UNIT ONE

FUNDAMENTALS OF A COMPUTER

Definition

- A ***computer*** is an electronic device that can manipulate (process), store and transfer data under the control of a program(a set of instructions).

Parts(components) of a computer

- Any computer is made up of two components.
  - ***Hardware***: a component that we can see and touch. E.g. Mouse, keyboard, monitor, cables etc.
  - ***Software***: a set of instructions that enable the hardware to communicate with the user. It is intangible.

1. Computer Hardware

- The hardware components of a personal computer (PC) are:
  - ***a.*** ***Input devices***: get data into the computer. E.g. keyboard, mouse, scanners, Digital Camera, Microphone.
  - ***b.*** ***System unit***: is housed in the case.
  - ***c.*** ***Output devices***: display the data in soft or hard copy. E.g. monitor, speaker, printer.
  - ***d.*** ***Cables and Connectors***: Connect the different components of a computer system together. There are two types of connectors:
    - *Male*: has one or more exposed pins.
    - *Female*: has one or more receptacles (holes).

The System Unit

It is housed in the case. It has the following essential components:

- ***CPU (Central Processing Unit)***: is the brain of the computer.
- ***Memory***: stores data and instructions for fast access. There are two types of memory:
  - ***ROM*** (Read Only Memory): stores instructions permanently.
  - ***RAM*** (Random Access Memory): stores data & programs during operation of the computer. It is only temporary and is lost when power is off.

… System Unit

- ***Motherboard***: is the main printed circuit board of the computer.
- ***Storage devices***: save the data. The capacity (size) is measured in *Bytes*. One byte is 8 bits (Binary Digits). One character in a computer contains 8 bits (one byte). E.g. *Magnetic*: Hard disk, floppy disk, magnetic tapes and *Optical*: CD-ROM, DVD, digital cameras.
- ***Ports***: are sockets at the back of the system unit which are used to attach the peripherals through cables. They are of different types such as:
  - *Serial*: transmit one bit at a time.
  - *Parallel*: transmit in bytes (multiple bits at a time).

2. Computer Software

- A computer can't do anything on its own without a software.
- A software can be classified into:
  - ***ROM BIOS***
  - ***Operating system***
  - ***Applications software***

a. ROM BIOS Chip

- It contains instructions that enable the computer to start-up or boot.
- *ROM* => Read Only Memory
- *BIOS* => Basic Input Output System
- It is located on the motherboard

b. Operating System (OS)

- It is a software that allows the user to operate the hardware and use applications software.
- It is a set of instruction codes that is used to:
  - Define input & output devices and connections
  - Provide instructions to the CPU
  - Load program files to memory
  - Maintain system security. …etc.
- E.g. DOS, Windows (98, 2000, XP), Linux etc.

c. Applications software

- They are computer programs that help the user to perform a specific work by manipulating text, number and graphics or combination of them.
- E.g. Microsoft Office (Word, Excel, Access, PowerPoint), Autocad, Peachtree, Mavis, …etc.
- *NB. A computer can do NOTHING without an operating system. But it can do without applications software.*

Classification of Computers

- Computers can be classified based on their size (memory). Some of the types are:
  - ***Microcomputers (Personal Computers (PC))***
    - They are used only by one person at a time.
  - ***Minicomputers***
    - They are mid-size computers.
  - ***Mainframe computers***
    - They are huge, general purpose computers.
    - Used by corporations, universities, governments …etc.
  - ***Super Computers***
    - They are the fastest, most powerful and most expensive computers.
    - Contain many gigabytes of information