

can help you perform tasks faster, cheaper, and more efficiently. Listed below are common examples of software for daily use:

- Office suites
- Accounting packages for example spreadsheets
- Database
- Publishing tools

Specialised software requires users to have special training and is specially designed for an individual or company's specific needs. Some known specialised software include:

- Computer aided design
- Digital media processing
- Web design
- Software development
- Management information system

Some specialised software are now commonly used by many organisations and can be classified as productivity applications. These include;

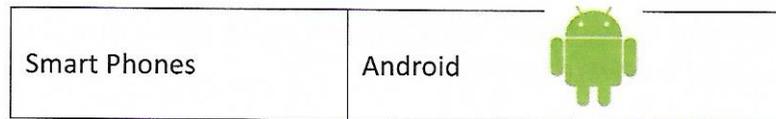
- Web design
- Graphics design
- Management information system

2. Operating System

System software provides the instructions to control the work of the computer hardware. It is often called the computer **operating system** (OS). Every computer system MUST have an operating System.

Common Operating Systems

Computer type	Names of Operating System
Personnel Computer (PC) or Corporate server	Microsoft Windows, Vista  Linux 
Corporate server	UNIX 
Apple Macintosh PC	Mac OS X 
iPad	iOS 



OS architecture

The operating system (OS) is the first thing loaded onto the computer; without the operating system, a computer is useless.

A computer operating system has four main parts:

- The kernel
- The device drivers
- The user interface
- System utilities

The kernel

The kernel loads the applications (software) into memory, making sure they do not interfere with one another. They are also involved in determining how the applications will share the process of using the CPU efficiently.

The device drivers

Every hardware component that makes up the computer will have a device driver that allows the operating system to control and communicate with it. There could be hundreds of device drivers pre-installed with the operating system, and the right ones for that particular computer set-up are loaded when the computer starts up. For this reason, it is possible that when a new printer or other piece of hardware is connected to the computer system for the first time, the OS will ask the user to install a software driver.

The user interface

This part of the operating system determines what is to be seen on the screen based on given user inputs. The user interface could be a basic command line interface or more commonly, a Graphical User Interface (GUI) such as the Mac OS X, Windows or Gnome.

System utilities

This part of the operating system provides all the basic facilities that run in the background without user interaction. For example, printing services and file management services.

An operating system does two things:

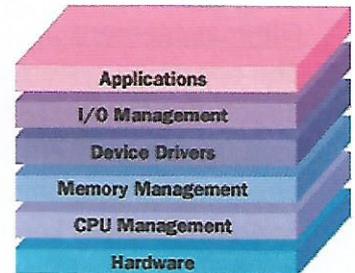
- It manages the hardware and software resources of the system. In a desktop computer, these resources include the processor, memory, disk space etc. (On a cell phone, they include the keypad, the screen, the address book, the phone dialer, the battery and the network connection).

- It provides a stable, consistent way for applications to deal with the hardware without having to know all the details of the hardware.

Note: The operating system controls every task your computer carries out and manages system resources.

The Windows OS architecture:

- OS manages the hardware and software resources
- Program seeks CPU time
- Program demands Memory, Storage and Input/Output capacity

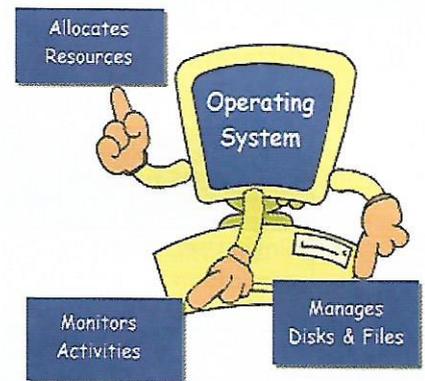


Main functions of an operating system

The operating system controls the basic functions of a computer. It also provides the interface between the computer hardware and the outside world (users).

The basic functions of an operating system include:

- Starting-up (Booting) the computer
- Performing basic computer activities.
- Providing a user interface
- Handling system resources
- File management



Booting the computer

The process of starting or restarting the computer is known as booting. A cold boot is when you turn on a computer that has been turned off completely. A warm boot is the process of using the operating system to restart the computer.

Performing basic computer activities (tasks)

The operating system performs basic computer tasks such as managing the various peripheral devices (mouse, keyboard and printers). Most operating systems now have a *'plug and play'* feature, which means a device such as a printer can be detected automatically and can be used by the operating system without any user intervention.

Provides a user interface

A user interacts with software through the user interface. The two main types of user interfaces are: command line and the graphical user interface (GUI). With a command line interface, the user interacts with the operating system by typing commands to perform specific tasks. With a graphical user interface, the user interacts with the operating system by using a mouse to access windows, icons, and menus.

Handling system resources

The operating system also handles system resources such as the computer's memory and sharing of the central processing unit (CPU) time using various applications and peripheral devices.

File management

The operating system also handles the organization and finding of files and directories (folders) saved or retrieved from a computer storage. The file management system allows the user to perform tasks such as creating files and directories, renaming, copying and moving files as well as deleting them. The operating system keeps track of where files are located on the hard drive using a particular type of file system.

3. Different features of the Operating System

OS types	Description	Example
Single User, Single application	Allows one user at a time, running one user application at a time.	Basic mobile phone OS
Single user, multi-tasking	Allows one user at a time but can deal with many applications at a time.	Windows, Linux, Mac OS X
Multi-user. Multi-tasking	Allows for multiple users running many applications at the same time.	Unix and Linux
Network Operating System	Allows computer resources such as printers and user applications to be shared by many users at the same time.	Windows server, Linux, Unix

Managing computer resources

The operating system manages the hardware and software resources of the computer system.

- In a PC, these resources include the processor, memory, devices, storage etc.
(On a cell phone, they include the keypad, the screen, the address book, the phone dialer, the battery and the network connection.)

Computer operating systems often contain additional applications known as tools or utilities to assist users in managing computer resources.

Examples of operating system tools and utilities include antivirus software, backup software and disk tools.

Antivirus software helps protect a computer system from viruses and other harmful programs. A computer virus is a computer program that can cause damage to a computer's software, hardware or data. It is referred to as a virus because it has the capability to replicate itself and hide inside other computer files.

Backup software helps back up files on your computer. Most computer systems use a hard disk drive for storage. Backup software copies the most important files to another storage device, such as an external hard disk. In this way, users can still have access to their files and applications even when their computer fails to work.

Disk tools includes a wide range of different tools that help manage hard disk drives and other storage devices. This includes utilities to scan the hard disks for any potential problems or disk cleaners to remove any unnecessary files.

In Windows, most of the operating system tools and utilities for managing computer resources can be found in the accessories folder and the control panel or settings (newer version of windows).

Accessories

A folder located in the Start menu in a Windows operating system that contains useful tools such as the Accessibility tools, Communication tools, System tools, Calculator, WordPad, Notepad etc.

Accessibility tools

The Magnifier

The Magnifier is a display utility that makes the computer screen more readable to people with impaired vision by creating a separate window that displays a magnified portion of the screen.

The Narrator (newer version of Windows)

The Narrator is a text-to-speech utility for people who are either blind or have increasingly impaired vision. Narrator reads what is displayed on the screen, the contents of the active window, menu options, or text that has been typed.

The On-screen Keyboard

On-Screen Keyboard is a utility that displays a keyboard on the computer screen. This tool allows people with vision problems to type in data using a pointing device or joystick.

System Tools

Examples of Accessories in the System tools folder are:

- Back Up
- Disk Cleanup

Backup

The Backup accessory makes it easy for users to backup all their important files. A

backup wizard can provide few choices for backing up users' files. Also provided is the option to create a "system recovery disk". A system recovery disk is a handy tool used to restore Windows and its applications in case the computer system fails to work.

Disk cleanup

The Disk Cleanup tool can be used to automatically remove unnecessary files on the storage devices, which can help make the PC run faster. It deletes temporary files and system files that are not in use, empties the Recycle Bin, and removes a variety of other items that are no longer needed by the user.

Other Tools

Some examples of more smaller applications or programs grouped in the accessories folder (or All Apps in newer version) include:

Notepad, Paint, Calculator, Wordpad & Clipboard

Control Panel or Settings

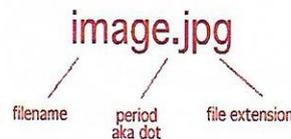
The Microsoft Windows Control Panel is a management tool for the Windows OS that allows users to change the computer and user settings within the OS.

Managing computer files and folders

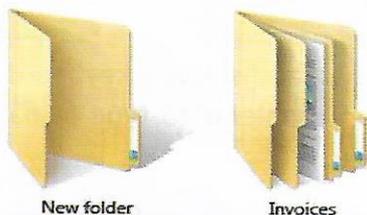
A computer file contains information such as text, images or audio. These files are stored and managed by the operating system. Windows files use different file-extensions or icons to make it easy to recognize a type of file.



A file-extension is a suffix (separated from the filename by a dot) to the name of a computer file applied to indicate the type of file. Examples of file-extensions are *.doc*, *.png*, *.jpeg*, *.exe*, *.dmg* and *.txt*.



A folder is like a computer container which users can use to store files. This way, users can organize their files into different categories to suit their preferences.



Windows default folders (Libraries)

The four (4) default folders (libraries) are:

Folder	Main use

Documents	Use this folder 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 Documents folder.
Pictures	Use this folder to organize and arrange digital pictures, whether from a camera, scanner, or in e-mail from other people
Music	Use this folder to organize and arrange digital audio files or music, such as songs from an audio CD or download from the Internet.
Videos	Use this folder to organize and arrange videos, such as clips from digital camera or camcorder, or video files from the Internet



Activity 1.5

1. Outline the basic architecture of the windows OS.
2. Provide some of the core OS functions for managing PC resources.
3. Provide the links between the core OS functions for managing PC resources.
4. Suggest any possible developments that can improve the way OS manage PC resources.

Data Communication and Networking

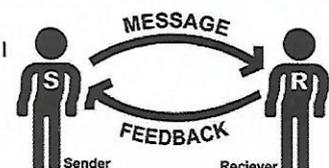
1. Data communication concepts

Data communication is about sending and receiving of information between two devices by means of electrical signals.

The device that transmits the data is known as sender or source and the device that receives the transmitted data is known as the receiver.

There are two main types of signals used in data communi

- i. Analog signals
- ii. Digital signals



Data communication is also known as data transmission. Data transmission can happen over a wire or wireless medium.