

Key information:

Card: 1.1

| | |
|-------------------|--|
| ALU | <ul style="list-style-type: none">• Processes and manipulates data• It performs simple calculations and logical decision making |
| CU/ Controller | <ul style="list-style-type: none">• Coordinates the other parts of the CPU• It ensures that all processes take place at the right time and in the correct order |
| Registers | <ul style="list-style-type: none">• Register is a storage location found on the CPU where data or control information is temporarily stored |
| Internal memory | <ul style="list-style-type: none">• Fast access temp storage on the CPU |

The CPU utilises buses in 3 different ways

- **Address bus-** where data is saved or loaded from memory (it's address)
- **Control bus-** determines if it is loading/saving
- **Data bus-** data is loaded/saved on this line

Key information:

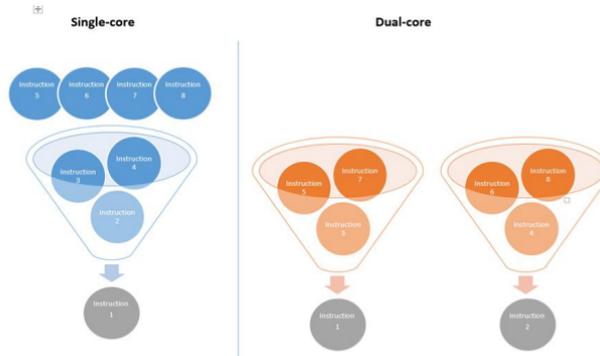
Card: 1.2

| | |
|--------------------------------------|---|
| PC- Program counter | A counter that keeps track of the memory address of which instruction is to be executed next. |
| MAR- Memory address register | The address in main memory that is currently being read or written. |
| CIR- Current instruction register | A temporary holding area for the instruction that has just been fetched from memory. |
| ACC- Accumulator | Holds the answers to calculations |

Key information:

Card: 1.3

| | |
|-----------------|---|
| Cache size | MORE cache= the faster the rate the system can provide instructions to the CPU MORE cache= more instructions that are repeatedly used to be stored can be stored on the CPU so it can access them faster |
| Clock speed | FASTER clock speed= the faster the computer is able to run the FDE cycle and process more instructions FASTER clock speed= more power is needed straining the CPU's battery FASTER clock speed= increases temperature which can be damaging |
| Number of cores | SINGLE core CPU= Instructions are run one at a time DUAL core CPU= More than 1 instruction can be <u>processed at the same time</u> PERFORMANCE may be affected when 1 core is waiting for another to process an instruction |



| | |
|--|---|
| <p>CISC</p> <p>Complex instruction set computer</p> | <ul style="list-style-type: none">• Larger due to more complex circuitry• The instruction cycle in CISC is more complex than RISC, so it can process more complex instructions• Have higher clock rates• Use more electricity and generate more heat• <u>Are commonly found in desktops and laptops</u> |
| <p>RISC</p> <p>Reduced instruction set computer</p> | <ul style="list-style-type: none">• RISC processors process a limited number of instructions• RISC processors use relatively simple instructions.• To carry out more complex commands the problem is broken down into a longer list of simpler instructions.• RISC processors run cooler / uses less power / are cheaper to run.• <u>Are commonly found in mobile devices</u> |

Key information:

Card: 1.5

| Von Neumann | Harvard |
|---|--|
| <p>A single control unit will process instructions/data one at a time</p> <p>Data and instructions are stored in the same place and are not distinguishable</p> <p>Registers (in the CPU) are used to store instructions/data</p> | <p>Data and instructions are stored in separate locations</p> <p>Reading and writing of data can happen at the same time</p> |

Key information:

Card: 1.6

Primary memory-

Memory used to store data and instructions that are required by the CPU.

RAM

Used to store data and instructions which are currently being used. Also referred to as main memory.

Read only memory. Used to store the boot sequence as this should never be changed.

ROM

Flash

Is used for the permanent storage of data. This means that data is not lost when the power is switched off. However, the data stored in flash memory can be changed.

RAM vs ROM

| RAM | ROM |
|--|--|
| Volatile memory | Non-volatile memory |
| Stores the user data / programs / part of the operating system that is currently in use. | Used to store the BIOS / bootstrap loader. |
| Memory can be written to or read from. | Memory can only be read from and not written to. |

Cache

Is volatile and can be used for the temporary storage of frequently accessed data and instructions.

Key information:

Card: 1.7

| Key vocabulary | |
|----------------------------|--|
| Secondary Storage | A non-volatile storage medium which stores files and programs. Examples include the hard drive (HDD) and solid state drives (SSD). |
| Magnetic devices | Magnetic disks are read and written to with a moving head inside the disk drive. They often contain moving parts and are susceptible to damage. Magnetic devices can be either internal or portable. |
| Solid State devices | SSD has no moving parts. It retains an electronic charge using logic gates. Examples include SD cards and USB memory sticks. Also referred to as flash storage. |
| Optical devices | Optical media includes CD, DVD and Blu-Ray disks. Lasers are used to read and write data to a disk. Data is stored on tracks around the disk as a series of pits which represent binary code. |
| Cloud storage | Cloud storage refers to saving data in an off-site location maintained by another party. Examples include Dropbox, Google and Microsoft. This relies on having an internet connection to be able to upload and download files from a cloud server. |

| Comparing secondary storage | |
|-----------------------------|--|
| Capacity | The amount of space that is available to store files. Generally measured in GB. |
| Speed | How quickly a computer can read and write data from a storage device. |
| Portability | How easy a device is to be transported. Some devices may be permanent hardware, others may be easier to transport. |
| Durability | Will the device withstand a certain amount of damage without corrupting files? |
| Reliability | The length of time that a device is expected to last for, how long will it retain functionality? |
| Cost | The cost of a device is compared in terms of cost per GB. |

Key information:

Bit is 1 or 0

Nybble as 4 bit block (and usefulness in conversion from hex-binary) e.g. $1101_2 \rightarrow C$

Byte as 8 bits 10110110_2

| | Symbol | Value |
|-----------|--------|------------|
| Byte | B | 8 bits |
| Kilobyte | KB | 1024 bytes |
| Megabyte | MB | 1024 Kb |
| Gigabyte | GB | 1024 MB |
| Terabyte | TB | 1024 GB |
| Petabyte | PB | 1024 TB |
| Exabyte | EB | 1024 PB |
| Zettabyte | ZB | 1024 EB |
| Yottabyte | YB | 1024 ZB |

Card: 1.8

Motherboard- The motherboard is the main circuit board of a computer.

The CPU and ROM will be mounted on the motherboard and have expansion slots and other ports for devices

GPU- Is a microprocessor that performs the calculations needed to produce graphic images on screen by rapidly manipulating and change memory.

- **Integrated GPU**- An integrated GPU uses the computer's RAM.
- **Dedicated GPU**- A dedicated GPU has its own video memory.

Sound card- Sound cards convert analogue input signals into digital data and reverse this process for audio output.

