

# Year 7 | Topic 3 | Computer Science | Inside a Computer

**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.

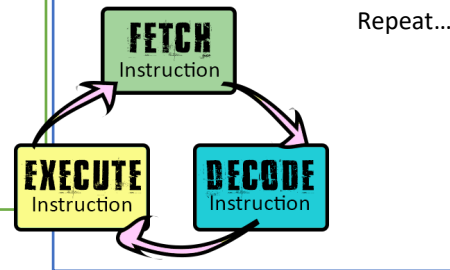
## Fetch – Decode - Execute

The CPU operates by repeating three operations:

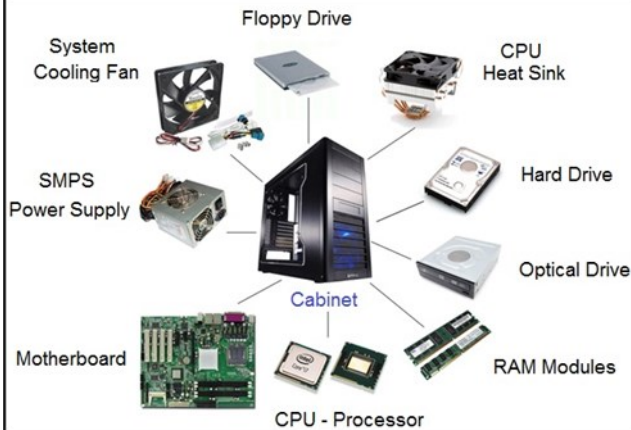
**FETCH** – causes the next instruction and any data involved to be fetched from main memory

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

**EXECUTE** – carries out the instruction



## Computer System - Internal Hardware Components



## Factors affecting CPU performance

### Clock speed

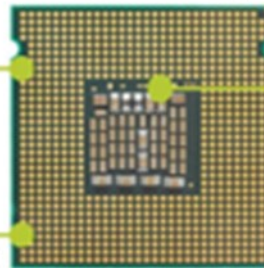
Cycles per second measured in hertz

### Cache size

Superfast working memory

### Number of cores

The number of duplicate processors linked together on a single chip



## RAM - Random Access Memory

Stores programs and files currently in use—such as the operating system and any programs you have open. It keeps them closer to the CPU for faster processing.

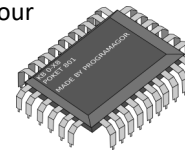
It is volatile, so it will be empty when the computer has no power.



## ROM - Read Only Memory

Pre-written instructions that can't be changed. These are the first instructions needed when booting up your computer.

It is non-volatile - keeps its data when no power is going to it.



CPU	Central processing unit—the “brain” off a computer that processes all the instructions
Hardware/Components	The physical parts of a computer system - the motherboard, RAM, Hard drive, etc.
Software	Software is the programs that run on a computer - e.g word, google chrome, calculator, etc.
Motherboard	The circuit board inside a computer that the CPU and RAM fits into, and also connects the other components
RAM	Random access memory—Memory that contains the programs and files currently in use by the computer. It is volatile.
ROM	Read only memory—Memory that contains the boot up sequence which get the computer started up properly.
Cache	A piece of temporary memory inside the CPU, stores frequently used instructions for faster processing
Clock speed	The speed of the CPU (fetch-decode-execute cycle). Measured in hertz
Execute	To carry out or run the instruction
GHz	Gigahertz—measures how fast the fetch-decode
Operating System	It communicates with the hardware and software and provides the main set of instructions
Volatile	Data is lost when there is no power

