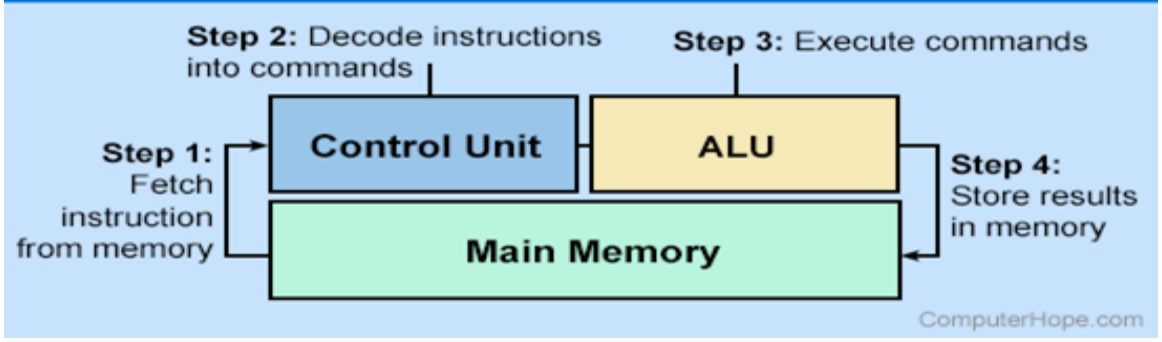
Ormiston Victory Academy

Subject: Computing
Topic: Inside a Computer/ Binary

Summary of key information:

The purpose of the CPU	
The purpose of the CPU	To manage basic operations of the computer. To be the 'brains' of the computer
CPU Components	Control Unit. Arithmetic Logic Unit. Registers. Cache
Von Neumann Architecture	The architecture that allows for the storage of instructions and data in the same location
The FDE Cycle	The cycle the CPU continuously carries out to process instructions

Machine Cycle



Performance of the CPU	
Cores	CPUs with multiple cores have more power to run multiple programs at the same time.
Clock Speed	The clock speed describes how fast the CPU can run. This is measured in megahertz (MHz) or gigahertz (GHz) and shows how many fetch-execute cycles the CPU can deal with in a second.
Cache Size	The more data that can be held in the cache, the shorter the trips the electric pulses need to make so this speeds up the processing time of each of those billions of electrical signals, making the computer noticeable faster overall.

Key terms: Control Unit, Cache, Registers, ALU, Clock Speed, Mhz, Ghz, Von Neumann Architecture

Homework this half term - to help prepare for your end of half term multiple choice quiz.

How do I use this to help me revise? Guidance and advice on how to use your knowledge organiser!

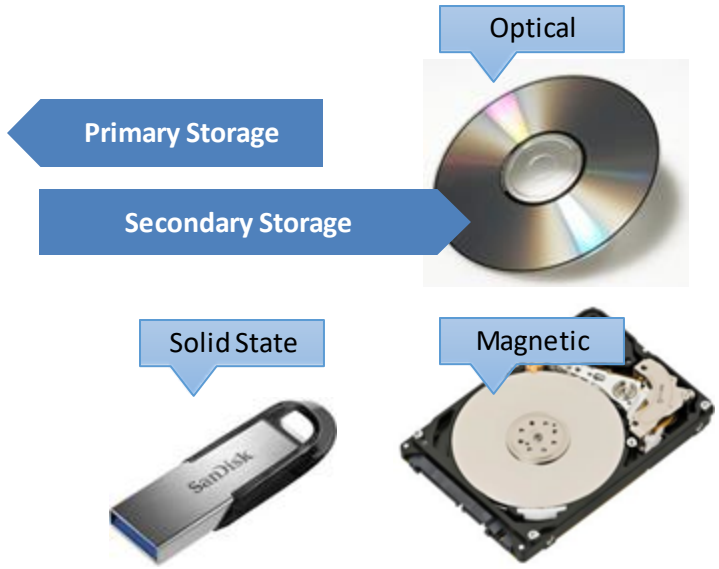
Summary of key information:

Random Access Memory (RAM)

- High Speed
- Volatile – the data is lost when the computer is turned off
- Where data, files and programs are stored while they are being used
- Files are copied into RAM while they are being used, and are copied back to secondary storage once they have been used
- When a computer runs out of memory, an area of secondary storage can be used as virtual memory

Read Only Memory (ROM)

- Cannot be changed
- Non-Volatile – the data remains when the computer is turned off
- A small chip installed on the motherboard
- Contains the instructions a computer needs to boot up (BIOS)
- Tells the CPU to perform checks and set up the computer
- Check that RAM is working, check for hardware, copy OS to RAM



Optical	Magnetic	Solid State
• Data is stored as microscopic indentations in the surface of the disc • Data is read by shining a laser beam on the surface • The changes in the position of the reflected beam represent 1 and 0	• Magnetic Hard Drives are made up of a stack of spinning magnetised metal disks. • Data is stored magnetically in small areas called sectors within circular tracks • A read/write head on a moving arm is used to access sectors on the disk • Positive and negative charges represent 1 and 0	• **Solid-state storage** (SSS) is a type of computer **storage** media that stores data electronically and has no moving parts. • It is made from silicon microchips. • Because there are no moving parts, SSDs require less power and produce far less heat than spinning hard disk drives or magnetic tape.

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COLLECTIVE MEMORY

Model IT

Summary of key information:

Data units	
Bit (b)	The smallest unit of data. 0 or 1
Nibble (N)	4 bits
Byte (B)	8 bits (note the difference between b and B)
Kilobyte (KB)	1000 bytes.
Megabyte (MB)	1000 KB
Gigabyte (GB)	1000 MB
Terabyte (TB)	1000 GB
Petabyte (PB)	1000 TB

Images	
Pixel	The smallest element of a bitmap image.
Vector vs Bitmap	A vector image describes the lines and shapes. A bitmap image consists of rows of coloured dots.
Colour Depth	The number of bits used to represent each pixel in a bitmap image. An 8 bit image can show 2^8 or 256 colours.
Resolution	In a bitmap image resolution is measured in DPI (dots per inch). The higher the resolution the better the picture quality
Image size	The size of an image is width x height x colour depth (+10% for metadata)

Sound	
Analogue / Digital	Analogue sound waves must be converted into digital sound waves by taking a sample of the sound at set intervals. This is because computers can only work with digital 'numbers', and not analogue 'sound'
Sample rate	Number of times analogue signal is sampled per second. Measured in Hertz
Bit depth	Number of bits used per sample. Sometimes known as sample resolution
File size	Sample rate x sample resolution x seconds
Factors	Larger sample rate and/or bit depth will make the file size bigger and improve the playback quality; and vice versa. Also, making the duration of the recording longer will make the file size bigger, and vice versa