

CPU and von Neumann Architecture

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| **A** | | **CPU structure** | | |
| **Control Unit** | | | CU | Communicates with the ALU, immediate access store and main memory to perform the functions of the CPU. |
| **Immediate access store** | | |  | A collection of registers with specific roles in the CPU |
| **1** | **Accumulator** | |  | Stores data to be operated on, or the result of any operation carried out by the ALU |
| **2** | **Current Instruction Register** | | CIR | Stores the instruction to be used next |
| **3** | **Memory Address Register** | | MAR | Stores the address to be used next (all stages) |
| **4** | **Memory Data (or Buffer) Register** | | MDR  MBR | Stores data which has been retrieved from or is about to be sent to RAM |
| **5** | **Program Counter** | | PC | Stores the next address in the program (Fetch stage) |
| **Arithmetic and Logic Unit** | | | ALU | Takes two operands from the Accumulator and an operator from the CIR and returns a single result to the Accumulator |

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| **B** | **Key vocab** | |
| **Systems Architecture** | | The way the components of a computer are arranged. |
| **von Neumann architecture** | | System architecture where the data is stored in the same place as the instructions |
| **Fetch-Decode-Execute cycle** | | The cycle followed by the von Neumann architecture |

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| **C** | **CPU hardware** | | | |
| **Bus** | | | A connector which transfers data between components. Three types are data, address and control | |
| **Cache** | | | Fast, expensive memory which is loaded from RAM and called by the CPU | |
| **Clock generator** | | | A circuit which produces a square wave, which is the maximum frequency a CPU can perform instructions | |
| **Core** | | | A processing unit which can run simultaneously with others. It will have its own L1 and L2 cache, but share L3 cache and RAM | |
| **Single-core** | | | | Only one core |
| **Dual-core** | | | | Two cores |
| **Quad-core** | | | | Four cores |
| **Multi-core** | | | | More than one core |
| **Register** | | A section of high speed memory | | |

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| **D** | **CPU vocab** | |
| **Boot Process** | | Set of instructions required to make the computer start |
| **Clock speed** | The frequency which the CPU runs at, and the number of instructions which can be processed per second (Hz) | |
| **Overclock** | | Run the CPU at a higher clock speed than its default |