

Hardware Knowledge Organiser

Components of the CPU

A. ALU: performs calculations & logical comparisons

B. Registers – fastest temporary information storage on CPU

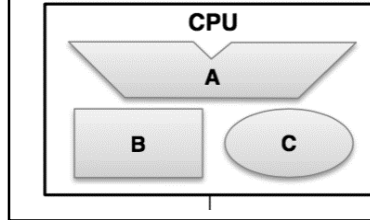
C. Controller - sends and receives signals from all parts of the computer. Generates clock ticks or controls the clock

Internal memory – Fast temporary memory – used for frequently used instructions.

Buses Allow transfer of data to different parts of the computer –

Address, Data & Control

CPU - Know your shapes



Primary Storage – Main Memory

Random Access Memory (RAM) is used for the temporary storage of currently running programs and data.

Read-only Memory (ROM) is used for the permanent storage of data. E.g. BIOS

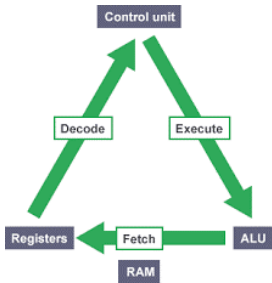
Media	Suitability	Typical capacity	Durability	Portability	Speed
Flash drive	Moving relatively small files from work to home	2 GB – 64 GB	★★★★	✓	★★★★
External hard drive	Backing up a home computer system	500 GB – 4 TB	★	✓	★★★
CD/DVD/Blu-ray disk	Storing multimedia files	650 MB (CD) 9 GB (DVD) 50 GB (Blu-ray)	★★★	✓	★★
Magnetic tape	Backing large commercial servers on multiple tapes	200 GB – 400 GB	★★	✓	★

Secondary storage is also known as backing storage.

Data is written from memory to secondary storage when data is no longer being actively used, for retrieval at a later time.

Optical, Magnetic & Solid State Storage in the cloud

Storage in the cloud is a contemporary data storage facility that allows users to store their data on third-party servers. They can then access that data from many computing devices.



The fetch-decode-execute cycle

Fetch - cycle takes the address required from memory, stores it in the instruction register.

Decode – Control Unit decodes instruction.

Executed - Instruction carried and many result stored in register

CPU Performance (3Cs)

Clock Speed - Higher clock speed, faster the computer/more instructions it can process.

Cores – More cores mean more instructions processed at same time. Multitasking improves

Cache – Stores frequently used instructions (stores more open programs). CPU gets faster data access.

Additional hardware

Motherboard

The motherboard is the main [circuit board](#) of a computer. Provides slots and ports for other components.

Graphics Processor Unit GPU

A GPU is a microprocessor that performs the calculations needed to produce graphic images on screen.

Dedicated GPU

A dedicated GPU has its own video memory.

Sound cards - . Sound cards convert analogue input signals into digital [data](#) and reverse this process for audio output

Measurement Unit

4 Bits	1 Nibble
8 Bits	2 Nibble
1024 Byte	1 KB (Kilobyte)
1024 KB	1 MB (Megabyte)
1024 MB	1 GB (Gigabyte)
1024 GB	1 TB (Terabyte)
1024 TB	1 PB (Petabyte)



Must Know

You must:

- Know CPU Components and shapes
- Know the difference between inputs and outputs.
 - List inputs/outputs
- The Fetch – Decode Execute cycle
 - Sentence for each part
- Describe Cache
- List the 3 Cs that affect CPU performance.
- Know two features of RAM & ROM
- List examples of Optical, Magnetic and Solid State memory (Secondary Storage).
- Know difference between bits and bytes

Should know

You Should:

- Explain the function of CPU Components.
- Explain the function of the 3 Cs
- Explain how the CPU, RAM and I/O devices work together.
- Explain how more RAM can improve performance of your computer.
- Explain how cache can improve computer performance.
- Know the properties of different types of secondary storage devices.
- Know the purpose of additional hardware e.g. motherboard.
- Calculate storage in different units. Bytes, Kb etc.

Top of the class

You Could:

- Be able to describe how the 3Cs affect CPU performance
- Explain how memory is used in the FDE cycle
- Explain what an embedded system is and an example where used.
- Explain the difference between RISC & CISC processors.
- Justify different secondary storage devices for particular situations.