

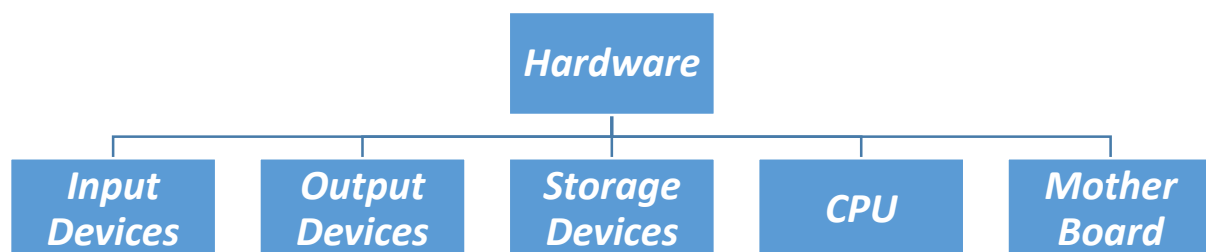
Learning objectives

- General information
- Understand the Software system
- Understand the types of operating systems available
- Differentiate among the major desktop operating systems
- Explain how device drivers work
- Explain computer file storage concepts

Information technology : refers to use computers in business, education and every think in life.

Components of a computer system

1. Hardware: the physical equipment used in computing.



- **Input devices** : The devices that used to pass information to the central processing unit (CPU) for examples:

- ✚ Keyboard
- ✚ Mouse
- ✚ Scanner
- ✚ Microphone
- ✚ Trackball (alternative to the mouse)
- ✚ Joystick
- ✚ Digitizing tablet
- ✚ Web camera
- ✚ Touchpad

✚ Light pen

➤ **Output devices** : The devices that used to display the computer data in an understandable or readable format. For examples:

- ✚ Screen / Monitor /VDU(Visual Display Unit)
- ✚ Speakers / Headphones
- ✚ Plotter
- ✚ Printer
- ✚ LED / LCD

➤ **Input / Output Devices:**

- ✚ Touch screen
- ✚ Modem

➤ **Storage devices:**

Types of storage devices:

1. Read Only Memory(ROM): this memory is

- ❖ Fixed
- ❖ You cannot write to this memory .
- ❖ The contents of this are unchangeable and supplied during the manufacturing of the computer.
- ❖ It contains instructions needed for the computer to work correctly when switched on .

2. Random Access Memory (RAM) : this is the

- ❖ The working memory
- ❖ The operating system is loaded into it when the computer is switched on
- ❖ It contains all the work in progress
- ❖ It is volatile (its contents are lost when you switch off your computer)
- ❖ Changeable / writable
- ❖ The more RAM you have the faster your computer

3.

- **Motherboard**: It is contained within your system unit and all vital computer systems plug into it.
- **CPU (Central Processing Unit)**: it is responsible for the control and execution of all the computers operations. The speed of the **CPU is measured in MHz or GHz**

Understanding System Software

- **Software** is a broad term for any program that runs on a computer. This can include the operating system and all its helper files, utilities that keep the computer healthy and running well, and applications. Another name for software is a program.
- **A programmer** writes the instructions that become computer programs.
- **Application software** is software that enables you to perform a useful task on your computer. Some programs are classified as productivity software (**is a software that helps a human perform one or more business or personal enrichment tasks**) because they allow you to get things done. Other application software is designed to entertain you, or to help you learn something.
- **System Software**: Software that starts the computer and keeps it running, performing basic system tasks such as running applications, managing files, and correcting errors.

- System software includes **BIOS**, the operating system, and utility programs.



The System BIOS

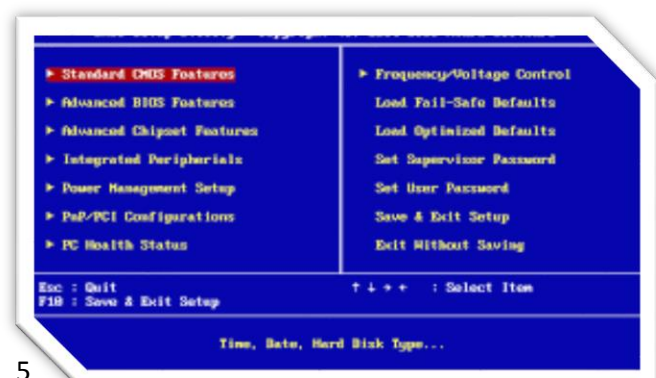
- The most basic software is the **Basic Input Output System (BIOS)**.
- It is stored on a read only chip on the motherboard so that it does not accidentally get changed or corrupted.
- It helps the computer start up and performs some basic testing on the hardware.
- In short, it is the software that initializes and tests the system at start-up.
- **BIOS** is the built-in software on the motherboard that starts the computer.
- It performs a power-on self-test (POST) at start-up, which ensures that all the critical hardware devices are functioning properly, including the CPU, the RAM, and the motherboard.
- If the hardware passes the tests, the BIOS looks for an operating system on one of the available drives, and then passes off control to the operating system to complete the boot process.

- The BIOS has a list of default settings it uses for managing memory and devices, but those settings can be overridden by user settings that you specify.



The Operating System

- The BIOS starts the computer at a basic level, but the operating system does the bulk of work to keep it running and to help the user accomplish tasks.
- *the operating system performs these important functions:*
 - 1) It provides the user interface that humans use to communicate commands and receive feedback.
 - 2) It communicates with the hardware, instructing it to take action to accomplish tasks. For example, it communicates with the keyboard and mouse to accept input, and it communicates with the display screen to show output.

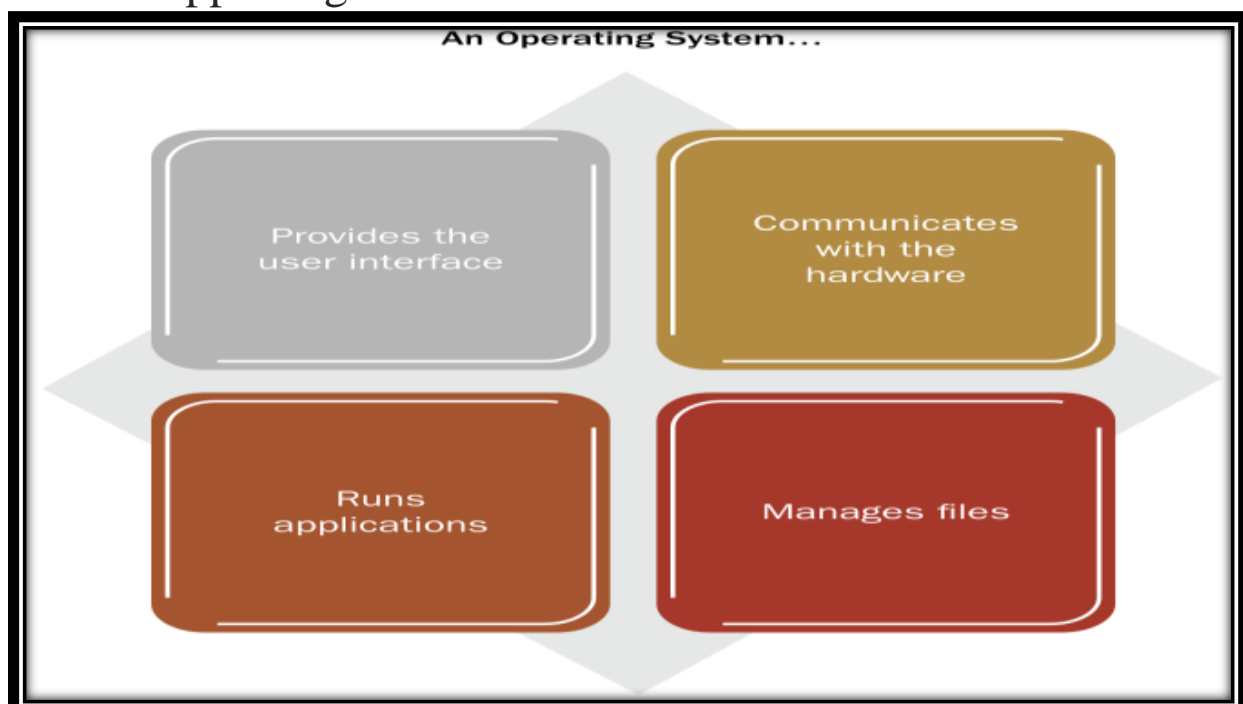


- 3) It runs applications, and enables humans to interact with them.
- 4) It controls and manages the file storage system.

The functions performed by an operating system

Operating Systems: examples

- There are many kinds of operating systems, suited for a wide range of devices, from supercomputers to smartphones.
- Each operating system is optimized for the hardware it runs on and the tasks the user is likely to want to perform.
- Microsoft Windows, Mac OS and Linux for desktop and notebook PCs.
- UNIX for mainframes and servers;(the operating system in a server is designed to give computer professionals many options for managing and configuring the server and supporting users and databases.



- Android for tablets and smartphones (For example, the operating system on a tablet computer is designed to be **compact** (because there is limited storage space in the tablet), **easy to** operate (because most users are not computer professionals), and **fast to** respond to simple commands)
- Special versions of Windows (i.e. windows phone) and Mac OS (IOS) also power tablets and smartphones.
- Microsoft Windows is the most popular operating system.

Platform

- Some operating systems are designed to run on just one specific platform.
- **Platform:** A type of computer hardware that is compatible with certain operating systems.
- **Intel platform:** A platform that was originally based on CPUs made by Intel.
- The Intel platform can run Windows, UNIX, Linux, and newer versions of Mac OS X operating systems.

Note

- The 32-bit Intel platform is sometimes called **x86**.
- That name is a nod to the old Intel line of CPUs where the model numbers all ended in 86, such as 286, 386, and 486
- The 64-bit Intel platform is sometimes called **x64**.
- Windows 7 comes in both 32-bit and 64-bit versions, and when purchasing a copy of Windows, you must match the Windows version to the hardware platform you have

User Interfaces

- An operating system can have either a **graphical user interface (GUI)** or a **command-line interface**.
- **Graphical User Interface (GUI)**: A user interface based on a graphical environment, in which users interact with it using a pointing device or touch screen as the primary input device.
- **Command-line Interface**: A user interface based on typing text at a command prompt.

- A GUI (left) and a command-line interface (right).

Utility software

- **Utility Software:** Software that performs some useful service to the operating system, such as optimizing or correcting the file storage system, backing up files, or ensuring security or privacy.
- Microsoft Windows comes with utilities for checking a disk for errors and optimizing the way files are stored on an HDD (hard disk drive).

Utilities



- In addition to the main components of an operating system, **utility software** may also be available, either provided free with the OS or added on.
- Utility programs assist with a wide range of system maintenance and security functions, such as checking storage disks for errors, blocking security and privacy threats, and backing up important files.



Some Utility Software Types

- **Malware:** Harmful or maliciously created software, such as a virus or spyware.
- **Virus:** A type of malware that attaches itself to an executable file and spreads to other files when the program is run.
- **Spyware:** A type of malware that spies on the user's activities and reports them back to the spyware's developer.
- **Adware:** A type of malware that pops up unwanted ads on the screen.
- **Firewall Software:** Software that blocks hackers from accessing a computer by closing unnecessary services and ports.
- **Anti-Spam Software:** Software that rejects junk email messages.



➤ **Disk**



Checking Program: Software that finds and fixes errors in the disk storage system.

- **Registry Cleanup Program:** Software that analyzes the Windows registry and deletes unneeded entries.
- **Registry:** The main system configuration database for Microsoft Windows.
- **Uninstaller Utility:** Software that removes installed software along with its associated files and registry entries.

Comparing the Major Operating Systems

When you think about operating systems, you probably think first of Microsoft Windows, which is the operating system used on more than 90 percent of all desktop and notebook PCs.

Microsoft Windows: The graphical Microsoft operating system designed for Intelplatform desktop and notebook computers.

Windows 7

Desktop/Notebook OSs: Mac OS X

- **Mac OS X:** The graphical operating system designed for Apple Macintosh's desktop and notebook computers. Newer versions now run on the Intel platform.
- **Mavericks** The code name for Mac OS X 10.9. Mac OS X 10.9 (Mavericks)



Desktop/Notebook OSs: Linux

- **Linux:** An open-source, cross-platform operating system that runs on desktops, notebooks, tablets, and smartphones.
- The name **Linux** is a combination of the words Linus and UNIX. Linux is open-source, which means that Mr. Torvalds retains ownership of his original code, but it is free to the public to use in any way they see fit.

Ubuntu Linux



- Users are free to modify the code, improve it, and redistribute it.
- Developers are not allowed to charge money for the Linux kernel itself (the main part of the operating system), but they can charge money for **distributions** (**distros** for short), which are packaged collections of addons and utility programs for Linux.
- Some of the most popular distros include SUSE Linux, Ubuntu Linux and Red Hat Linux.

Desktop/Notebook OSs: Chrome OS

- **Thin client:** A computer with minimal hardware, designed for a specific task. For example, a thin web client is designed for using the Internet.
- One popular thin client operating system is **Chrome OS**.
- **Chrome OS:** A **thin client** operating system created by Google for small notebook computers (netbooks)

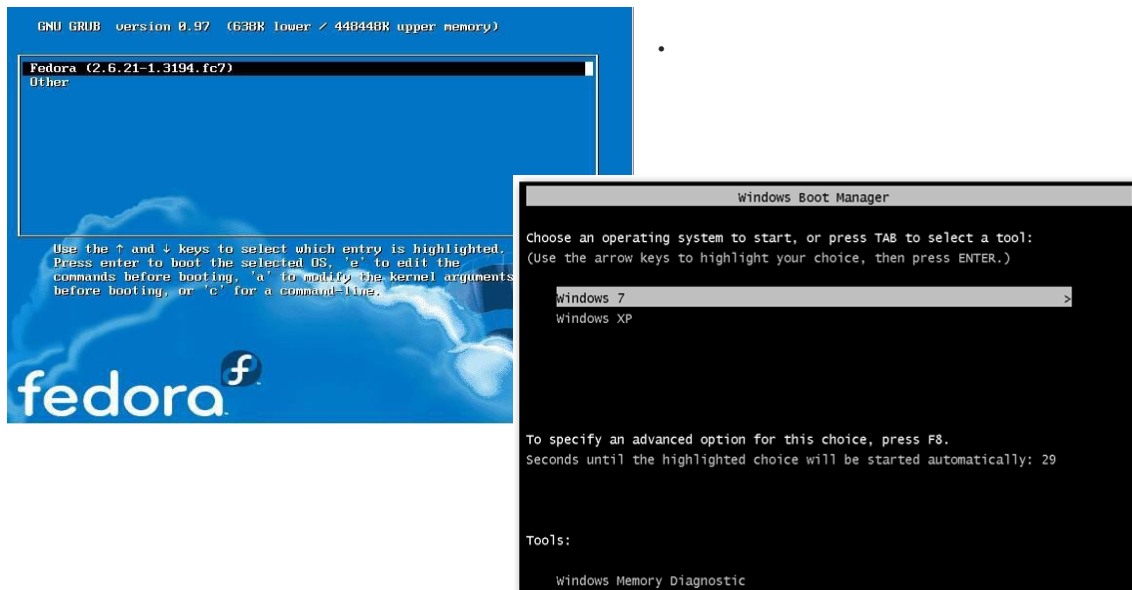
Google
Chrome OS.



Running More than One OS using Multi-boot

- **Multi-boot** (or **dual-boot**) system is a computer system in which two operating systems are installed on the same hard drive, allowing either operating system to be loaded and given control.
- Each operating system must be on a separate volume in order to multi-boot .
- The drawback to multi-booting is that each time you want to switch operating systems, you have to restart the computer.

Multi-boot



Running More than One OS using Virtual Machine

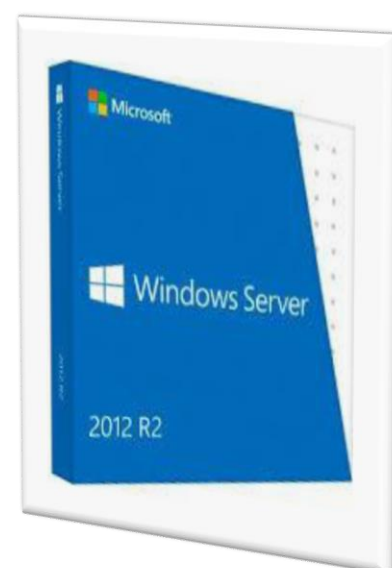
- **Virtual Machine (VM):** a self-contained operating environment that behaves as if it is a separate computer, with no access to the host operating system.
- The **drawback** is that your computer's runtime resources — RAM, CPU, GPU, etc. — are shared between all running virtual machines.



- This means if you decide to run Linux within Windows, Linux won't be running at 100% and might therefore lag or experience some other kind of performance hit. The more RAM you have, the smoother it will run.

Operating Systems for Servers

- **Server:** A computer that is dedicated to performing network tasks such as managing files, printers, or email for multiple users.
- **UNIX:** A multi-user, command-line operating system for servers.
- **Windows Server:** The server-optimized version of Microsoft Windows.
- Its GUI is similar to that of the client version of Windows (that is, the version designed for individual PCs), but it has different features and utilities designed to help IT professionals control server activities.



OSs for Tablets & Smartphones

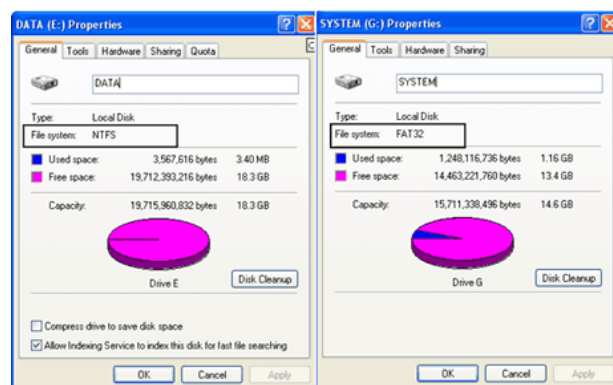
- **iOS:** The Apple-created operating system for Apple tablets and phones.
- **Android:** An open-source operating system used on a variety of portable devices, including tablets and smartphones.
- **Windows RT:** The Windows version designed for system-on-chip tablet computers.
- **Windows Phone:** The Windows version designed for smartphones.

Understanding Device Drivers

- **Device driver:** A file that translates instructions and messages between the operating system and a hardware device.
- You can update a device driver to solve some performance problems you may have with the device, and roll back the driver if the new driver does not work as well as the previous one.
- Each device driver is designed for one specific device and one specific operating system, although it may work, fully or partially, with other similar devices or operating systems.
- When you install a new piece of hardware, Windows uses a technology called **Plug and Play** to identify the device and locate a driver for it if possible.
- **Plug and Play:** A standard that enables the BIOS and operating system to identify a hardware device and install a driver for it automatically if one is available.

Understanding Digital Storage

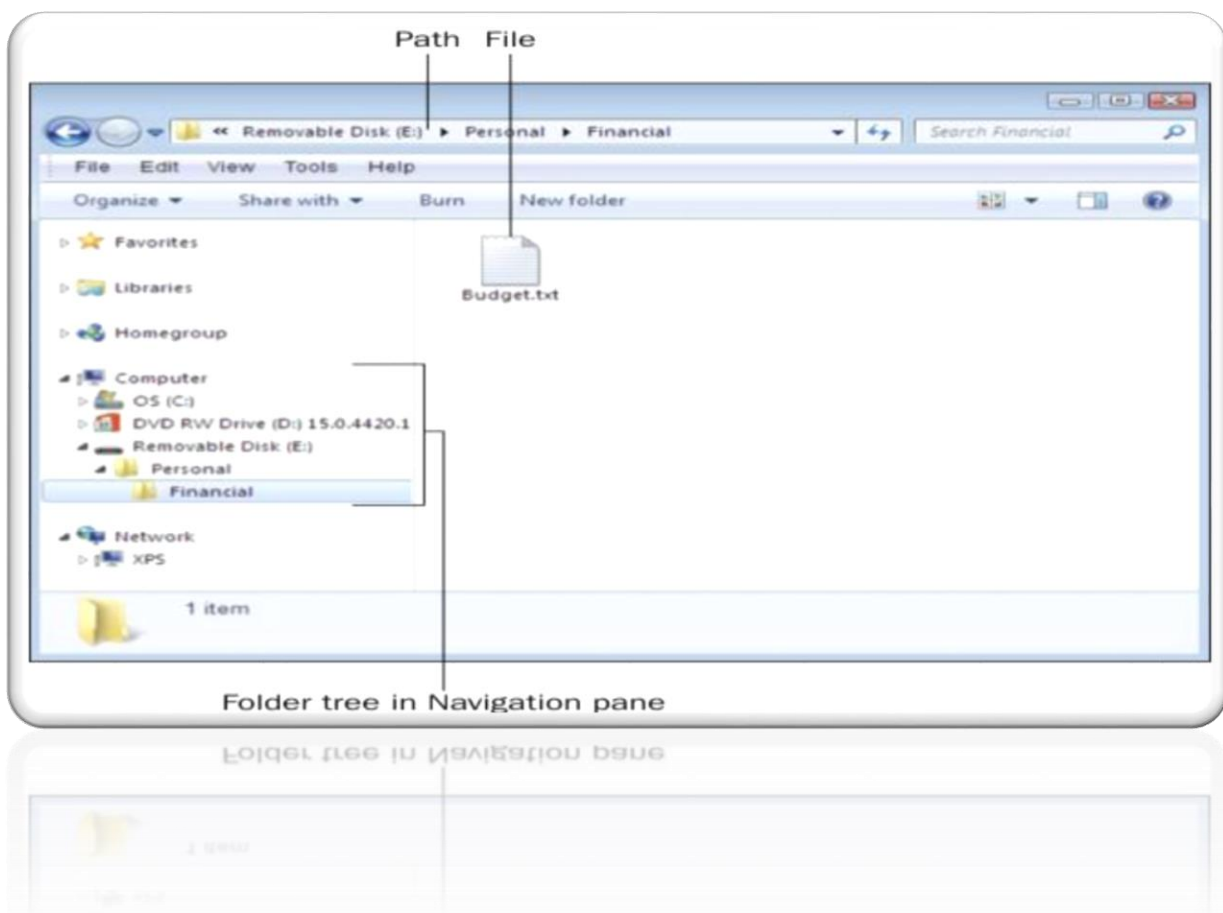
- ✓ A drive is a physical storage unit.
- ✓ Each drive has one or more volumes.
- ✓ Volumes are represented by letters, such as C:, D: ... etc.
- ✓ To prepare a hard drive for use, it must first be **partitioned**.
- ✓ **Partitioning** creates the logical divisions of the available space on a storage medium such as an HDD; or, a logical division of space on a storage medium.
- ✓ Each volume must then be **formatted**.
- ✓ Formatting a volume organizes the available space by creating a **file system** on it.
- ✓ **File system** is a set of rules for storing and managing the files on a volume, such as **NTFS** or **FAT32**.
- ✓ **New Technology File System (NTFS)** is the proprietary Microsoft file system used in modern versions of Windows.
- ✓ **System volume** is the volume on which the operating system files are stored.
- ✓ **FAT32** is a file system used in Windows 95, Windows 98, and Windows Millennium Edition. FAT stands for File Allocation Table.
- ✓ **Hierarchical File System Plus (HFS+)** is the file system used with Mac OS X.
- ✓ **ISO 9660** is a file system used on optical media such as CDs; also called CD File System, or CDFS.



How Files Are Organized in Folders

- ✓ The top level of a storage volume is its **root directory**.
- ✓ A **file's path** is the complete descriptor of its location, including the volume and any folders you pass through to get to it (e.g. E:\Personal\Budget.txt)
- ✓ A **folder tree** is a graphical representation of a volume's storage hierarchy, with subordinate branches for folders and subfolders.

The Budget.txt file's complete path is illustrated in the navigation pane.



File Extensions and File Types

- ✓ A **file extension** is a code following the name of the file that indicates its type.
- ✓ Extensions are separated from the filename by a period, like this: Myfile.docx. In this example, docx is the extension, and it indicates the Microsoft Word format.
- ✓ Almost all files have file extensions in Windows, not just data files.
- ✓ You can configure the OS to associate a file type with any of the applications you have installed on your computer.

File Extensions and File Types



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