

Big Question: What is primary storage in a computer

S.P.I.R.I.T

- ✓ Independence
- ✓ Perseverance

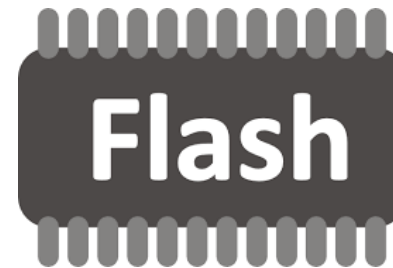
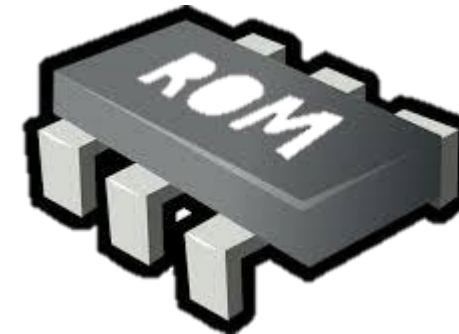
Monday, 04 April 2022

Learning Intention

To develop knowledge by
To understand primary storage and identify its role in the computer system

To secure understanding
Be able to distinguish between volatile and non-volatile memory

To achieve excellence by
Compare key features of RAM, ROM and CACHE memory



Tier 3 words:

Volatile memory

is computer memory that requires power to keep the stored information; When the power is interrupted, the stored data is lost.

Non-volatile memory

is computer memory or storage that is saved regardless if the power to the computer is on or off.

Memory

- For a computer to work it needs to store data.
- Sometimes this is permanent and sometimes it is temporary.

REMEMBER: All memory stores information as bits and bytes.

Task

Produce a mind map on Primary storage. It should contain the following things:

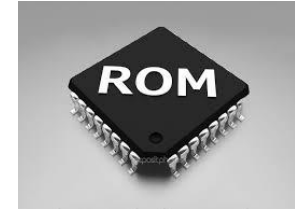
RAM

- What does RAM stand for?
- What is RAM?
- Key features of RAM
- Explain how it is used in a computer system?
- Give an example of what may be stored in RAM



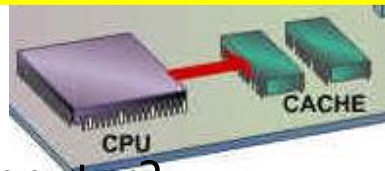
ROM

- What does ROM stand for?
- What is ROM?
- Key features of ROM
- Explain how it is used in a computer system?
- Give an example of what is stored in ROM



CACHE

- What is Cache memory?
- Where is it found in a computer?
- What gets stored in there?
- Key features of cache
- *THINK IT: Research L1 L2 and L3 cache*



VIRTUAL MEMORY

- What is virtual memory?
- When is it used? Give an example

THINK IT: Flash memory

- *What is flash memory?*
- *Key features of flash memory*
- *Where is it often found?*

RAM



- Random Access Memory
- This is a **volatile** memory type.
 - when the computer is turned off (or loses power) the data in RAM is lost.
 - ***It is used to store the data and programs currently in use.***

e.g. If you write a 1000 word essay and there is a power cut, you lose your work.

- However it is not lost if you minimize the screen. This is because until you click Save, it is stored in RAM only.

To develop knowledge by

Describing primary storage and identify its role in the computer system

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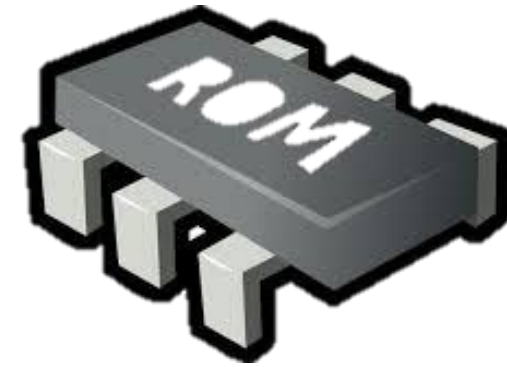
distinguishing between volatile and non-volatile memory

To achieve excellence by

Compare key features of different types of primary storage

ROM

- Read Only Memory
- Used for the permanent storage of data
- Data stored in ROM cannot be changed



This is a **non-volatile** memory type.

- It continues to store the data even when it has no power.
- It stores programs and data that does not change.
 - BIOS (see next slide)
 - Settings for a washing machine.

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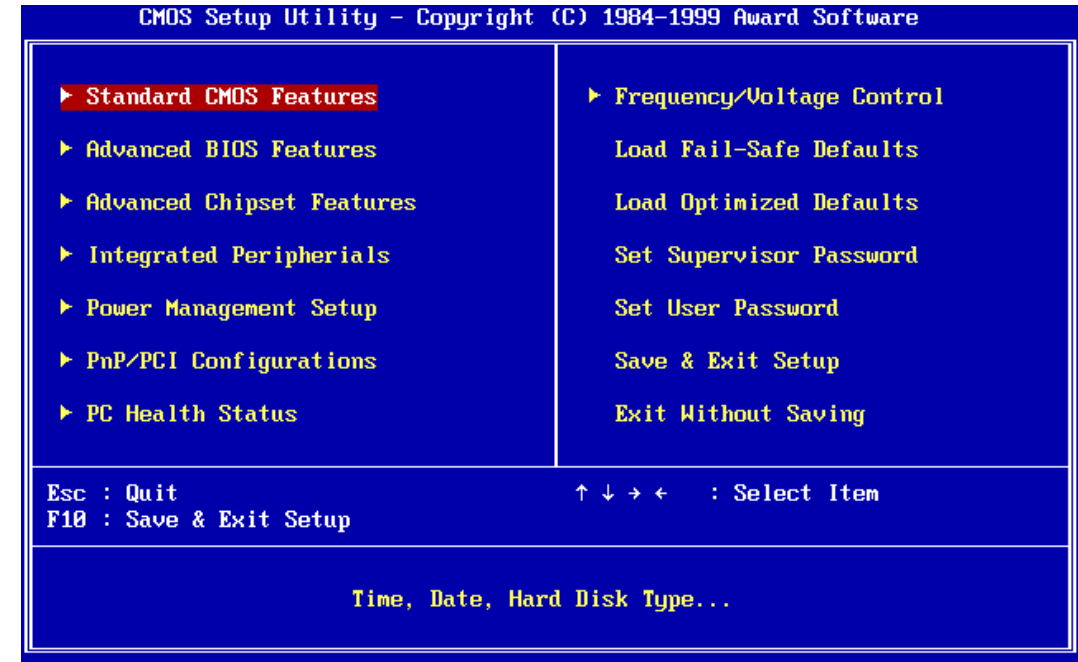
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ROM

- **ROM** is used to store the **BIOS**.
- This is a **program** which is used **to get the computer system started** after you turn it on.
- It also **manages data flow** between the computer's operating system and attached input, output and storage devices such as the hard disk, keyboard, mouse and printer.



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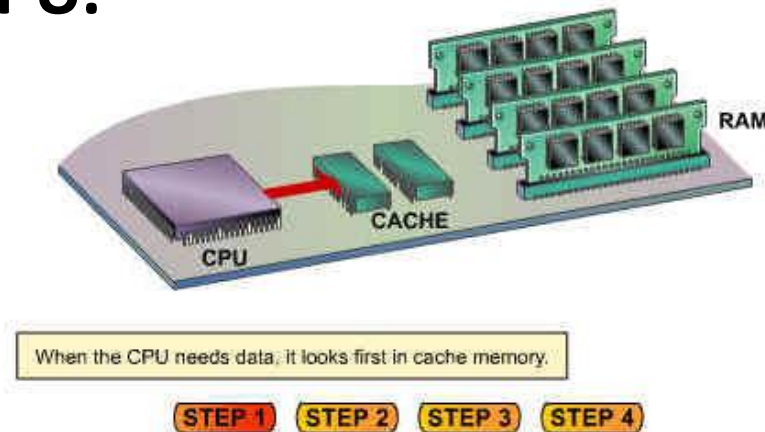
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Cache

- Cache memory (RAM cache memory) is **volatile** and can be used for the temporary storage of **frequently accessed / recently used data and instructions**.
- It consists of a small number of store locations that can be accessed **very quickly by the CPU**.
- It is quicker than RAM.



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L1 L2 L3 Cache

More cache memory improves the performance as it can provide **instructions** and data to the **CPU** at a much **faster** rate than other system memory such as RAM.

More cache memory will allow more instructions that are repeatedly used by a CPU to be stored, and therefore increase the hit rate; increasing performance as a result.

- 
- L1 cache 2-64KB smallest and fastest.
 - L2 cache 256-512KB if instructions are not present in L1, L2 is searched, some latency due to increased size.
 - L3 cache 1-8MB, instructions are searched for in here if not present in L1 and L2. Largest and slowest cache but still faster than RAM.

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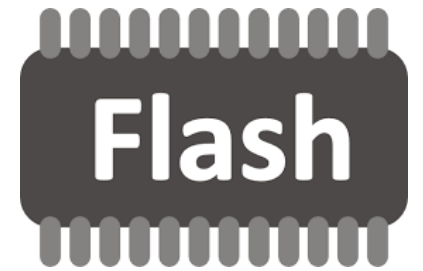
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Flash memory

- Used for the **permanent storage of data**.
However, the data stored in flash memory **can be changed**.
- Flash memory is permanent – data is not lost when the power is switched off.
- **Example:** Flash memory can be used for storing the programs such as the **BIOS**, which is advantageous as the BIOS can be upgraded.
- Also found in memory sticks, SD cards, mobile phones, digital cameras, tablet computer



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Virtual memory

- It is a **temporary** storage area used when **RAM is full**
- **Virtual memory** is simply an area of secondary storage that is used like RAM.
- Virtual memory is much **slower** than main memory because processing power is being taken up by moving data around, rather than just executing instructions.
- **Swapping** (also called **paging**) is the process the OS uses to move data between RAM and virtual memory. The OS moves data from processes that are not immediately needed out of the RAM and stores them in virtual memory. It copies the data back into RAM when the process is needed again.



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Summary of different types of memory



	Permanent	Volatile	Data can be changed	Speed
Cache memory		✓	✓	★★★★
ROM	✓			★★★
RAM		✓	✓	★★
Flash memory	✓		✓	★

