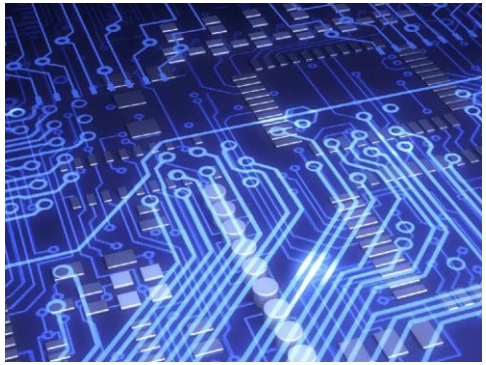
COMPUTER SCIENCE
Knowledge Organiser

Unit-1: Systems architecture



Computer Science Command Words

Add
In computer science, if you are asked to add, you need to join one thing to something else to increase the size, number or amount.

Solve
In computer science, if you are asked to solve something, you need to get the answer(s) using algebraic and/or numerical and/or graphical methods.

Convert
In computer science, if you are asked to convert something, you need to change the form, character or function of something.

Analyse
In computer science, if you are asked to analyse something, you need to bring out the essential elements or structure. You will be expected to identify parts and relationships, making sense of the information to reach conclusions.

Explain
In computer science, if you are asked to explain something, you need to give a detailed account, including the reasons or causes.

Define
In computer science, if you are asked to define something, you need to give the precise meaning of a word, phrase, concept or physical quantity.

Describe
In computer science, if you are asked to describe something, you need to give a detailed account or picture of a situation, event, pattern or process.

Justify
In computer science, if you are asked to justify something, you need to give valid reasons or evidence to support an answer or conclusion.

Calculate
In computer science, if you are asked to calculate something, you need to get a numerical answer and show the relevant stages of your working.

Show
In computer science, if you are asked to show something, you need to give steps in a derivation or calculation.

Evaluate
In computer science, if you are asked to evaluate something, you need to assess the limitations and possible consequences/implications; make comments/judgements about ideas, work, solutions or methods in relation to selected criteria.

Compare
In computer science, if you are asked to compare, you need to give an account of the similarities and differences between two (or more) items or situations, referring to each of them throughout.

Discuss
In computer science, if you are asked to discuss something, you need to offer a considered and balanced review which includes a range of arguments, factors or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence.

State
In computer science, if you are asked to state something, you need to give a specific name, value or other brief answer without explanation or calculation.

Give
In computer science, if you are asked to give, you need to present information which determines the importance of an event or issue. Quite often, you will be asked to show causation.

Complete
In computer science, if you are asked to complete something, you need to provide all necessary or appropriate parts.

Identify
In computer science, if you are asked to identify something, you need to provide an answer from a number of possibilities. You will need to recognise and briefly state a particular factor or feature.

"The will to succeed is important, but what's more important is the will to prepare."

Bobby Knight (NBA Coach)

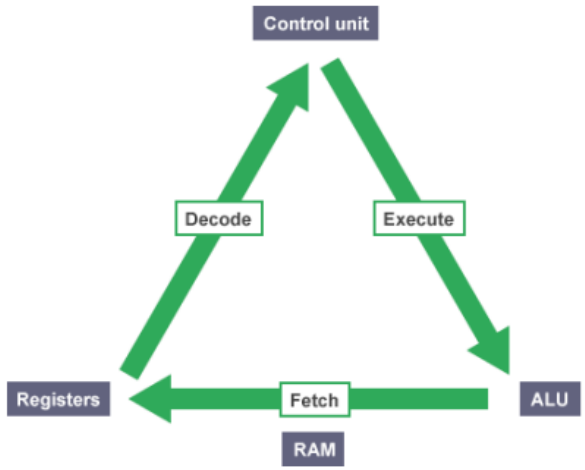
Knowledge Organiser - 1.1 Systems Architecture

CS

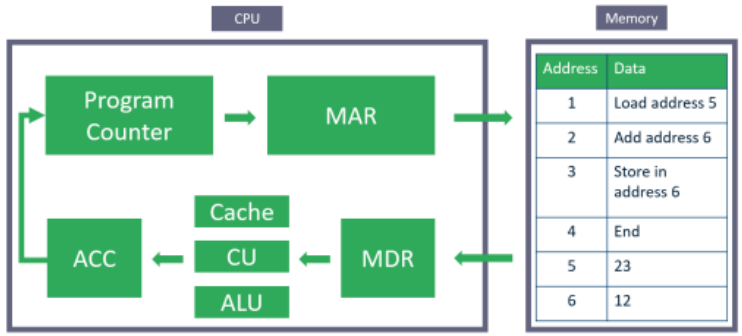
Key vocabulary

CPU	**Central Processing Unit.** Fetches – Decodes – Executes instructions.
CU	**Control Unit.** Manages the components of the CPU.
ALU	**Arithmetic and Logic Unit.** Carries out basic mathematics and comparisons.
Cache	Super fast memory located next to the CPU. Stores commonly used data & instructions.
Registers	Small memory containers inside the CPU.
MAR	**Memory Address Register**. Stores the address of the next instruction.
MDR	**Memory Data Register.** Stores the data fetched from the main memory (RAM).
Program Counter	A register that records the current instruction being executed.
Accumulator	A register used by the (ALU) to store the results of calculations.
Clock Speed	The speed of a computer's CPU, measured in hertz. This indicates the number of fetch-decode-execute cycles that can run per second.
Cores	A processing unit within a CPU. CPUs can have multiple cores.
Embedded System	A special purpose computer built into another device.

Fetch – Execute Cycle



Von Neumann Architecture



Knowledge Organiser - 1.2 Memory & Storage

CS

Units

Unit	Abbreviation	Value
Petabyte	PB	1000^5 bytes
Terabyte	TB	1000^4 bytes
Gigabyte	GB	1000^3 bytes
Megabyte	MB	1000^2 bytes
Kilobyte	KB	1000 bytes
Byte	B	8 bits
Nibble	N	4 bits
Bit	b	0 or 1

Capacity Calculations

Moving between units	* By 1000 to move down / By 1000 to move up
Sound file size	Sample rate * duration * bit depth
Image file size	Colour depth * image height * image width
Text file size	Bits per character * number of characters

Key vocabulary

Primary Storage	Volatile memory used to store currently used data and instructions.
RAM	**Random access memory.** This is volatile memory that is constantly being written to and read from. It does not retain its contents without a constant supply of power. When a computer is turned off, everything stored in its RAM is lost.
ROM	**Read only memory**. This is non-volatile memory or storage containing data that cannot be changed.
Virtual Memory	A section of a secondary storage which is temporarily used as RAM.
Secondary Storage	Non-volatile memory used for long-term storage of programs and data.
Optical Storage	Storing and reading data from a disc using a laser. Examples include CD, DVD, Blu-ray.
Magnetic Storage	Storing and reading data from a hard drive disc using magnetism.
Solid State Storage	Storing and reading data using electricity
Capacity	The maximum amount of data that a device can contain.
Compression	A method of reducing file sizes, particularly in digital media such as photos, audio and video.
Lossy Compression	A form of compression that reduces digital file sizes by removing data.
Lossless Compression	A form of compression that encodes digital files without losing detail. Files can also be restored to their uncompressed quality.