

# Knowledge Organiser: Understanding computers *Discover how computers work*

## Summary

Computers require input hardware, processing hardware and output hardware. The hardware that defines a computer is the **CPU** and **memory**. Without these a computer could not function. The CPU and memory work together to run programs.

**CPU** - executes programs using the **fetch-decode-execute cycle**.

**Memory** - stores program operations and data while a program is being executed. There are several types of memory, including: **registers, cache, RAM** and **virtual memory**.

**Storage** - stores programs and files long term, even when they are not in use. Devices such as hard drives, USB memory sticks or SD cards are used to store files such as photos, music and software applications long term.

An **input device** is any piece of computer hardware **used to provide data to a computer system**. Examples include: keyboard, mouse, scanner, digital camera and webcam.

An **output device** is any piece of computer hardware used to communicate the results of data that has been processed.

## Key Vocabulary

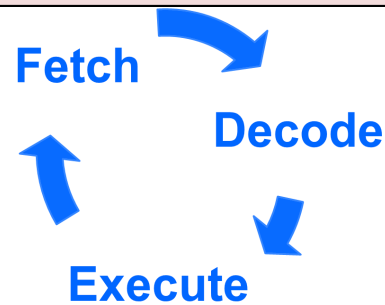
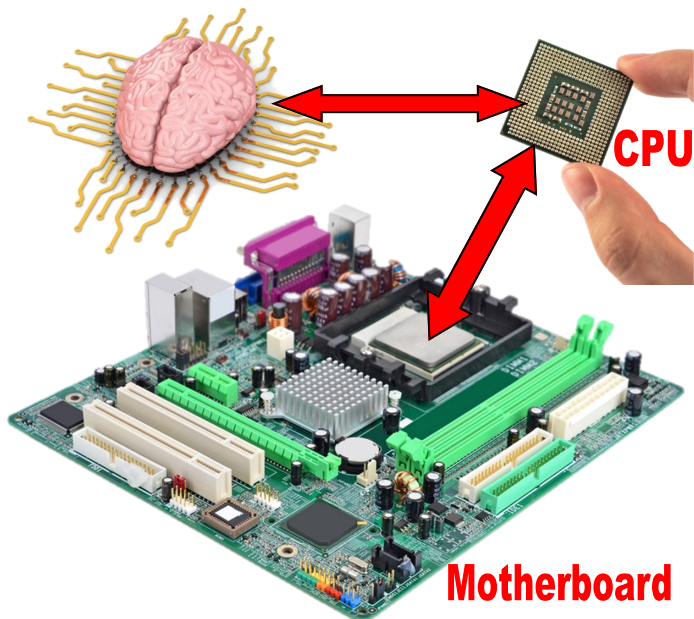
<b>Clock speed</b>	The speed of a computer CPU, measured in hertz.
<b>Cache</b>	A piece of temporary memory. It can refer to a part of the RAM, storage disk, CPU, or an area for storing web pages.
<b>CPU</b>	<b>Central Processing Unit</b> - the brains of the computer that processes program instructions. Also called a <b>microprocessor</b> .
<b>Execute</b>	To run a computer program.
<b>GHz</b>	Gigahertz. One billion hertz per second = one gigahertz. This is a measure of frequency and is used to describe bus speeds and CPU clock speeds.
<b>Hardware</b>	The physical parts of a computer system, e.g. a graphics card, hard disk drive and CD drive.
<b>Motherboard</b>	The circuit board inside a computer that houses the CPU, memory and connections to other devices.
<b>RAM</b>	Memory that is constantly being written to and read from. It does not retain its contents without a constant supply of power, i.e. when a computer is turned off, everything stored in its RAM is lost.
<b>Registers</b>	The section of high speed memory within the CPU that stores data to be processed.
<b>Software</b>	Software is the programs that run on a computer.
<b>Virtual memory</b>	A section of a computer storage drive which is temporarily used as RAM.

## Central Processing Unit

The **Central Processing Unit** or **CPU** is arguably the most important component of a computer.

You can think of the CPU as being like the brain in a human.

It is responsible for all of a computer's processing.



## The Fetch - Decode - Execute cycle

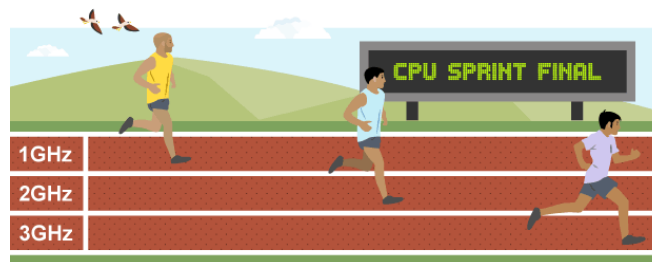
The **CPU** operates by repeating three operations:

**FETCH** - causes the next instruction and any data involved to be fetched from main memory

**DECODE** - decodes the instruction to make sure it can be carried out

**EXECUTE** - carries out the instruction

Repeat...



## Binary Units

Remember the units used in the binary system.

1 byte =	8 bits
1 Kilobyte =	1024 bytes
1 Megabyte =	1024 Kilobytes
1 Gigabyte =	1024 Megabytes
1 Terabyte =	1024 Gigabytes