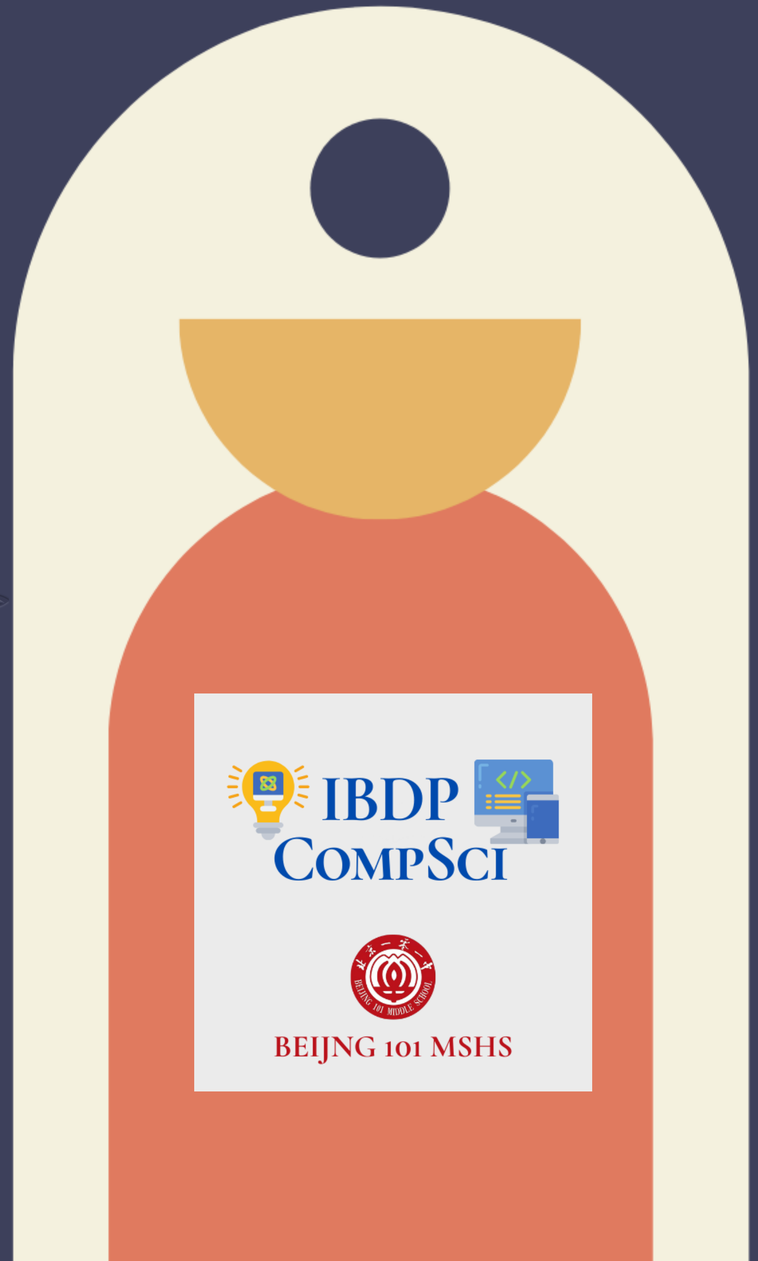
Welcome to Computer Science ***IBDP***

Beijing 101 Middle/High School



Highlights from Last time

♥ Logical Rule for a real world.

♥ Topic 2-Computer Architecture

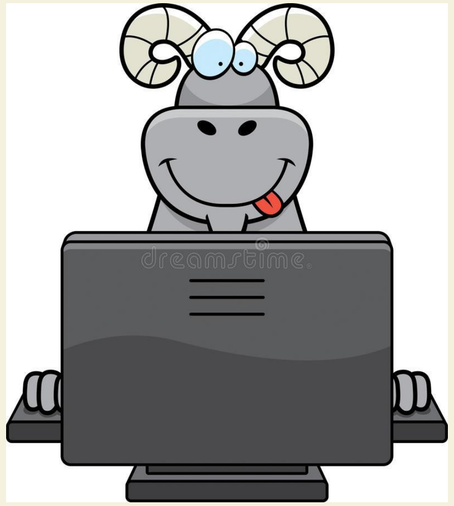
Today

- Ram & Rom
- Cache Memory
- Machine Instruction cycle

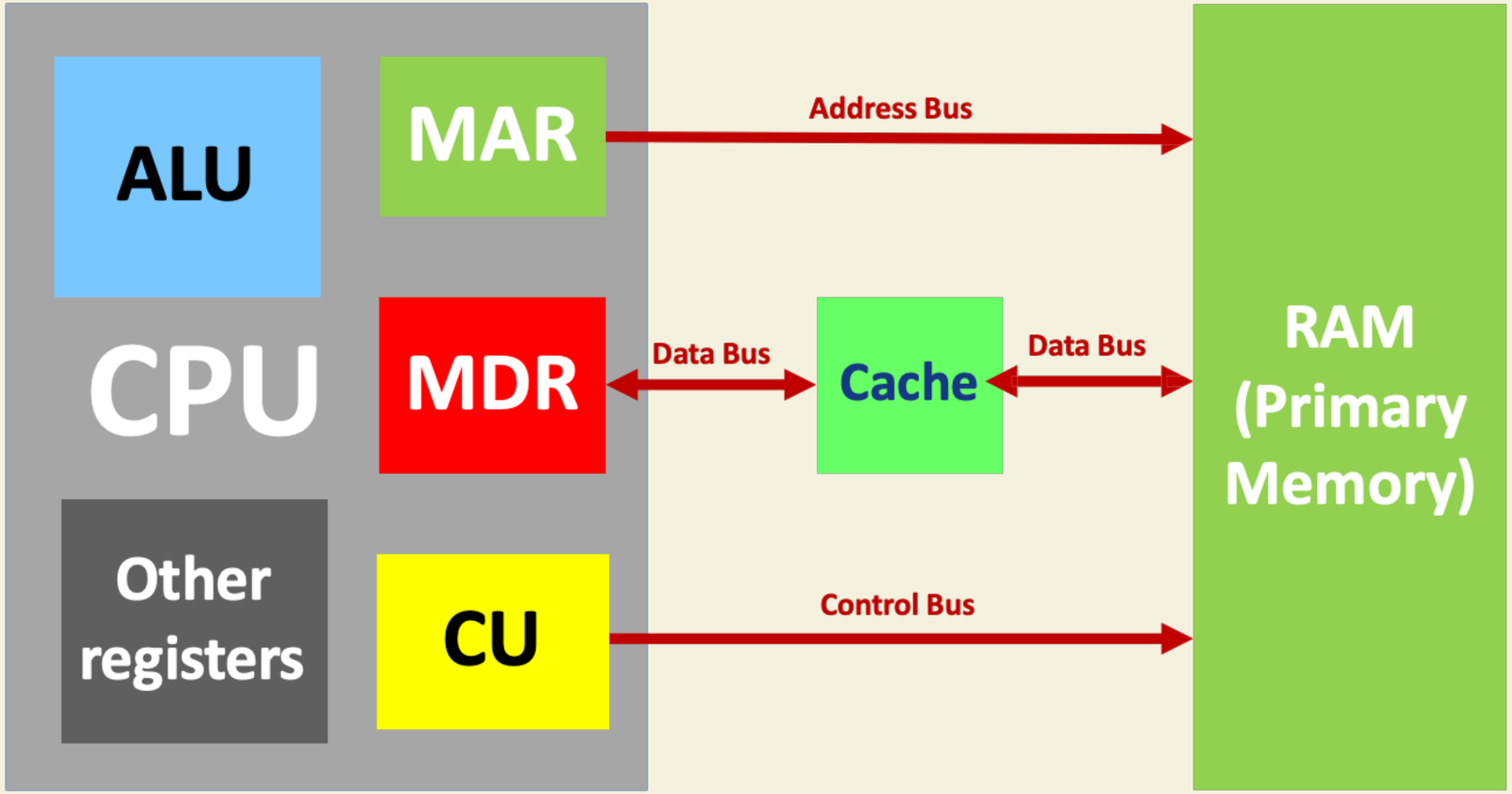
Task-Managebac Submission

- Describe the function of the data bus found in a PC
- Outline the function of the ALU (Arithmetic Logic Unit)

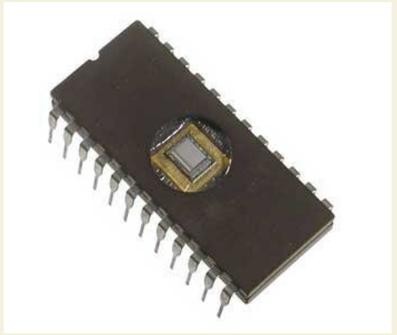
Topic 2.1.2
Describe primary memory.

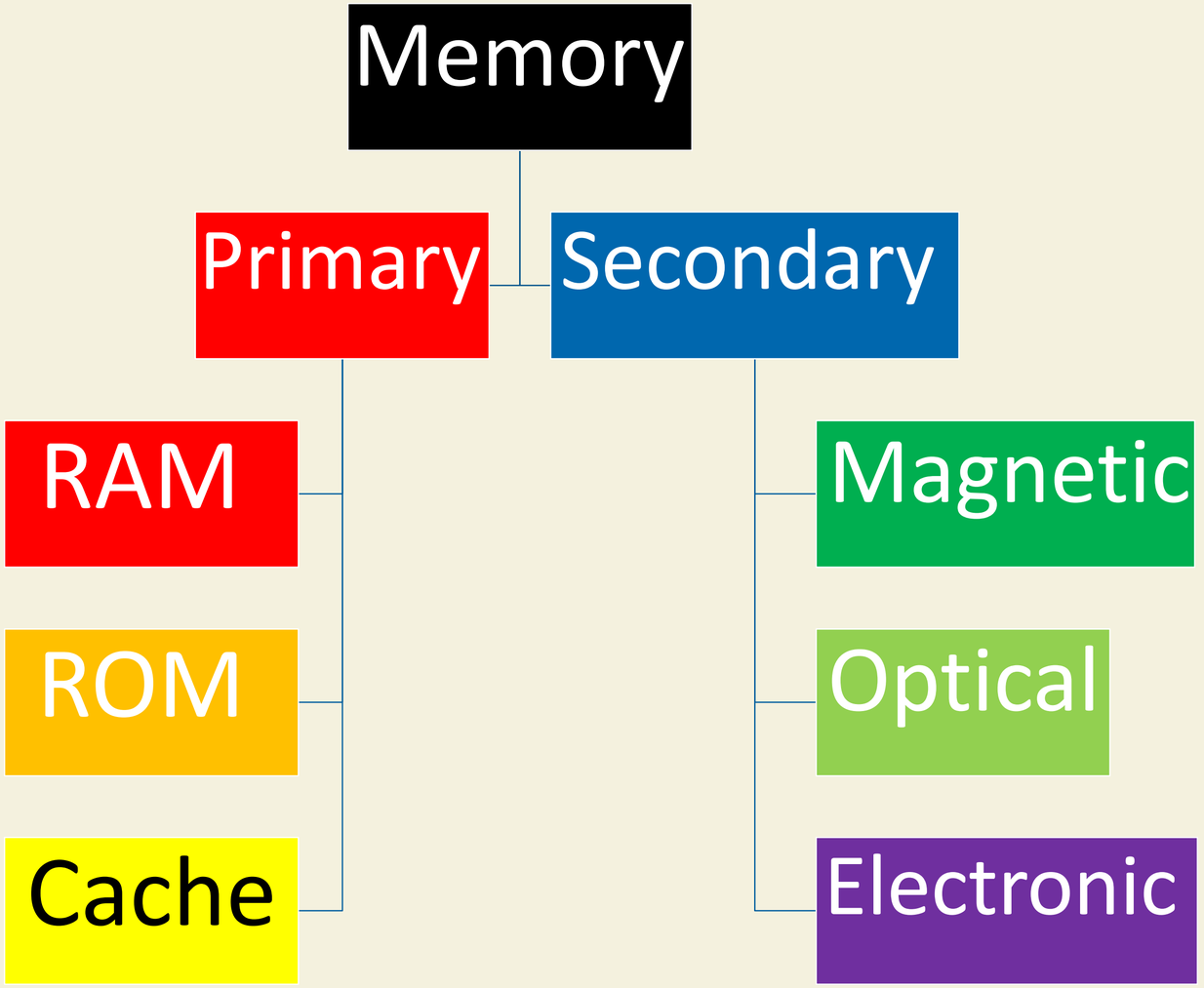


Simplified model: CPU, RAM



Simplified model: CPU, RAM





Primary memory = RAM

♥ As **RAM** is so important, it is often referred to as **primary memory** (even though it is actually only a branch of primary memory, alongside the cache and ROM).

In an exam/test, if you see *memory*, unless explicitly stated
otherwise, it would normally be referring to **RAM**.

RAM = Random Access Memory

- Contains the **data** and **instructions** the computer has loaded since starting up and everything the user has opened/loaded.
- Is **volatile** = loses its contents if power is lost
- Has a special link to the CPU (via busses)

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ROM = Read Only Memory

- Originally its contents were static (hence ‘read only’) and could not be changed – not true any more (flash upgrades).

- Non-volatile = does not lose its contents if power is lost

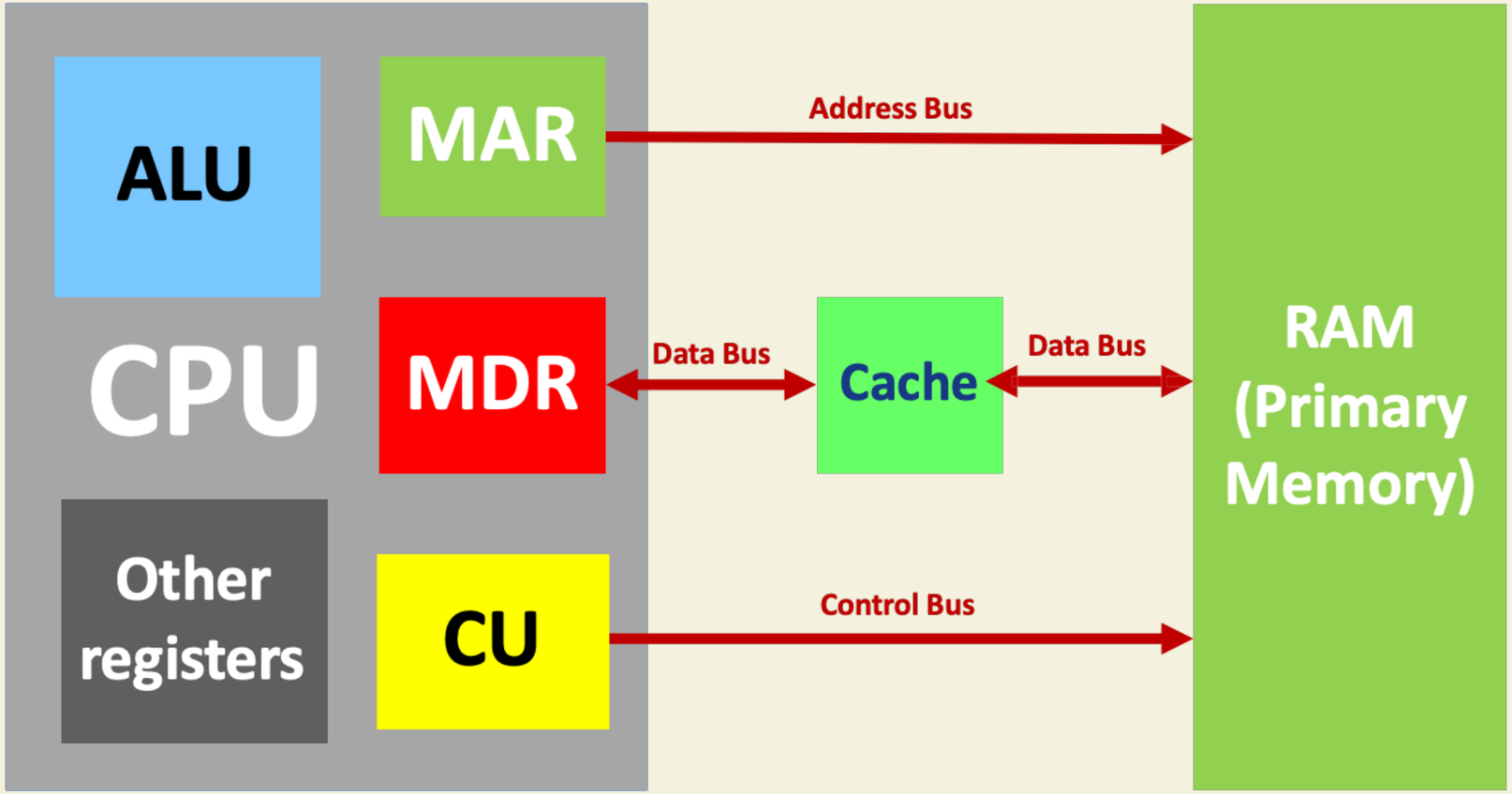
- Stores the BIOS (Basic Input Output System) – a small program that allows the computer to know what to do to find the operating system to ‘boot’ the computer after power is restored.

RAM - ROM

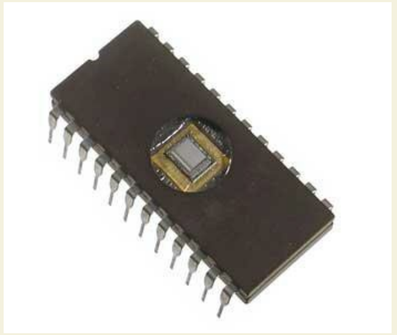
RAM	ROM
Volatile	Non-volatile
Contains user’s programs and data that has been loaded since ‘booting up’	Contains the BIOS
Usually upgradeable, can be increased	Usually part of motherboard, difficult to upgrade

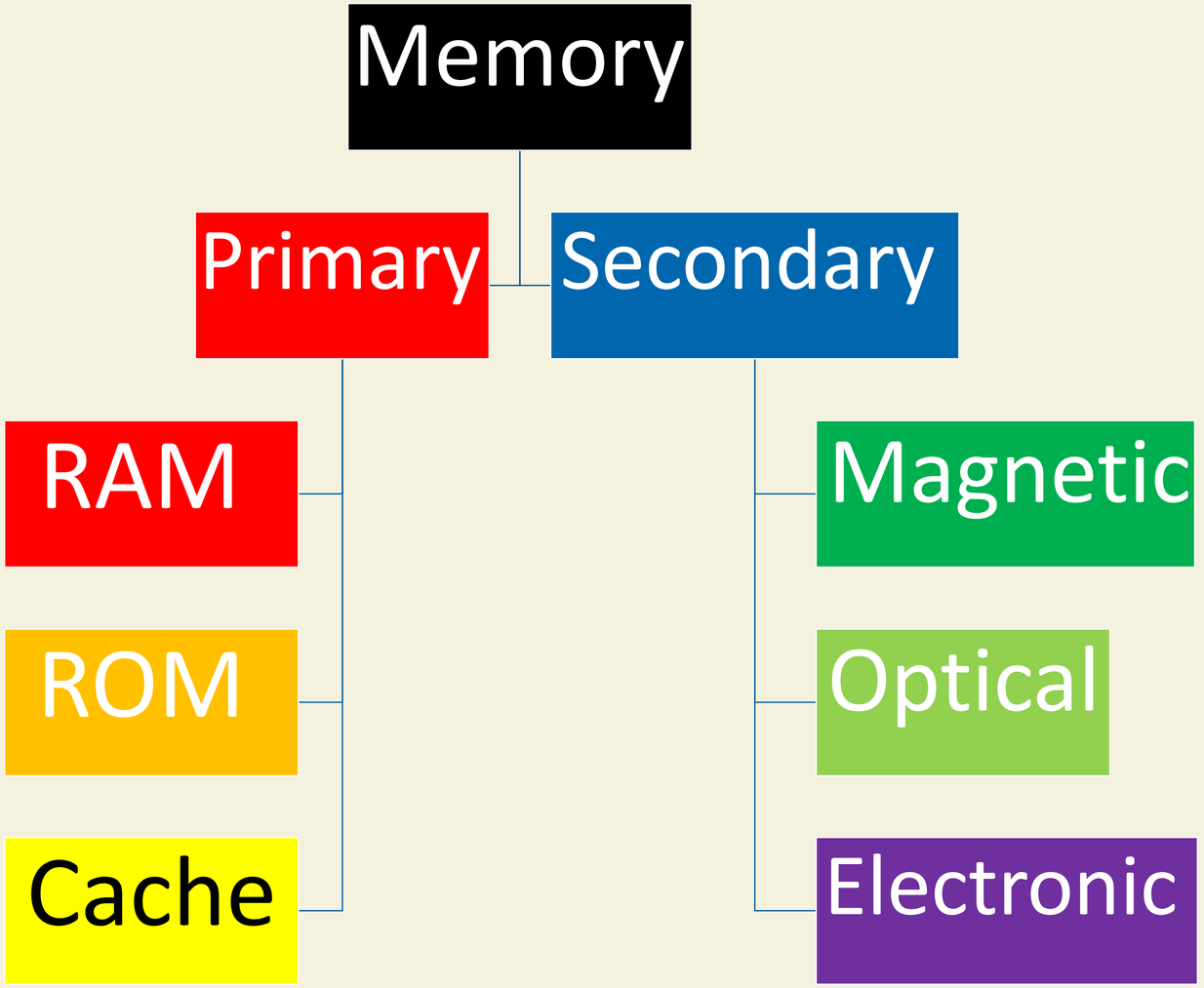
Topic 2.1.3
Explain the use of cache memory.

Simplified model: CPU, RAM



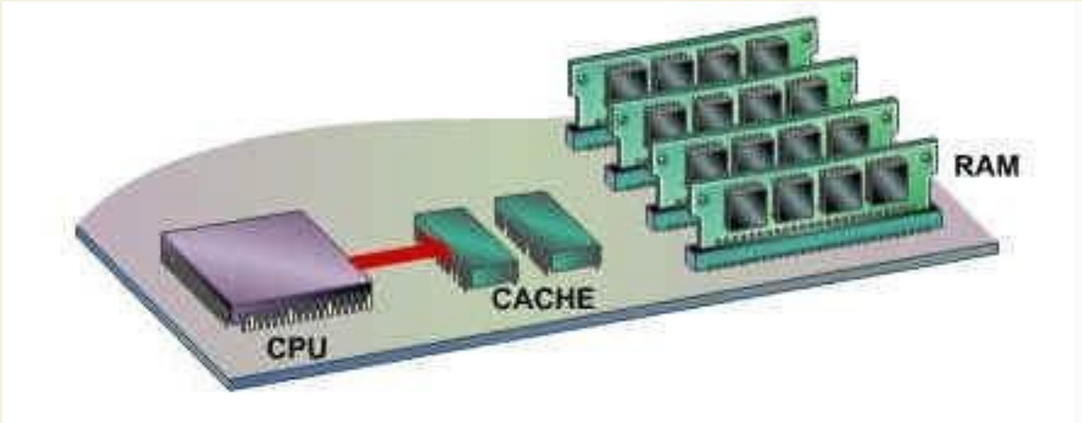
Simplified model: CPU, RAM





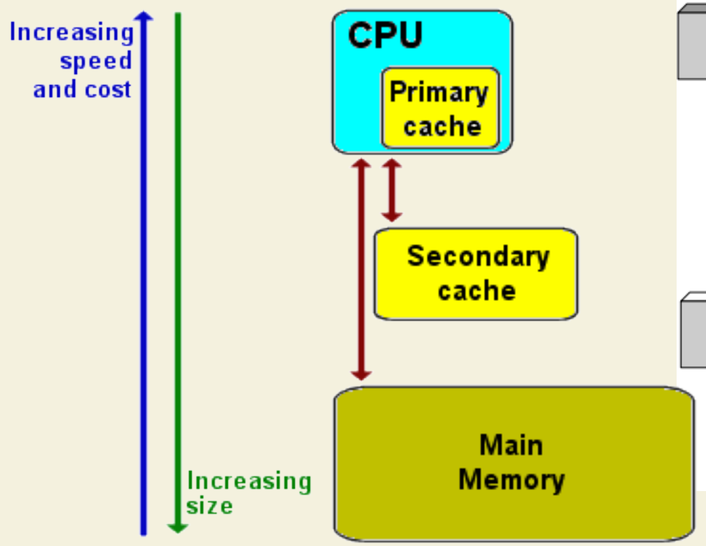
Definition: cache

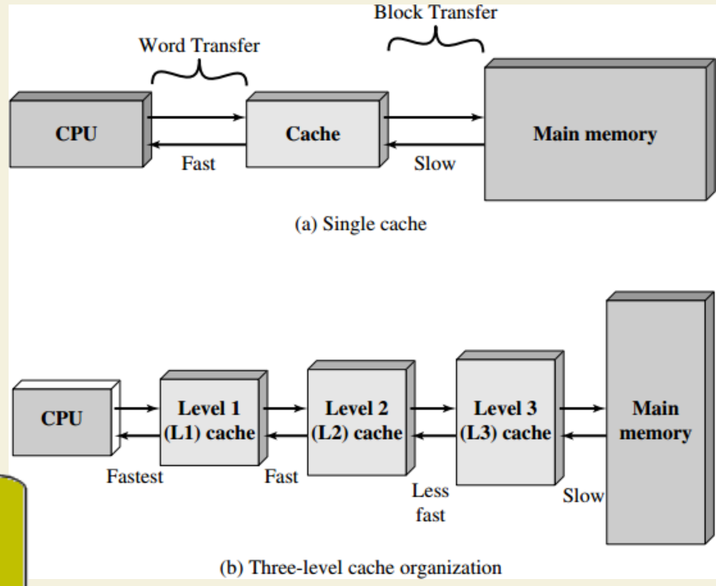
A type of **small**, **high-speed** memory **inside** the CPU used to hold **frequently used data**, so that the CPU needs to access the much slower RAM less frequently



Cache levels*

*Although not examined, it is good to know that cache actually exists in levels/stages in modern computers





How Does Cache Work?