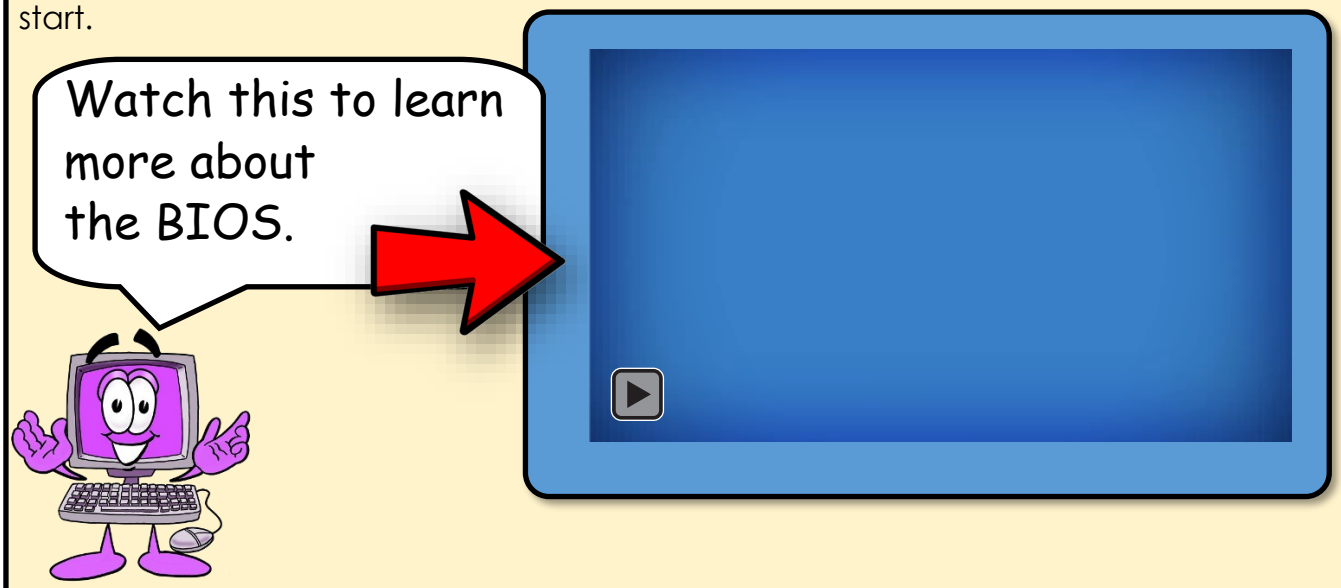
KS3 Computer Science

Computer Hardware: BIOS and CPU

Name: Class: Teacher:

The BIOS (Basic In Out System)

The BIOS is the set of instructions that are used when a computer system first starts up. The BIOS is stored in the ROM so that it is n ot lost when the power in turned off and is ready on power up. It stores all the setting needed to enable the computer system to start.



The CPU (Central Processing Unit)

The job of the CPU is to process all that data and instructions to make the computer system work. The processing power of a CPU depends on:

- **Clock speed** - The number of instructions a single processor can carry out per second (Hz). For most desktop computers this will somewhere around 3.5 GHz (3.5 billion instructions per second).
- **Number of cores** - Each processes data independently of the rest. The more cores a CPU has the more instructions it can carry out at once. Most PCs have 4 or more cores.
- **Cache size** - The cache is the data storage inside the CPU. It is much faster than **RAM.** A larger CPU cache gives the CPU faster access to more data it needs to process.

Activity 1: BIOS and CPU

Question 1

What does **BIOS** stand for?

Question 2

What is the job of the **BIOS**?

Question 3

Where is the **BIOS** stored?

Question 4

What does **CPU** stand for?

Question 5

What is the job of the **CPU**r?

Question 6

What three items does the CPUs processing power depend on?

Item 1:

Item 2:

Item 3:

Question 7

How is the clock speed of a CPU calculated?

Question 8

What units do we use to measure the clock speed of a CPU?

Parts of the CPU

The Control Unit (CU)

- The control unit is in overall control of the CPU.
- Its main job is to execute program instructions by following the **fetch-decode-execute cycle**.
- It controls the flow of data within the CPU and outside the CPU.

The Arithmetic Logic Unit (ALU)

- This carry out all the calculations.
- It performs logic operations such as AND, OR and NOT.

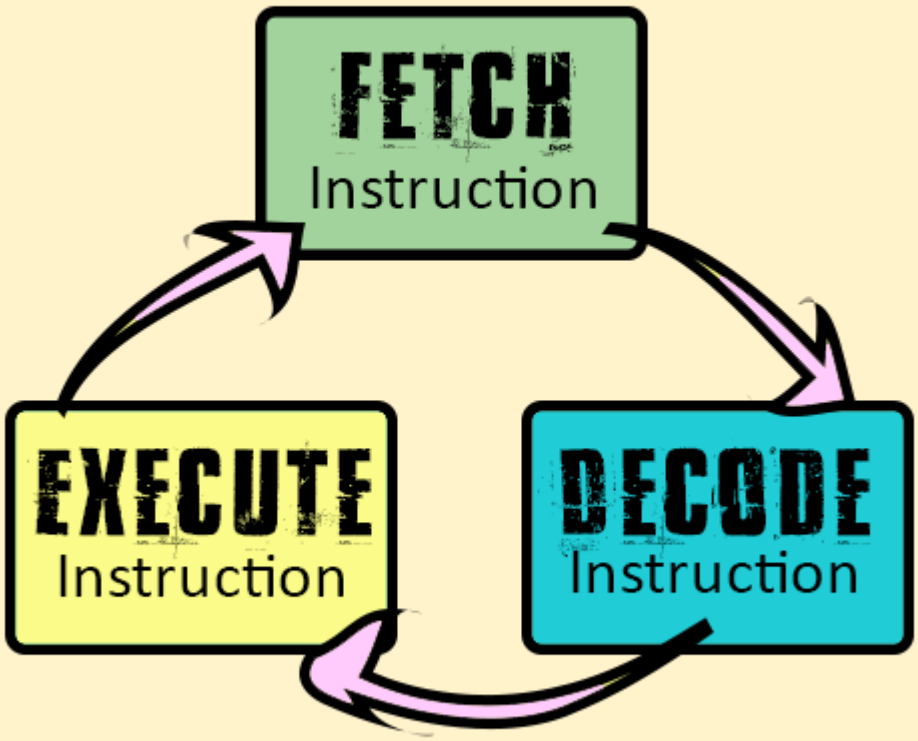
The Cache

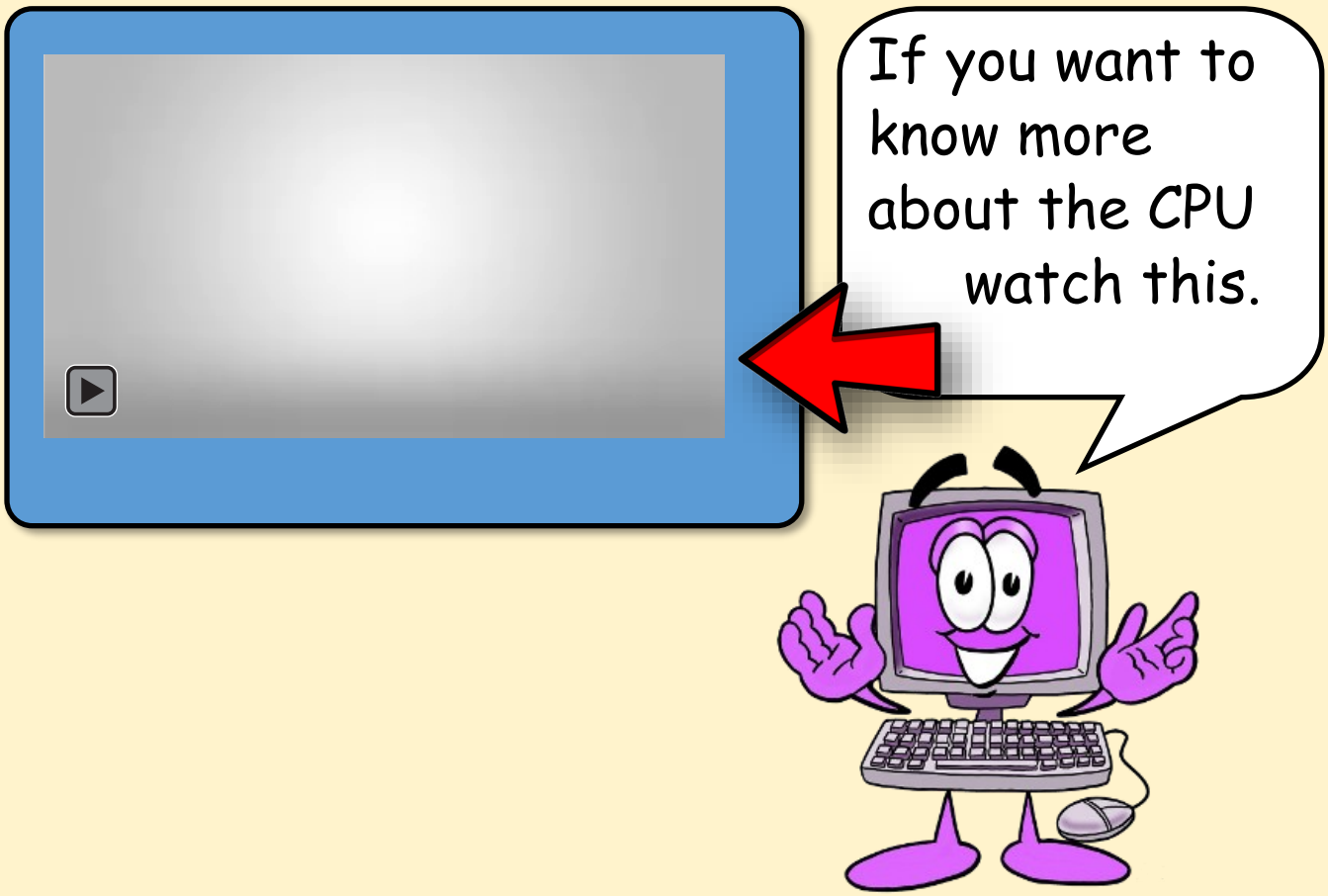
- Very fast memory in the CPU.
- Stores regularly used data so the CPU can access it quickly the next time it is needed, The CPU will check the cache first to see if the data is their, if it is not there then it will go to the RAM.
- Cache has a very low capacity and are expensive compared to RAM and secondary storage.
- There are three levels of cache:
  - ⇒ Level 1 is the fastest but has lowest memory.
  - ⇒ Level 2 is slower than level 1 but can hols more.
  - ⇒ Level 3 is slower than level 2 but can hold more.

The Fetch-Decode-Execute Cycle

All the CPU does is carry out instructions, one after the other, billions times a second.

The **fetch-decode-execute** cycle describes how it does it.





Activity 2: Parts of the CPU

Question 1

Look at the statements in the table and tick the part of CPU that relates to it.

Statement	CU	ALU	Cache
Carries out the calculations.	☐	☐	☐
Controls the flow of data in the CPU.	☐	☐	☐
Stores regularly used data.	☐	☐	☐
Follows fetch-execute-decode cycle.	☐	☐	☐
Very low capacity compared to RAM.	☐	☐	☐
Performs logic operations.	☐	☐	☐
CPU checks for data before checking the RAM.	☐	☐	☐
Very fast memory in the CPU.	☐	☐	☐
Has three levels.	☐	☐	☐

Question 2

Order the three levels of cache form the slowest to the fastest.

Slowest Fastest

Level 3 Level 3 Level 3

Question 3

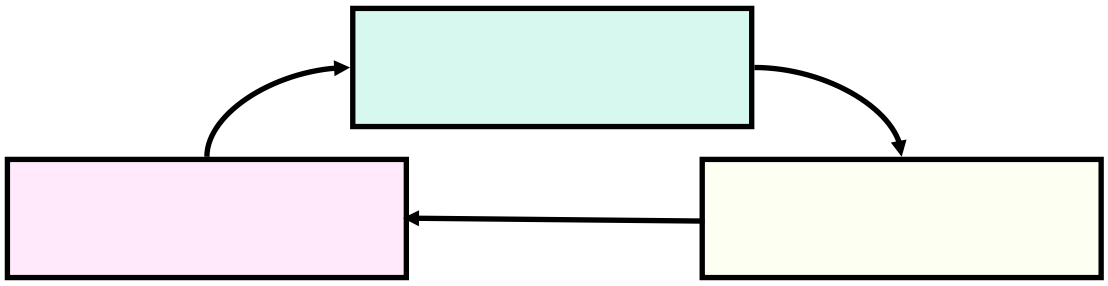
Order the three levels of cache from lowest capacity to highest capacity.

Lowest Highest

Level 3 Level 3 Level 3

Question 4

Fill in the missing spaces on this diagram.



Investigation Activity: What is CPU overclocking?

HOUSE POINT

Von Neumann Architecture

What is **Von Neumann architecture**