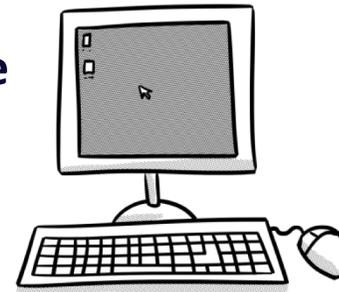


Computing KS3 Computer Hardware



10 Quick Questions:

1. Read the table below and decide whether the statements are True or False:

Statement	True (✓)	False (✗)
CPU stands for Central Processing Unit.		
The CPU fetches and decodes instructions.		
The speed of a CPU is usually measured in GigaHertz (GHz).		
If a CPU has many cores, this slows down the computer.		
The hard disk drive is part of the CPU.		

2. List three examples of input devices which can be used to input data
3. List three examples of output devices which can be used to output data
4. Define the word 'fetch' in relation to the function of the CPU
5. Define the word 'decode' in relation to the function of the CPU
6. Define the word 'execute' in relation to the function of the CPU
7. Describe what happens during the F-D-E cycle
8. State one input device, one output device and one secondary storage device that are built into a smart phone
9. Describe the purpose of the ROM in a computer.
10. Describe the purpose of the RAM in a computer.

Key Terms

Accumulator: a register that gathers together (adds up/accumulates) the results of currently running programs

Arithmetic Logic Unit: ALU performs arithmetic and logic instructions

Control Unit (CU): manages the execution of instructions

Central Processing Unit (CPU): the core of every Personal Computer. Without it, no PC can function.

Decode: This means to take encoded data and transform it back into data or information which is readable to a software program or user.

Execute: A computer term. You 'execute' a program when you load it into computer volatile memory (RAM) and tell the CPU to begin running the instructions within the programme.

Fetch: A memory term. It means to extract data from memory or a database in order to process it in some way

Hardware: Hardware is a set of physical objects such as monitor, keyboard, mouse, and so on

Input devices: any piece of hardware which is used to enter data or content into a computer system

Memory Address Register (MAR): stores the location of the next piece of data to be fetched from memory

Memory Data Register (MDR): temporary storage place for data being fetched from or transferred to memory

Memory: Memory is the internal storage location where data and information is stored on a computer

Motherboard: the main printed circuit board in the computer

Output devices: a piece of hardware that obeys a computer command to do something in the real world

Program Counter (PC): holds the address of the next instruction to be executed

RAM: RAM is an acronym for Random Access Memory. It holds data so that it can be processed by the central processing unit. RAM is a temporary storage location (volatile)

ROM: ROM is an acronym for Read-Only Memory. It saves information permanently (non-volatile)

Challenge Activity: Can you draw a diagram of a computer using the concept of Von-Neumann Architecture?
Label your diagram using as many key terms as possible



What is a computer system?

- A computer system is one that is able to take a set of inputs, process them and then create a set of outputs.
- This is done using hardware and software.



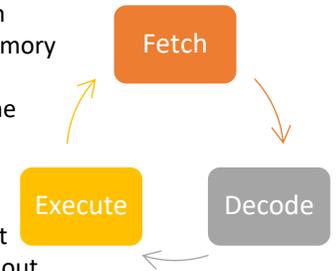
Von Neumann Architecture

- Von Neumann architecture is based on the stored-program computer concept, where instruction data and program data are stored in the same memory



Fetch-Decode-Execute Cycle (F-D-E Cycle)

- **Fetch** is responsible for getting an instruction or data from main memory into the CPU
- **Decode**: The control unit reads the instruction and makes sure that it is an instruction that the CPU can carry out
- **Execute**: Here the instruction that has been decoded will be carried out.



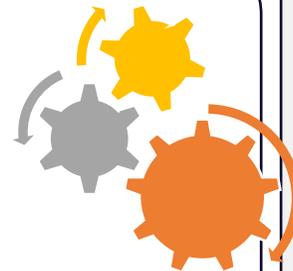
The CPU

- The Central Processing Unit, or CPU, executes programs using the fetch-decode-execute cycle
- It is the most important component of any computing device
- It handles basic instructions and allocates the more complicated tasks to other specific chips to get them to do what they do best
- The CPU is made up of several parts, known as registers



The Registers of the CPU:

- Arithmetic Logic Unit (ALU)
- Memory Address Register (MAR)
- Memory Data Register (MDR)
- Program Counter (PC)
- Control Unit (CU)
- Registers
- Accumulator
- Buses (Address, Control & Data)

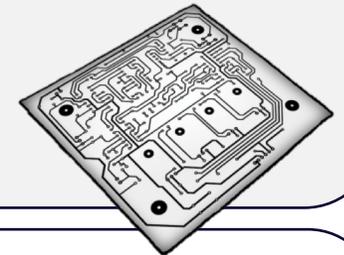


KS3 Spine

Computer Hardware

Motherboard

- The Motherboard is the main printed circuit board in the computer
- It is essential as a means of connecting all of the computer's parts together



Hard Disk Drive

- A hard disk is a **secondary** storage device for digital data
- It can be magnetic or solid state

RAM (Random Access Memory)

- RAM is **primary** or **main** memory and is used to store computer programs while they are running and also any data the programs need to undertake their task



ROM (Read Only Memory)

- The memory in a computer we can only read to but cannot write on. It stores such instructions that are required to start a computer known as BIOS.

Input & Output Devices

