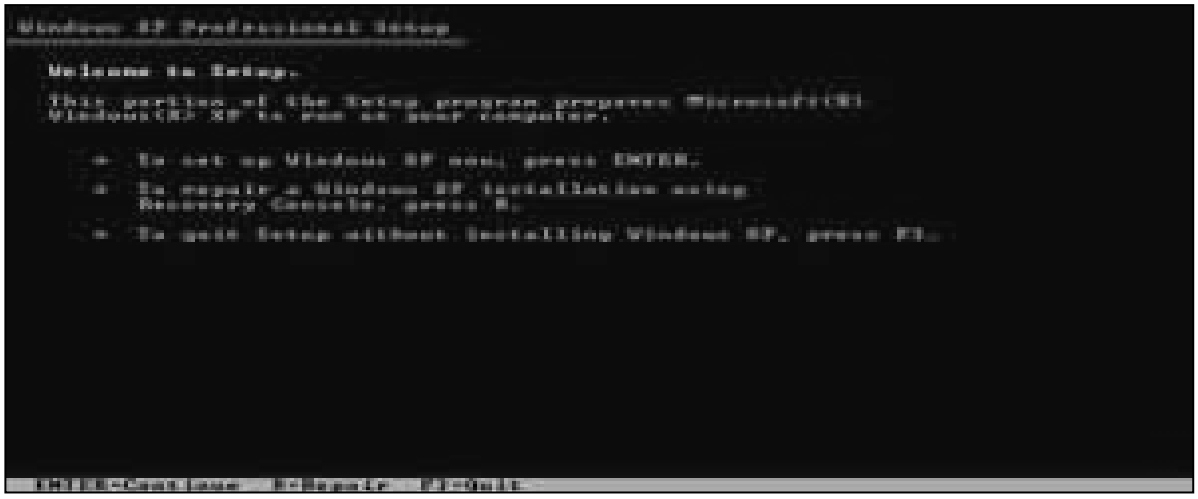
- You will be asked to insert the floppy disk with the Raid or SCSI drivers. Press enter after you have inserted the disk.

Step 5

- You will see a list of Raid drivers for your HDD. Select the correct driver for your device and press enter.

Step 6

- You will then get a Windows XP Professional Setup screen. You have the option to do a new Windows install, Repair previous install or quit. Since we are doing a new install we just press Enter to continue.



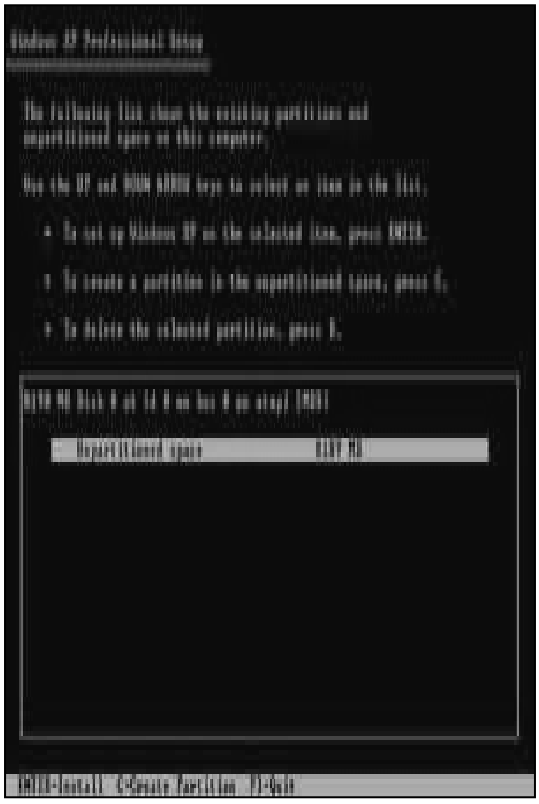
Step 7

- You will be presented with the End User Licensing Agreement. Press F8 to accept and continue

Step 8

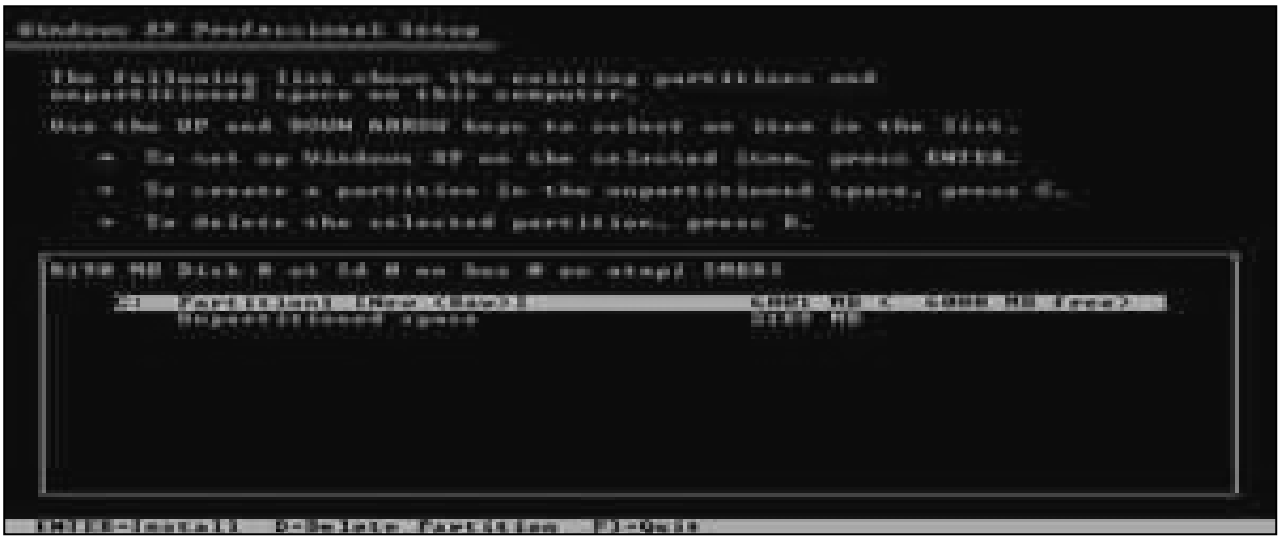
- This step is very important. Here we will create the partition (**Disk partitioning** is the act of dividing a hard disk drive into multiple logical storage units referred to as *partitions*, to treat one physical disk drive as if it were multiple disks) where Windows will be installed. If you have a brand new unformatted drive you will get a screen similar to below. In our case the drive size is 8190MB. We can choose to install Windows in this drive without creating a partition, hence use the entire size of the drive. If you wish to do this you can just press enter and Windows will automatically partition and format the drive as one large drive. However for this demonstration I will create two partitions. The first partition will be 6000MB (C: drive) and second partition would be 2180MB (E: drive). By creating two partitions we can have one which stores Windows and Applications and the other which stores our data. So in the future if anything goes wrong with our Windows install such as virus or spy ware we can re-install Windows on C: drive and our data on E: drive will not be touched. Please note you can choose whatever size partition your like. For example if you have 500GB hard drive you can have two partitions of 250GB each.

Press C to create a partition.



Step 9

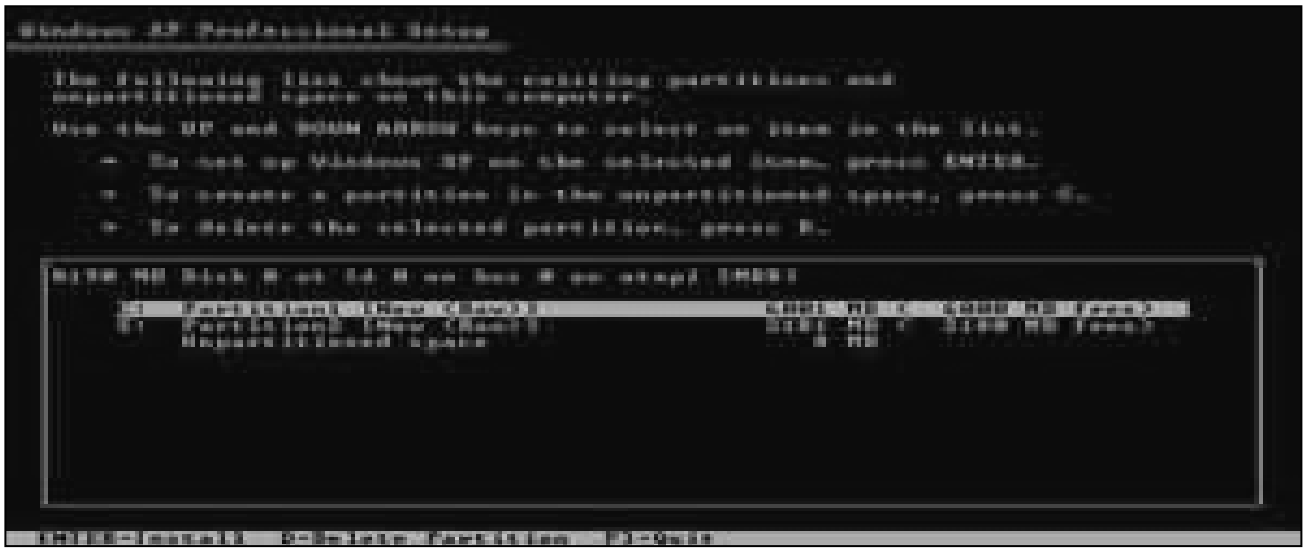
- Windows will show the total size of the hard drive and ask you how much you want to allocate for the partition you are about to create. I will choose 6000MB. You will then get the screen below. Notice it shows C: Partition 1 followed by the size 6000 MB. This indicates the partition has been created. We still have an un-partitioned space of 2189MB. Next highlight the un-partitioned space by pressing down the arrow key. Then press C to create another partition. You will see the total space available for the new partition. Just choose all the space left over, in our case 2180MB.



Step 10

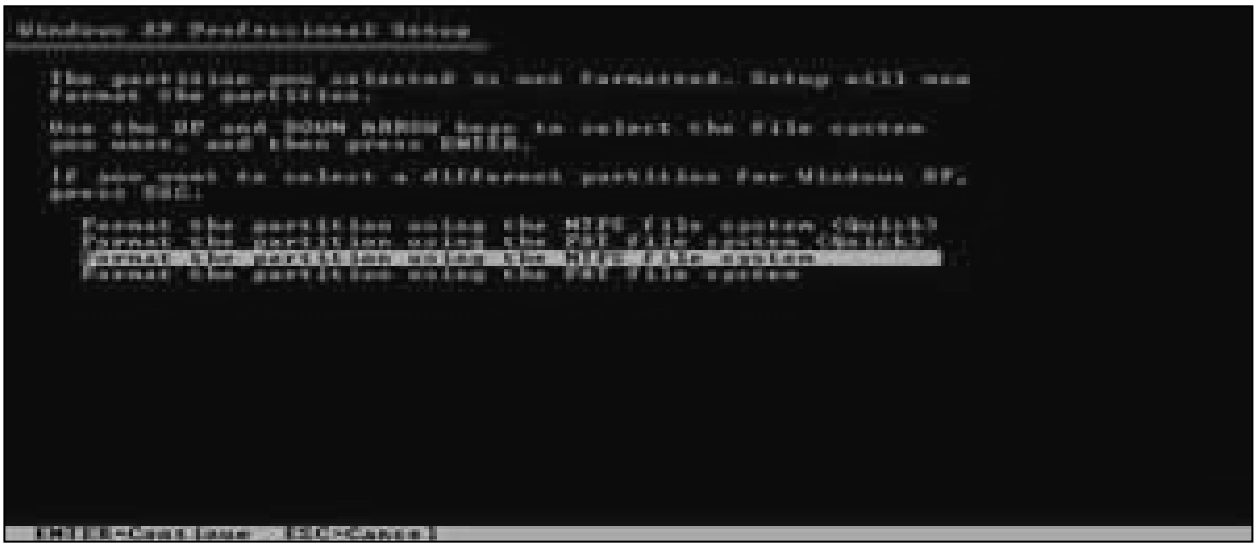
- Now you will see both partition listed. Partition 1 (C: Drive) 6000MB and Partition 2 (E: Drive) 2180MB. You will also have 8MB of un-partitioned space. Don't worry about that. Just leave it at that. Windows normally has some un-partitioned space. You might wonder what happened to D: drive. Windows has automatically allocated D: drive to CD/DVD-ROM.

Select Partition 1 (C: Drive) and press Enter.

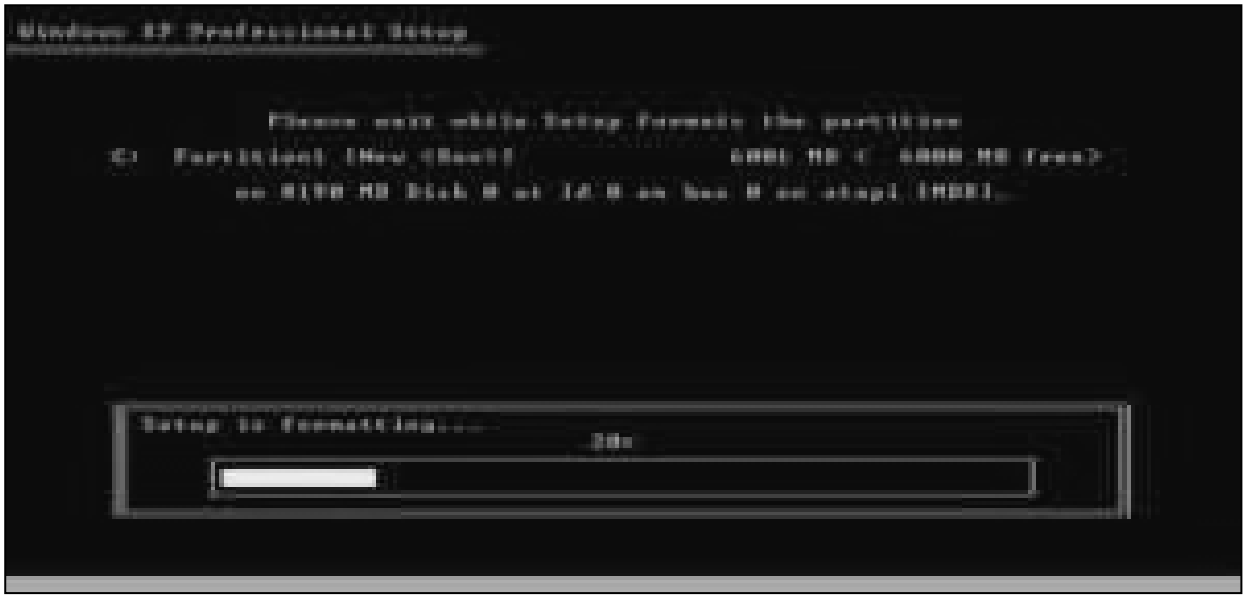


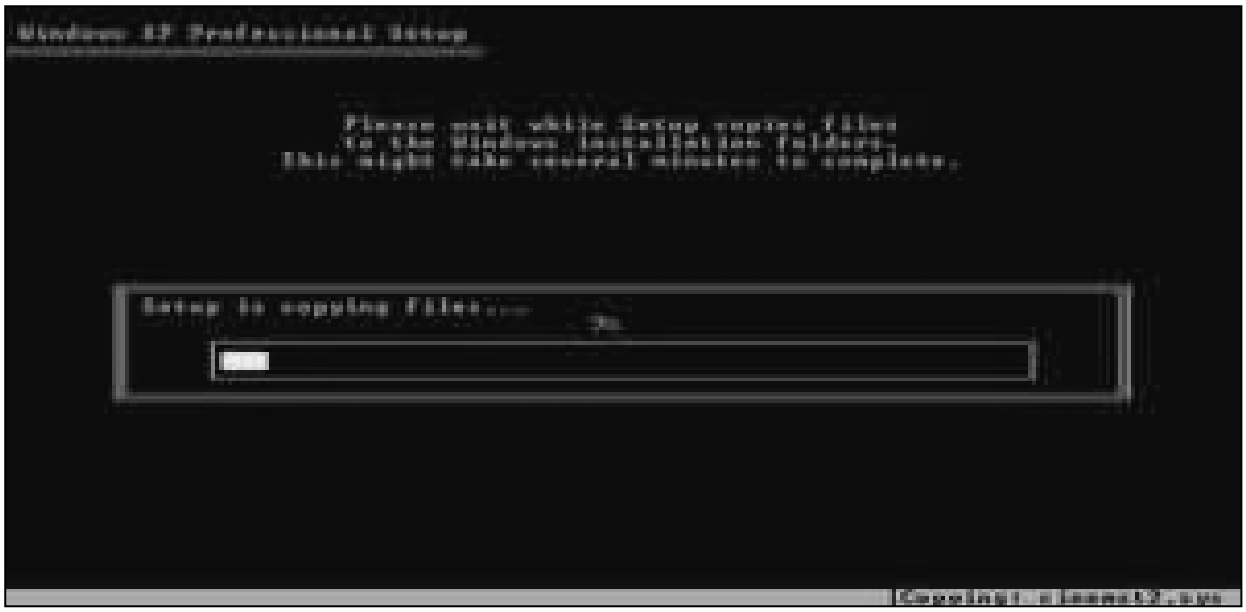
Step 11

- Choose format the partition using NTFS file system. This is the recommended file system. If the hard drive has been formatted before then you can choose quick NTFS format. We chose NTFS because it offers many security features, supports larger drive size, and bigger size files.



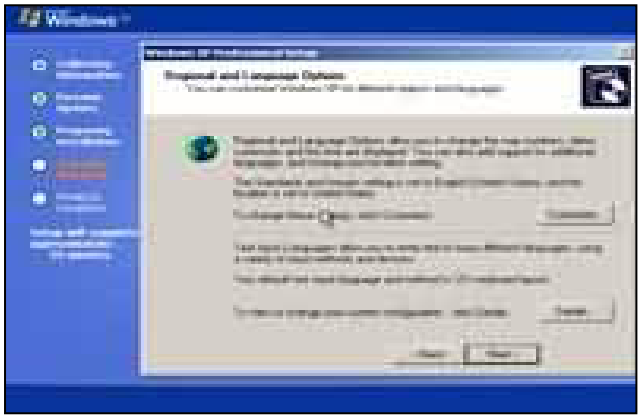
Windows will now start formatting drive C: and start copying setup files as shown on the two images below:





Step 12
- After the setup has completed copying the files the computer will restart. Leave the XP CD in the drive but this time DO NOT press any key when the message "Press any key to boot from CD" is displayed. In few seconds setup will continue. Windows XP Setup wizard will guide you through the setup process of gathering information about your computer.

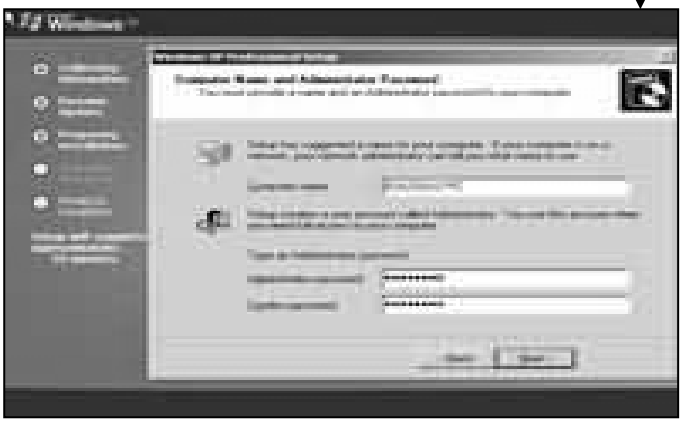
Step 13 - Choose your region and language.



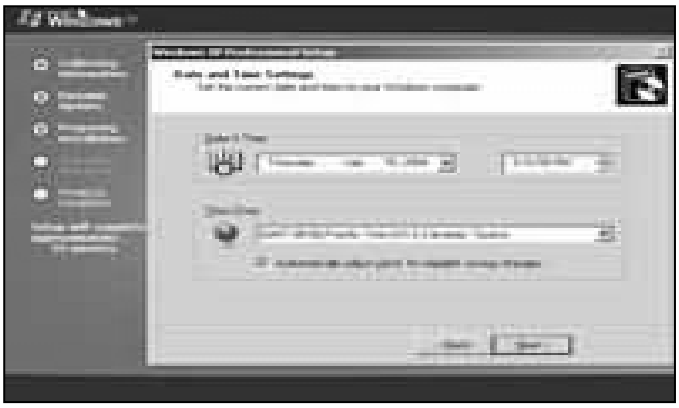
Step 14 - Type in your name and organization.

Step 15. Enter your product key.

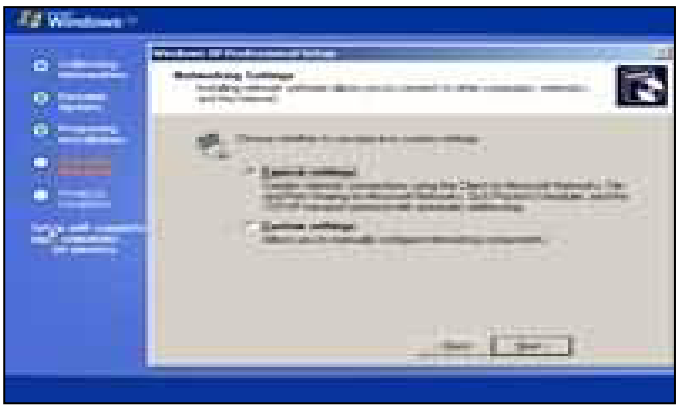
Step 16 - Name the computer, and enter an Administrator password. Don't forget to write down your Administrator password.



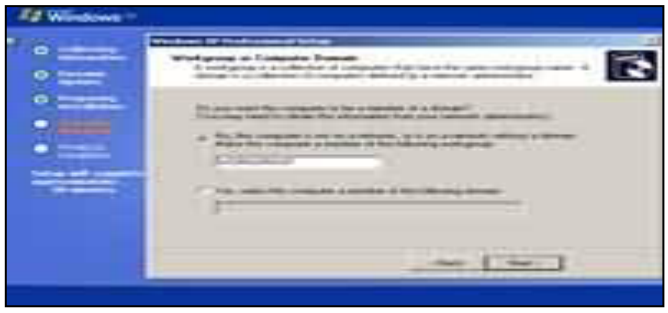
Step 17 - Enter the correct date, time and choose your time zone.



Step 18 - For the network setting choose typical and press next.



Step 19 - Choose workgroup or domain name. If you are not a member of a domain then leave the default settings and press next. Windows will restart again and adjust the display.



Step 20 - Finally Windows will start and present you with a Welcome screen. Click next to continue.

Step 21 - Choose *'help protect my PC by turning on automatic updates now'* and press next.

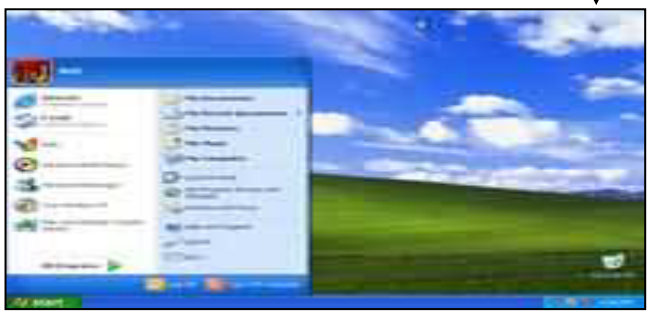
Step 22 - Will this computer connect to the internet directly, or through a network? If you are connected to a router or LAN then choose: *'Yes, this computer will connect through a local area network or home network'*. If you have dial up modem choose: *'No, this computer will connect directly to the internet'*. Then click next.

Step 23 - Ready to activate Windows? Choose yes if you wish to active Windows over the internet now. Choose no if you want to activate Windows at a later stage.

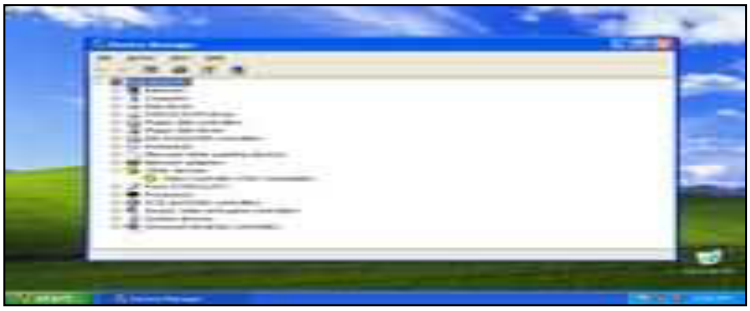
Step 24 - Add users that will sign on to this computer and click next.

Step 25 - You will get a Thank you screen to confirm setup is complete. Click finish.

Step 26. Log in, to your PC for the first time.



Step 27 - You now need to check the device manager to confirm that all the drivers have been loaded or if there are any conflicts. From the start menu select **Start -> Settings -> Control Panel**. Click on the **System** icon and then from the **System Properties** window select the **Hardware** tab, then click on **Device Manager**.



If there are any yellow exclamation mark "**!**" next to any of the listed device, it means that no drivers or incorrect drivers has been loaded for that device. In our case we have a Video Controller (VGA card) which has no drivers installed.

Your hardware should come with manufacturer supplied drivers. You need to install these drivers using the automatic setup program provided by the manufacturer or you need to manually install these drivers. If you do not have the drivers, check the manufacturer's website to download them.

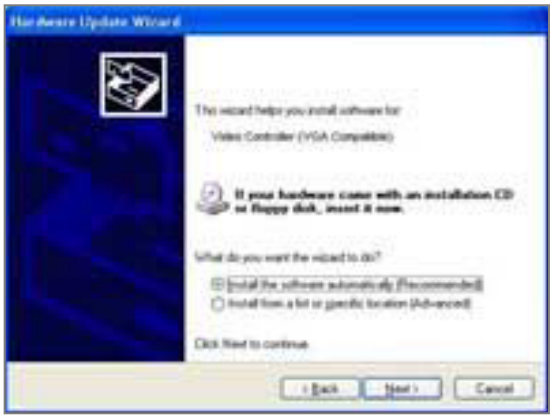
To install a driver manually use the following procedure:

(a) From the device manager double click on the device containing the exclamation mark.

(b) This would open a device properties window.

(c) Click on the **Driver** tab.

(d) Click Update Driver button. The Wizard for updating device driver pops up as shown below: ⟶



You now get two options. The first option provides an automatic search for the required driver. The second option allows you to specify the location of the driver. If you don't know the location of the driver, choose the automatic search which would find the required driver from the manufacturer supplied CD or Floppy disk. Windows would install the required driver and may ask you to restart the system for the changes to take affect. Use this procedure to install drivers for all the devices that contain an exclamation mark. Windows is completely setup when there are no more exclamation marks in the device manager.

Installing Microsoft Office 2003/XP/2007 Suites

Microsoft Office is an office suite of desktop applications, servers and services for the Microsoft Windows and Mac OS X operating systems, introduced by Microsoft on August 1, 1989. MS Office consists of the following application programs:

1. Office tools
2. Microsoft office publisher (DTP)
3. Microsoft office InfoPath
4. Microsoft office excel (spreadsheet)
5. Microsoft office access (database)
6. Microsoft office word (word processor)
7. Microsoft office PowerPoint (presentation)
8. Microsoft office outlook (Email client)
9. Microsoft Visio etc.

To install Microsoft office:

1. *Click **Start**, point to **Settings**, and then click **Control Panel**.*
2. *Double-click **Add/Remove Programs**, click **Add New Programs**, and then click **CD or Floppy**.*
3. *Click **Next**.*
4. *Click **Browse**.*
5. *Locate the root folder of the Office source location, click **Setup.exe**, and then click **Open**. Setup.exe is added to the command line that appears in the **Open** box of the **Run Installation Program** dialog box.*
6. *Click **Finish** to run Office Setup.*

7. *If requested, type your customer name and product key (CD key) information in the appropriate boxes, and then click* ***Next****.* ***Note*** *The* ***Next*** *button is not available until you type a valid product key.*
8. *Specify the location where you want to install Office, and then click* ***Next****.*
9. *On the* ***Choose which applications for setup to install*** *page, click* ***Next****. If you click* ***Choose detailed installation options for each application*** *on the* ***Choose which applications for setup to install*** *page, and then click* ***Next****, the feature tree appears on the* ***Choose installation options for all Office applications and tools*** *page. Because Office Setup detects that you are using Terminal Services, the only installation states that are available are* ***Not Available*** *and* ***Run from My Computer****. By default, some features are set to* ***Not Available****. Do not change the installation states of these features to* ***Run from My Computer****, because you may experience problems with the Office programs that use these features.* ***Warning*** *By default, some features are set to* ***Not Available*** *to make sure that there is optimum performance in a Terminal Server environment, including the elimination of unexpected errors. Do not change the installation states of these features to Run from My Computer.* ***Note*** *If your Office source location is an administrative installation,* ***Run from Network*** *is also displayed as an installation state.*
10. *On the* ***Begin installation*** *page, click* ***Install****.*
11. *When you receive a message that the installation completed successfully, click* ***OK****, click* ***Next****, and then click* ***Finish****.*

Writing (Burning) Data on a Blank CD/DVD

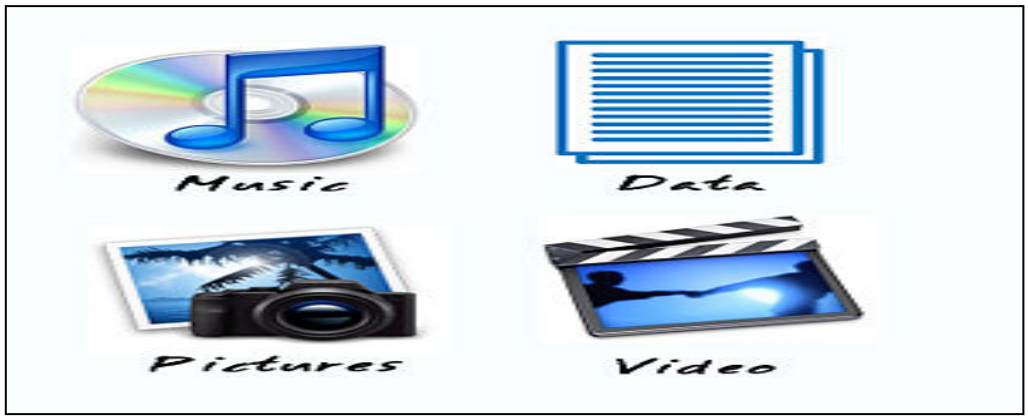
Step 1: *Check your computer to see that it has a CD or DVD drive that is capable of burning CDs.* This drive may be built into your computer or an external drive. Either type should work equally well.

Step 2: Make *sure you have a CD that can be burned.* There are two types of CDs that you can use.

•A CD-R (Compact Disc-Recordable) is a Write Once Read Many (WORM) optical medium. This means that once the disk is burned it can not be erased. This type disk is usually used for permanent storage. For example; a music CD, a picture CD, or any other type of data that you want to keep permanently.

A CD-RW (Compact Disc Re-Writable) is a rewritable optical disc format. This type of disk can be burned, erase, and then burned again. This type disk is usually used for temporary data storage.

Step 3: *Decide on the type of CD you plan to burn*. There are many different types of CDs that can be burned and how you proceed depends on which type you are going to burn. The major types of CD that can be burned are:



- **Music**. This type of CD is the type of CD that is normally burned for use in a home or automobile CD player.

•**Data**. This type of CD is most often used to store files that can be used by a computer. This type of CD can not be used in a standard home or automobile CD player. They are formatted using the "ISO9660" format, which cannot be read by a standard CD player. Although, a car CD player that reads MP3's will play a data disc. Data discs are capable of 100 MP3's on a typical 700MB CD. Burning MP3's directly to a CD will only grant you under 20 MP3's.

•**MP3.** This is a data CD containing only mp3 compressed music files. Because it is actually an ISO9660 data CD, not all CD players will be able to play it. This type of CD can contain a much larger number of songs than a music CD but can only be played on a computer or CD player specifically designed to play MP3s.

•**Disk image**. A disk image file is a file that contains an exact copy of a disk. The most common type of Disk image is an .ISO image. Disk images are usually used for storing an exact copy of a CD on a computer. By using a computer, one can burn a CD from an .ISO image and create a usable CD.

Ripping. Ripping a CD is the process of taking the audio off of one CD and either storing it on a computer or burning it to a second CD, thereby making a copy of the first CD.

Step 4:*Decide on the software you want to burn your CD with.* There are many different programs that are designed to burn CDs. Some are built into the computer's operating system, while others are individual programs. These programs range from very simple to very complex. Some of these are free, while others have to be purchased.

Using Windows burning tool

To copy files and folders to a CD

1. *Insert a blank, writable CD into the **CD recorder**.*
2. *Open **My Computer**.*
3. *Click the **files or folders** you want to copy to the CD. To select more than one file, hold down the CTRL key while you click the files you want. Then, under **File and Folder Tasks**, click **Copy this file**, **Copy this folder**, or **Copy the selected items**.*
   *If the files are located in My Pictures, under **Picture Tasks**, click **Copy to CD** or **Copy all items to CD**, and then skip to step 5.*
4. *In the **Copy Items** dialog box, click the CD recording drive, and then click **Copy**.*
5. *In My Computer, double-click the CD recording drive. Windows displays a temporary area where the files are held before they are copied to the CD. Verify that the files and folders that you intend to copy to the CD appear under **Files Ready to be written to the CD**.*
   *Under **CD Writing Tasks**, click **Write these files to CD**. Windows displays the CD Writing Wizard. Follow the instructions in the wizard.*

Step 5: *Burn your CD.* Burning your CD is as simple as running the software that you are going to burn your CD with, putting a CD into your CD burner, selecting the data to be burned, and then telling the program to burn the CD.

Disk Management using windows

Using Disk Defragmenter

Fragmentation

The scattering of parts of the same disk file over different areas of the disk. Fragmentation occurs as files on a disk are deleted and new files are added. It slows disk access and degrades the overall performance of disk operations, although usually not severely.

Defragmentation

This is the process of rewriting parts of a file to contiguous sectors on a hard disk to increase the speed of access and retrieval.

You might need to be logged on as an **administrator** or **a member of the Administrators group i**n order to perform this task.

Disk Defragmenter

consolidates fragmented files and folders on your computer's hard disk, so that each occupies a single, contiguous space on the volume. As a result, your system can gain access to your files and folders and save new ones more efficiently. By consolidating your files and folders, Disk Defragmenter also consolidates the volume's free space, making it less likely that new files will be fragmented.
You can also defragment disks from a command line using the defrag command.
Notes
*To open Disk Defragmenter, click **Start**, point to **All Programs**, point to **Accessories**, point to **System Tools**, and then click **Disk Defragmenter**.*

Using Backup

The Backup utility helps you create a copy of the information on your hard disk. In the event that the original data on your hard disk is accidentally erased or overwritten, or becomes inaccessible because of a hard disk malfunction, you can use the copy to restore your lost or damaged data.

- ***To start Backup, click Start, point to All Programs, point to Accessories, point to System Tools, and then click Backup.***

Using Disk Cleanup

Disk Cleanup helps free up space on your hard drive. Disk Cleanup searches your drive, and then shows you temporary files, Internet cache files, and unnecessary program files that you can safely delete. You can direct Disk Cleanup to delete some or all of those files.

- *To open Disk Cleanup, click **Start**, point to **All Programs**, point to **Accessories**, point to **System Tools**, and then click **Disk Cleanup**.*

System Restore overview

System Restore is a component of Windows XP Professional that you can use to restore your computer to a previous state, if a problem occurs, without losing your personal data files (such as Microsoft Word documents, browsing history, drawings, favorites, or e-mail). System Restore monitors changes to the system and some application files, and it automatically creates easily identified restore-points. These restore points allow you to revert the system to a previous time. They are created daily and at the time of significant system events (such as when an application or driver is installed). You can also create and name your own restore points at any time.

- If you restore to a restore point before a program was installed, that program does not work after restoration. If you want to use the program again, you must reinstall it.
- *To open system restore, click **Start**, point to **All Programs**, point to **Accessories**, point to **System Tools**, and then click **system restore**.*

Windows Media Player

Used to play and organize digital media files on your computer and on the Internet. In addition, you can use the Player to listen to radio stations from all over the world, play and copy CDs, create your own CDs, play DVDs, and copy music and videos to portable devices, such as portable digital audio players

File compression overview

Compressing files, folders, and programs decreases their size and reduces the amount of space they use on your drives or removable storage devices. Drive compression decreases the amount of space used by all of the files and folders stored on that drive.

To compress a file or folder on an NTFS drive

1. *Open **My Computer.***
2. *Double-click a **drive or folder.***
3. *Right-click the file or folder you want to compress, and then click **Properties**.*
4. *On the **General** tab, click **Advanced**.*
5. *Select the **Compress contents to save disk space** check box, and then click **OK**.*
6. *In the **Properties** dialog box, click **OK**.*

   *In **Confirm Attribute Changes**, select the option you want.*

Formatting disks

Formatting is the process of preparing a new disk for use by imprinting empty sectors and tracks on the surface of the disk so that the operating system can recognize and make it accessible.
To format a removable media:

- Insert the media disk into the floppy or USB port.
- Double click **My computer**
- Right click the **drive**
- On the shortcut menu, **Click format**
- In the **format dialog box**, choose a file system FAT32 or NTFS
- Specify the **capacity** and type in the drive label.
- Click **Start** to start formatting
- Click **close.**

Scanning a storage device for problems

Windows XP and later versions have a disk management tool known as **chkdsk** that helps the user to check and repair minor drive problems such as lost storage locations or damaged surfaces.
To scan a drive for errors:

- *From **start menu**, click **Run** command*
- *On the **Run dialog box** that appears type the word **'command'** in the **open** textbox.*
- *A **DOS** window similar to the one shown below appears*

- *Type **the drive letter** of the drive you want to scan at the prompt followed by a colon then press enter key e.g. **E:***
- *The prompt changes i.e. **E:\>***
- *Then type the word **chkdsk** at the prompt and press the enter key i.e. **E:\>chkdsk***
- *Wait for the computer to finish scanning and then type the word **exit** at the prompt to close the **Dos** window then press the **enter key.***