

# 1 Basic Concepts of IT

## 1.1 Some Definitions

### 1.1.1 Hardware

The term hardware refers to the physical components of your computer such as the system unit, mouse, keyboard, monitor etc...

### 1.1.2 Software

Software is the set of instructions that makes the computer work. For example, when you type in words via the keyboard, the software is responsible for displaying the correct letters, in the correct place on the screen. Software is held either on your computer's hard disk, CD-ROM, DVD or on a diskette (floppy disk) and is loaded (i.e. copied) into the computer's RAM (Random Access Memory), as and when required.

### 1.1.3 Information Technology (IT)

This is a general term that relates to the use of computers as an aid to creating and maintaining data, i.e. information. IT is related to all aspects of managing and processing information, especially within a large organization. Computers are critical in managing information, and computer departments within large organizations are often called IT departments. Alternative phrases are IS departments (Information Services) or MIS departments (Management Information Services). People working with computers in large companies will often refer to their job, as "Working in IT".

## 1.2 Types of Computers

### 1.2.1 Mainframe Computers

Mainframe computers are the big, powerful, expensive computers used in the background by most large organizations.

### 1.2.2 Minicomputers

Like mainframes, these are very powerful and also very expensive. In many ways, the old differences between a mainframe and a minicomputer have blurred and in many cases, the two words are almost interchangeable.

### 1.2.3 Supercomputers

A super computer, as the name implies is an incredibly powerful beast with a phenomenal capacity for processing data. They are used extensively by the military. In civilian use, they tend to be used for research and also in areas such as weather forecasting where a tremendous amount of data has to be processed rapidly and used to make predictions.

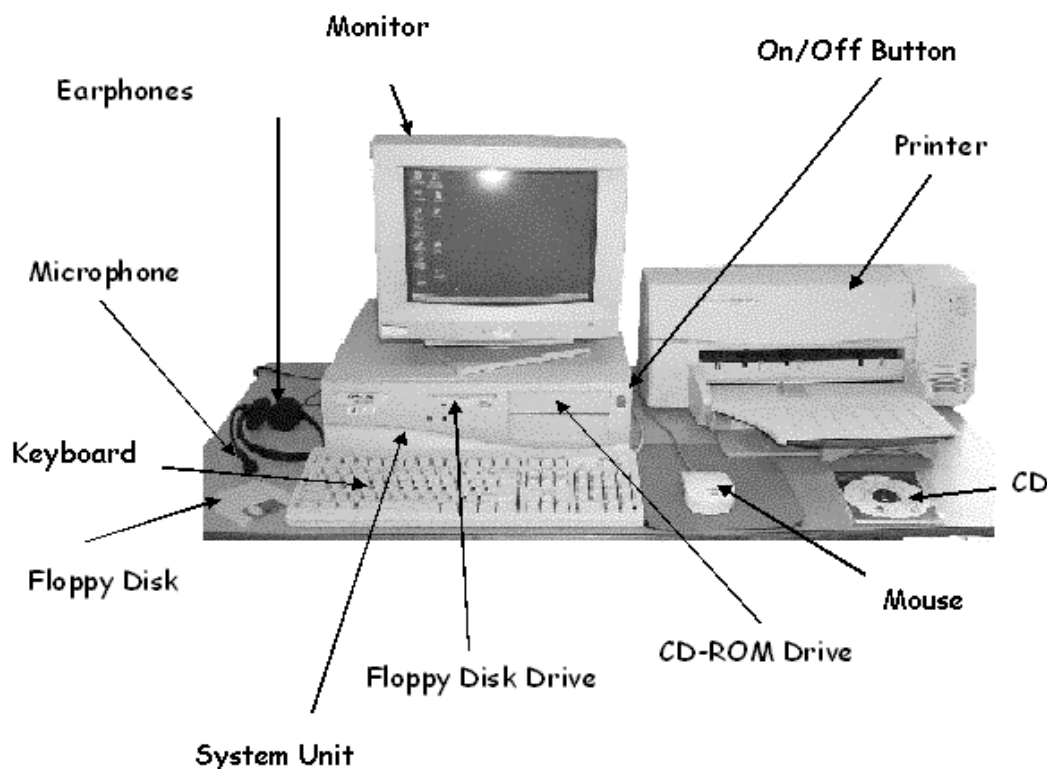
### 1.2.4 Personal Computers

IBM invented the PC (Personal Computer) way back in 1981. All PCs released since then are in many ways compatible with the original design, though many improvements to the original design have been made.

### 1.2.5 Laptop & Palmtop Computers

Laptop computers as the name implies are small, portable computers that can run on batteries as well as mains power. They use special screens, rather than the traditional bulky VDUs (Visual Display Units). Palmtop computers are even smaller than laptop computers.

## 1.3 Main Parts of a Computer



**Figure 1.3-1 Main Parts of a Computer**

## 1.4 The CPU

The CPU is the brain within your computer. It performs most of the calculations and is responsible for the smooth running of your operating system (Microsoft Windows) as well as your application programs, such as word-processors, spreadsheets and databases. There is a small amount of memory associated with the CPU, which it uses to perform these operations. It also accesses and uses the main memory (RAM - Random Access Memory) within your computer.

In many ways, the CPU is the most important item within your computer that governs the overall speed of your computer. The speed of the CPU is measured in MHz. This relates to the frequency that the CPU runs at and the higher the MHz rating of your CPU the faster your computer will run. To give you some indication of how PCs have advanced over the years, the original IBM PC released in 1981 ran at 4.77 MHz while modern PCs run at speeds in excess of 800 MHz!

## 1.5 Memory

### 1.5.1 RAM

The Random Access Memory (RAM) is the main 'working' memory used by the computer. When you first switch on the computer, the operating system (OS) loads from the Hard disk to the RAM.

### 1.5.2 ROM

Read Only Memory (ROM) as the name suggests is a special type of memory chip from which existing software can be read but not written to. A good example is the ROM-BIOS chip, which contains read-only software. Often network cards and video cards also contain ROM chips.

### 1.5.3 Video (graphics) memory

The picture that you see on your screen is a form of data and this data has to be stored somewhere. The on-screen pictures are held in special memory chips called video memory chips. These chips are usually located on the video card. A modern computer will be supplied with several Megabytes of video memory.

## 1.6 Input/Output and Storage Devices

Input devices are used to enter commands and data into the computer. Output devices are used to let the user know the results of the entered commands.

The memory of a computer is volatile. Therefore, a user needs to store the data in the memory to a non-volatile device so that they can be accessed again. Storage devices are used for this purpose.

Input/output and storage devices do not work just because the relevant hardware is connected to the computer. The corresponding software (generally called device drivers) need to be installed so that these devices can function properly.

## 1.6.1 Input Devices

### 1.6.1.1 Keyboards

The keyboard is still the most common way of entering information into a computer. There are a number of different types of keyboards, including those specially designed to use with Microsoft Windows.

### 1.6.1.2 Mice

The mouse came into common use on a PC with the introduction of the Microsoft Windows operating system. There are many different types of mice, a commonly used model now has a small wheel on it which, when combined with the correct software allows additional functions and fine control over the use of your applications.

### 1.6.1.3 Touch Pads

A touch pad is a device that lays on the desktop and responds to pressure. Used in conjunction with a special pen they can be used by graphic artists, who wish to create original digital artwork.

### 1.6.1.4 Light Pens

A light pen is used to allow users to point to areas on a screen and is often used to select menu choices.

And there are many more input devices such as Joy Sticks, Voice Input systems, etc.

## 1.6.2 Output Devices

### 1.6.2.1 VDUs (computer monitor or screen)

The VDU (Visual Display Unit) is the computer screen used to output information in an understandable format for humans. VDU's come in two forms CRT(Cathode Ray Tube) monitor and LCD(Liquid Crystal Display) monitor.LCD is a flat screen monitor.

### 1.6.2.2 Printers

Output from a display screens is called a **soft copy**. Output from a printer is called a **hard copy**. The four types of printers are:

- Ink-jet
- Laser
- Dot matrix

- Thermal

### 1.6.3 Storage Devices

#### 1.6.3.1 Floppy Disks

Floppy disks (disks, diskettes) are circular plastic disks. 3 1/2-inch 2HD disks have a 1.44 megabyte capacity.

#### 1.6.3.2 Hard Disks

A hard disk is an enclosed disk drive that contains one or more metallic disks. Enclosing the disk in a sealed container prevents entering of material that could cause a head crash. Hard disks have far more capacity than floppy disks do.

Hard disks come in three forms:

- An internal hard disk has one or more metallic platters sealed inside a container.
- Hard-disk cartridges can be removed when they are filled or transported.
- Mini and mainframe computers use hard-disk packs, which are hard disks consisting of several platters in a stack.

#### 1.6.3.3 Optical Disks

An optical disk is a metallic disk that uses a laser beam for reading and writing. Four kinds are:

**CD-ROM** (compact disc read-only memory) -- cannot be written on or erased by user (**read-only**).

**CD-R** (CD-recordable) or **WORM** (write once, read many) -- can be written to one time, after which it cannot be erased by users but can be read many times without deterioration.

**Erasable optical disks** -- can be written and erased and reused. Two basic types: **CD-RW** (compact disc re-writeable) and **MO** (magnetic optical).

**DVD** (digital versatile disk) -- similar to CDs. Have a greater capacity of 4.7 gigabytes.

DESCRIPTION	CAPACITY
CD-ROM	650 MB
CD-R	600 - 650 MB

Erasable	600 - 1000 MB
DVD	4.7 GB

**Table 1.6-1 Capacities of Optical Disks**

#### 1.6.3.4 Magnetic Tapes

Magnetic tape storage is mainly used to back up (duplicate) programs and data on disks. Two forms are:

**Magnetic Tape Streamers** (backup tape cartridge units) consist of tape cartridges used to back up microcomputer hard disks.

**Magnetic Tape Reels**, used to back up mini and mainframe computer storage. Run on magnetic drives (magnetic tape units).

#### 1.6.3.5 Pen Drives

Pen drives are fast becoming a common storage device. These are very high capacity portable devices that can be plugged directly into the USB port which is available in most modern day computers. These are also called flash drives.

### 1.7 Types of Software

#### 1.7.1 System Software

Systems software controls the operations of a computer and the other types of software that runs on the computer. Examples of systems software include the operating system, device drivers, programming languages, compilers, assemblers and translators.

#### 1.7.2 Application Software

An application program is the type of program that you use once the operating system has been loaded. Examples include word-processing programs, (for producing letters, memos etc), spreadsheets (for doing accounts and working with numbers), databases (for organizing large amounts of information) and graphics programs (for producing pictures, advertisements, manuals etc).

Application software may be of two types.

- **Packaged Software**

Programs prewritten by professional programmers that are typically offered for sale.

- **Custom-Made Software**

Programs written for a specific purpose and for a specific organization.

### 1.7.2.1 Commonly used application software

- Word-processing applications
- Spreadsheet applications
- Database applications
- Payroll applications
- Presentation applications
- Desktop publishing applications
- Multimedia applications

### 1.7.3 Utility Software

Utility software carries out all the day to day tasks in maintaining a computer system and its data files. Some common utilities are screensaver, virus checker, and system tools like disk defragmenter. Certain utility programs are usually bundled along with the operating system and are thought of as a type of systems software.

## 1.8 Operating Systems

The operating system is a special type of program that loads automatically when you start your computer. It allows you to use the advanced features of a modern computer without having to learn all the details of how the hardware works.

The operating system does the followings on a computer:

- Controls a Computer's Hardware
- Runs a Computer's Programs
- Organizes Files

Without an Operating System (OS), the computer will be unusable. The OS on your computer largely depends on the type of computer you are using. There are two main types of computers, the Personal Computer (PC) and the Apple Macintosh (Mac/iMac). These constitute two completely different types of hardware, and software, and generally you will not find the operating systems or software interchangeable between these two types of computers.

Here are some of the most common operating systems in use today:

- Windows 2000, Windows XP Home, Windows XP Professional
- UNIX
- Linux
- Solaris

### 1.8.1 Comparison of Operating Systems

Disk Operating System (DOS) is a single user single-process operating system that uses a command line interface known as a DOS prompt.

In windows you have to work with icons, buttons, dialog boxes etc... on the screen and you can control them mainly by moving a pointer on the screen (typically controlled by a mouse).

### **The Advantages of Using a GUI**

- All programs look similar.
- When you switch from a program supplied by one manufacturer to one from a different manufacturer, you will find the transition very easy.
- Application programs work in the same way as the underlying operating system.
- The GUI also allows programmers to easily write consistent looking programs.