# Lesson 1

# Understanding the Computer System

COMPUTER HARDWARE SERVICING

# Different components of a computer system

□ Hardware

□ Software

□ Peopleware

**Hardware** - the physical, touchable, electronic and mechanical parts of a computer system.

# A. Major hardware components of a computer system

1. **System Unit**- The main part of a microcomputer, sometimes called the chassis.

It includes the following parts: Motherboard, Microprocessor, Memory Chips, Buses, Ports, Expansion Slots and Cards.

# Tower Type System Unit
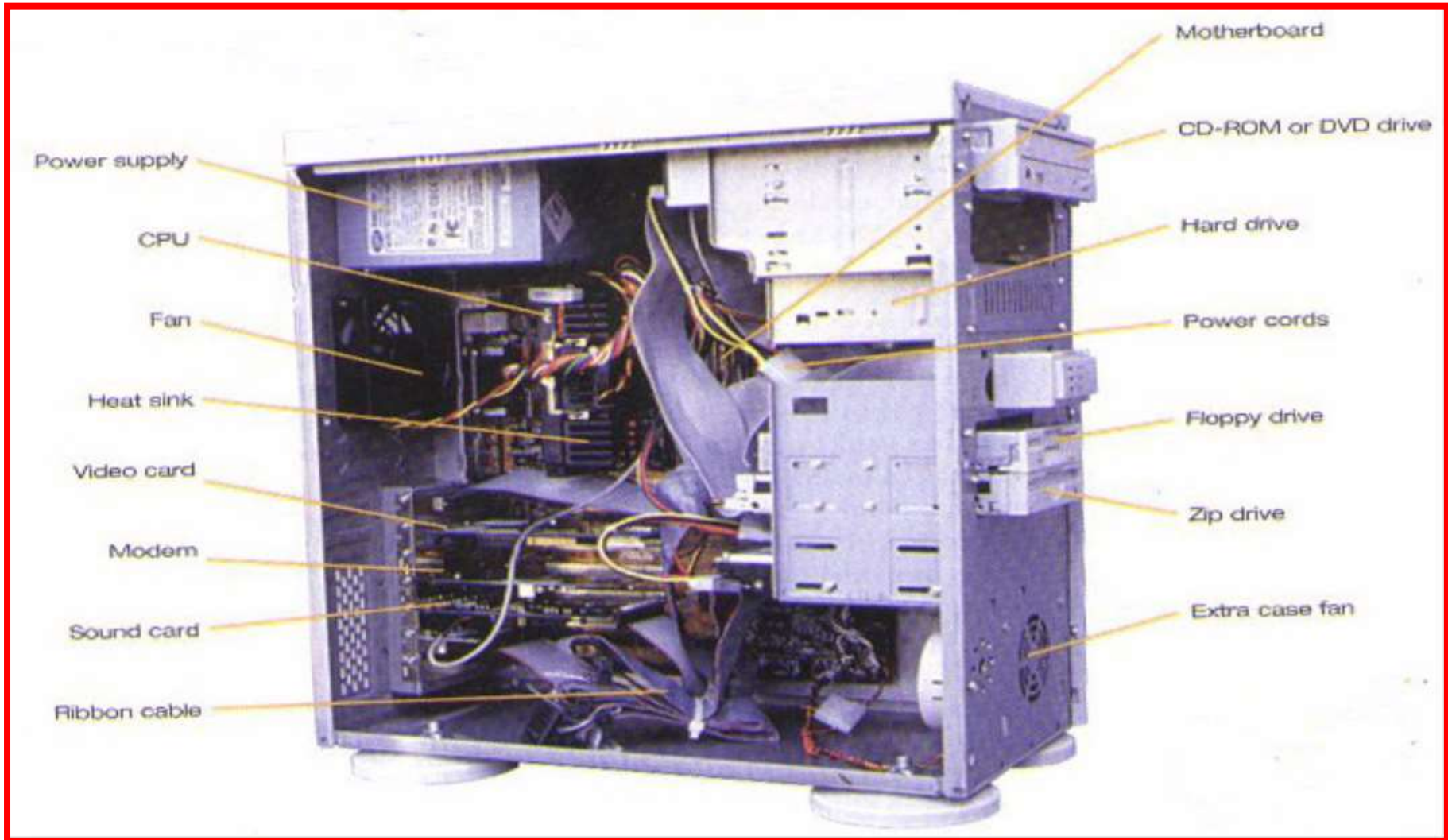
**2. Motherboard / Mainboard / System Board**- The main circuit board of a computer. It contains all the circuits and components that run the computer.

**3. CPU (Central Processing Unit)** - The processor is the main "brain" or "heart" of a computer system.  It performs all of the instructions and calculations that are needed and manages the flow of information through a computer.
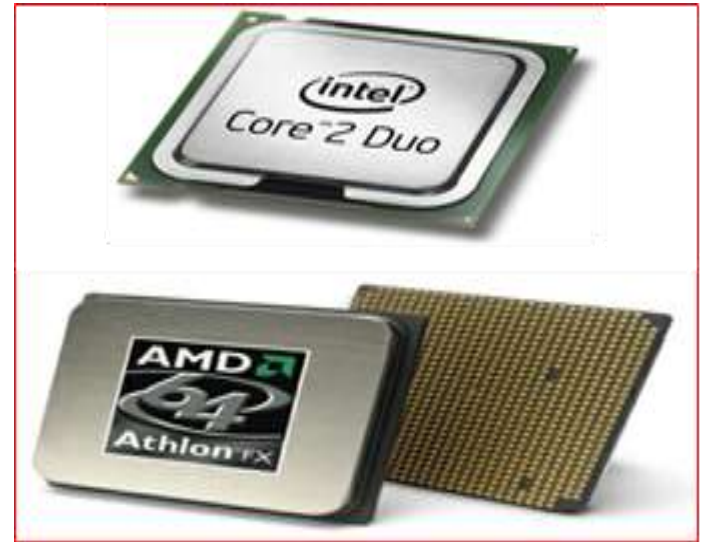


Examples of CPU (Intel Core 2 Duo and AMD Athlon)

**4. Primary storage-** (internal storage, main memory or memory) is the computer's working storage space that holds data, instructions for processing and processed data (information) waiting to be sent to secondary storage. Physically, primary storage is a collection of RAM chips.

# Two (2) Types of Memory

**ROM** – (Read Only Memory) ROM is non-volatile, meaning it holds data even when the power is ON or OFF.

**RAM** – (Random Access Memory) RAM is volatile, meaning it holds data only when the power is on. When the power is off, RAM's contents are lost.

SD Ram

DDR1

DDR2

Module-Sim Ram

DDR3

DDR3

EDO Ram

Sodimm DDR2

Sodimm SD Ram

Sodimm DDR1

Sodimm DDR3

**5. Expansion Bus -** A bus is a data pathway between several hardware components inside or outside a computer. It does not only connect the parts of the CPU to each other, but also links the CPU with other important hardware.

**6. Adapters**- Printed-circuit boards (also called interface cards) that enable the computer to use a peripheral device for which it does not have the necessary connections or circuit boards. They are often used to permit upgrading to a new different hardware.

**7. Power Supply Unit (PSU)** - Installed in the back corner of the PC case, next to the motherboard. It converts 120vac (standard house power) into DC voltages that are used by other components in the PC

**8. Hard Disk Drive (HDD) -** Also known as hard drive, is a magnetic storage device that is installed inside the computer. The hard drive is used as permanent storage for data. In a Windows computer, the hard drive is usually configured as the C: drive and contains the operating system and applications.

**9. Optical Drive-** An optical drive is a storage device that uses lasers to read data on the optical media. There are three types of optical drives: Compact Disc (CD), Digital Versatile Disc (DVD) and Blu-ray Disc (BD).

**10. Digital Versatile Disc (DVD)** - Designed to optically access data stored on a DVD. A laser moves back and forth near the disk surface and accesses data at a very fast rate.

# B. Input Devices

- Accepts data and instructions from the user or from another computer system.

# Two (2) Types of Input Devices

**1. Keyboard Entry**

**2. Direct Entry**

# 1. Keyboard Entry – Data is inputted to the computer through a keyboard.

**Keyboard** - The first input device developed for the PC. Data is transferred to the PC over a short cable with a circular 6-pin Mini-din connector that plugs into the back of the motherboard.

**2. Direct Entry** – A form of input that does not require data to be keyed by someone sitting at a keyboard. Direct-entry devices create machine-readable data on paper, or magnetic media, or feed it directly into the computer's CPU.

# Three Categories of Direct Entry Devices

**1. Pointing Devices -** An input device used to move the pointer (cursor) on screen.

❖ **Mouse** - The most common 'pointing device' used in PCs. Every mouse has two buttons and most have one or two scroll wheels.
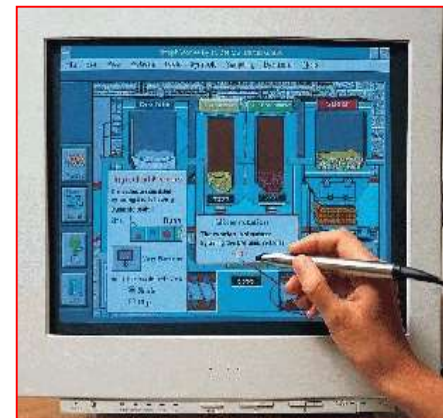
# Mouse

❖ **Touch screen-** A display screen that is sensitive to the touch of a finger or stylus. Used in myriad applications, including ATM machines, retail point-of-sale terminals, car navigation and industrial controls. The touch screen became wildly popular for smart phones and tablets

❖ **Light Pen -** A light-sensitive stylus wired to a video terminal used to draw pictures or select menu options. The user brings the pen to the desired point on screen and presses the pen button to make contact.

**Digitizer Tablet -** A graphics drawing tablet used for sketching new images or tracing old ones. Also called a "graphics tablet," the user contacts the surface of the device with a wired or wireless pen or puck. Often mistakenly called a mouse, the puck is officially the "tablet cursor."

**2. Scanning Devices-** A **device** that can read text or illustrations printed on paper and translates the information into a form the computer can use.



Image Scanner

Bar Code Reader

**3. Voice- Input Devices -** Audio input devices also known as speech or voice recognition systems that allow a user to send audio signals to a computer for processing, recording, or carrying out commands. Audio input devices such as microphones allow users to speak to the computer in order to record a voice message or navigate software

# c. Output Devices

**Output Devices -** Any piece of computer hardware that displays results after the computer has processed the input data that has been entered.

**1. Computer Display Monitor-** It displays information in visual form, using text and graphics. The portion of the monitor that displays the information is called the *screen or video display terminal.*

# Types of Monitor

**CRT Monitors -** *Cathode Ray Tubes* (CRT) were the only type of displays for use with desktop PCs. They are relatively big (14" to 16" deep) and heavy (over 15 lbs).



**LCD Monitors** - *Liquid Crystal Display* (LCD) technology has been used in laptops for some time. It has recently been made commercially available as monitors for desktop PCs.

**LED Monitors**
*(**L**ight **E**mitting **D**iode)* - A display and lighting technology used in almost every electrical and electronic product on the market, from a tiny on/off light to digital readouts, flashlights, traffic lights and perimeter lighting.

**2. LCD Projectors-** utilize two sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them. Each crystal, therefore, is like a shutter, either allowing light to pass through or blocking the light

**3. Smart Board -** A type of display screen that has a touch sensitive transparent panel covering the screen, which is similar to a touch screen.

# 4. **Printer** - A device that prints text or illustrations on paper.

**Types of printer**

**Ink-Jet or Bubble-Jet Printer - b**prays ink at a sheet of paper. Ink-jet printers produce high-quality text and graphics.



**Laser Printer -** Uses the same technology as copy machines. Laser printers produce very high quality text and graphics.

**LCD and LED Printer-** Similar to a laser printer, but uses liquid crystals or light-emitting diodes rather than a laser to produce an image on the drum.



**Line Printer -** Contains a chain of characters or pins that print an entire line at one time. Line printers are very fast, but produce low-quality print.



**Thermal Printer-** An inexpensive printer that works by pushing heated pins against heat-sensitive paper. Thermal printers are widely used in calculators and fax machines.

5. **Speakers -** Used to play sound. They may be built into the system unit or connected with cables. Speakers allow you to listen to music and hear sound effects from your computer.

# D. Ports

**D. Ports** - External connecting sockets on the outside of the computer. This is a pathway into and out of the computer. A port lets users plug in outside peripherals, such as monitors, scanners and printers.

# The Ports and their function

**1. Serial Port -** Intended for serial type mouse and older camera

**2. Parallel Port -** Also called as printer port. This is only for old model printer. It has 25 pins. It is a female port.

3. **VGA (Video Graphic Array) Port** - Used to connect monitors. It has 15 pins and it is a female port.

**4. USB (Universal Serial Bus) Port** - High speed serial interface that is used with almost all devices. It is used to connect latest model printers, pen drives, cell phones etc. it has 4 pins.

**5. PS/2 Port** - Simple, 6-pin, low-speed serial connections commonly dedicated to a keyboard and mouse.

**6. Power Port-** Intended for power cord.

**7. S-Video Port -** S-Video connections are available on certain source components and video display devices, and offer a higher level of video performance over composite video signals.



**8. Audio Port -** Intended for plugging in the speaker or headset.



**9. LAN (Local Area Networking) Port -** A physical interface often used for terminating twisted pair type cables used to connect computers onto a local-area networks (LAN), especially Ethernet RJ-45 connectors

# E. Cables and Wires

**Cables and Wires**- A cable is most often two or more wires running side by side and bonded, twisted or braided together to form a single assembly, but can also refer to a heavy strong rope.

# The Cables and Connectors

**These jacks are intended for the PS/2 port specifically for PS/2 type of keyboard and mouse.**



**This type of jack is intended for the audio and microphone port.**



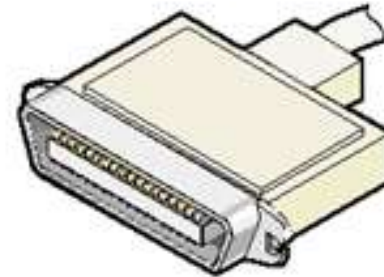**S-video jack is obviously for S-Video port**

This monitor jack is intended for the VGA (Video Graphic Array) port



This USB (Universal Serial Bus) plug is intended for USB port. Modern or new model of peripherals like printer, camera, scanners and even other portable computer attachments used USB type of plugs.

**This printer cable jack is intended for the parallel port.**

**RJ45 ("RJ" in RJ45 stands for "registered jack," since it is a standardized networking interface and the "45" simply refers to the number of the interface standard) is a type of connector commonly used for Ethernet networking.**

**Power cord is the most important cord because it connects the computer to the main source of electricity to make it functional.**

# Software

is the set of instructions (also called a program) that guides the hardware to operate effectively. Software can be split into two main types:

❖**System Software**

❖**Application Software**

**1. System Software** – Any software required to support the production or execution of application programs, but which is not specific to any particular application. Common operating systems include Windows, the Macintosh OS, OS/2 and UNIX.

**2. Application Software** – Designed to help the user to perform singular or multiple related tasks. Examples of application software are as follows:

a. *Word processing software* - Creates, edits, saves, and prints documents. Example: MS Word, WordPerfect, Ami Pro, MacWrite.

b. *Spreadsheet software* - An electronic spreadsheet consisting of rows and columns is used to present and analyze data. Example: MS Excel, Lotus 123, Quattro Pro.

*c. Database management software -* Used to structure a database, a large collection of computer programs. Data is organized as fields and records for easy retrieval. Example: MS Access, dBase, Fox Pro, Oracle.

d*. Graphic software -* Graphics programs display results of data manipulation for easier analysis and presentation. Example: Macromedia Flash, Harvard Graphics, 3D Studio Max, Adobe Photoshop

# People ware

**Peopleware -** Refers to people involved in the data processing operations such as the system administrator, office workers, students and others.