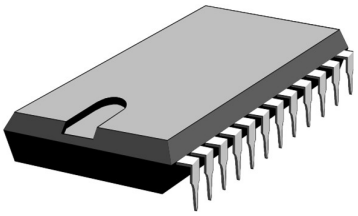
3) Main Parts of a Personal Computer

Know the main parts of a personal computer such as: central processing unit (CPU), hard disk, common input and output devices, types of memory. Understand the term peripheral device.

3.1 Central Processing Unit

The **Central Processing Unit** or **CPU** can be thought of as the brain of the computer. The function of the CPU is to execute the instructions in the programs. At the heart of its operations are **arithmetic** and **logical operations**

The CPU is made up of millions of electronic components called transistors, capacitors and resistors. Transistors are the active components of the CPU. Modern CPUs contain millions of transistors.



It was the miniaturisation of components and the creation of the **integrated circuit (IC)** that has made the development of modern computers possible. Although integrated circuits contain enormous numbers of components and connectors, the whole object is manufactured as a single item through special manufacturing techniques. From the outside, the integrated circuit looks like a small black box with a number of electrical connectors on the outside.

3.2 Hard disk

The hard disk is the component that stores data and programs even after the computer has been switched off. It consists of a number of rotating platters which are covered with a magnetic film. Information is stored using the magnetic properties of the film. The platters rotate from between 5000 and 10000 rpm or faster.

Heads are attached to the end of arms that are able to move backwards and forwards across the surface. These heads move very close to the surface, typically only a speck of smoke could fit between the head and the surface.

Because a hard drive is both mechanical and electronic in construction, it is called an **electro-mechanical device**.

3.3 Input devices

Input devices are components which are used to feed commands and data into the computer. These include devices such as keyboards and mice.

3.4 Output devices

Output devices are devices that the computer uses to send us the results of the processing. These include the VDU (monitor) and printers.

3.5 Peripheral devices

A computer system comprises the case which houses the motherboard, CPU, hard drives, power supply and various other components. Devices such as printers, monitor, keyboard and mouse which are connected to the main unit by various types of cables and connectors are called **peripheral devices**.

3.6 Memory

There are two general categories of memory: primary and secondary.

Secondary memory consists of the various devices that are able to store data and programs even when the power is off. This includes devices such as hard drives, floppy drives, tape drives, CD drives and DVD drives.

Primary memory is the memory that is intimately associated with the actual working of the computer. This includes memory that holds the start-up routines as well as the current program and data it is working with. There are various forms of primary memory: RAM, ROM and Cache memory.

RAM or **Random Access Memory** holds the current running program and its associated data.

ROM or **Read Only Memory** contains certain key routines (small programs). One example, is the set of start-up routines. These take control of the computer when you switch on and ensure that the computer **boots-up**. Booting-up is the process of starting the computer up so that it is able to load and run computer programs.

Cache memory is very high speed memory that is used by the CPU in executing the individual instructions of the program. It is used to hold items such as instructions that are next in line to be executed and data that is likely to be needed by the CPU.

All of these concepts will be dealt with in more detail in the next chapter.

4) Computer Performance

Know some of the factors that impact on a computer's performance such as: CPU speed, RAM size, the number of applications running.

The performance of a computer is determined by a number of factors, all of which work together. Often a single item that is functioning poorly will cause a bottleneck resulting in poor performance.

CPU: The model of the CPU and its speed are the first factors that determine computer performance. Generally, the CPU so far outperforms the other components, that poor performance is usually due to other factors. One important factor in the performance of the CPU is the amount of on-board cache memory. If the CPU has sufficient cache memory it can queue future instructions and data in cache. Since access to cache memory is far faster than that to RAM, the overall processing performance is improved. On-board cache memory helps especially where the CPU is involved in processing of graphics.

RAM: If a computer does not have sufficient RAM, it has to make use of the hard disk to store intermediate data that it would normally store in RAM. This is referred to as **virtual memory**. Since hard disk access is much slower than access to RAM, this will slow down the computer. The more RAM a computer has, the less need there will be to make use of virtual memory.

Number of applications: Modern computers are designed to run more than one application at a time and to allow applications to be working on multiple sets of data at the same time. For example, a user may be working on four documents at once. However, the more open applications and documents there are, the more this will place a burden on the processing power of the computer. For best performance, only open the applications and documents you need. Close others.

Graphics cards: The graphics card is the unit that converts the signals from the CPU into a form that can be displayed on the monitor. A good graphics card can take over many of the tasks of the CPU in generating the output. This leaves the CPU free to do other processing tasks. The quality of the graphics card is a key factor in the performance of a computer, yet is one which is often overlooked.