

Main Memory

CHAPTER 3



Learning Objectives

Understand the concept
of main memory

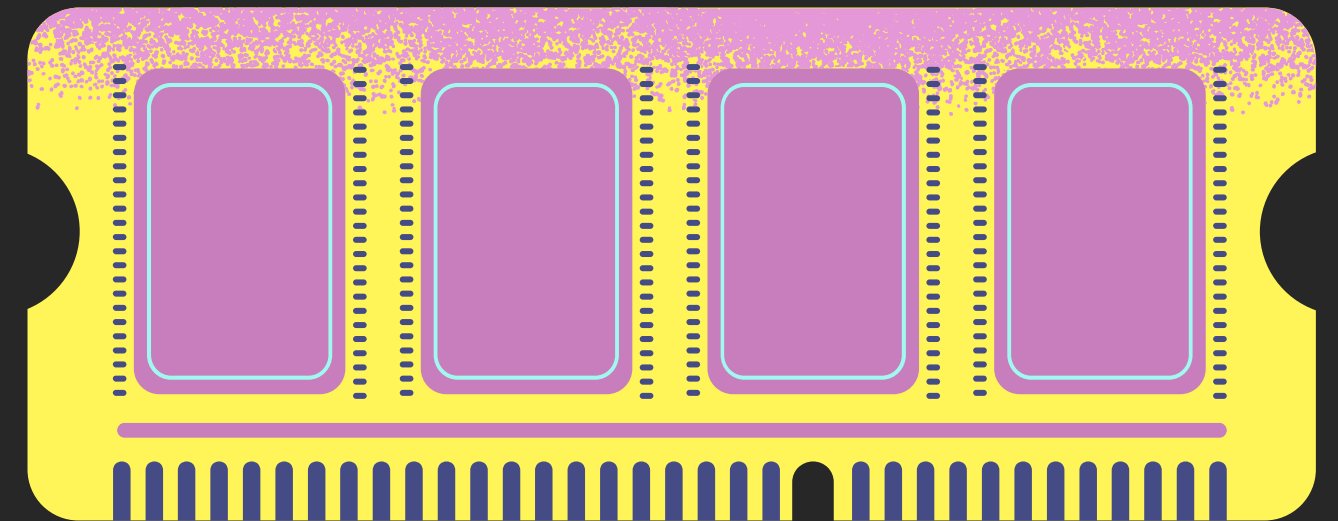
Identify the different
types of main memory

Explain the functionality
of main memory

Main Memory

Main memory is the internal storage area in a computer where data and instructions are stored temporarily.

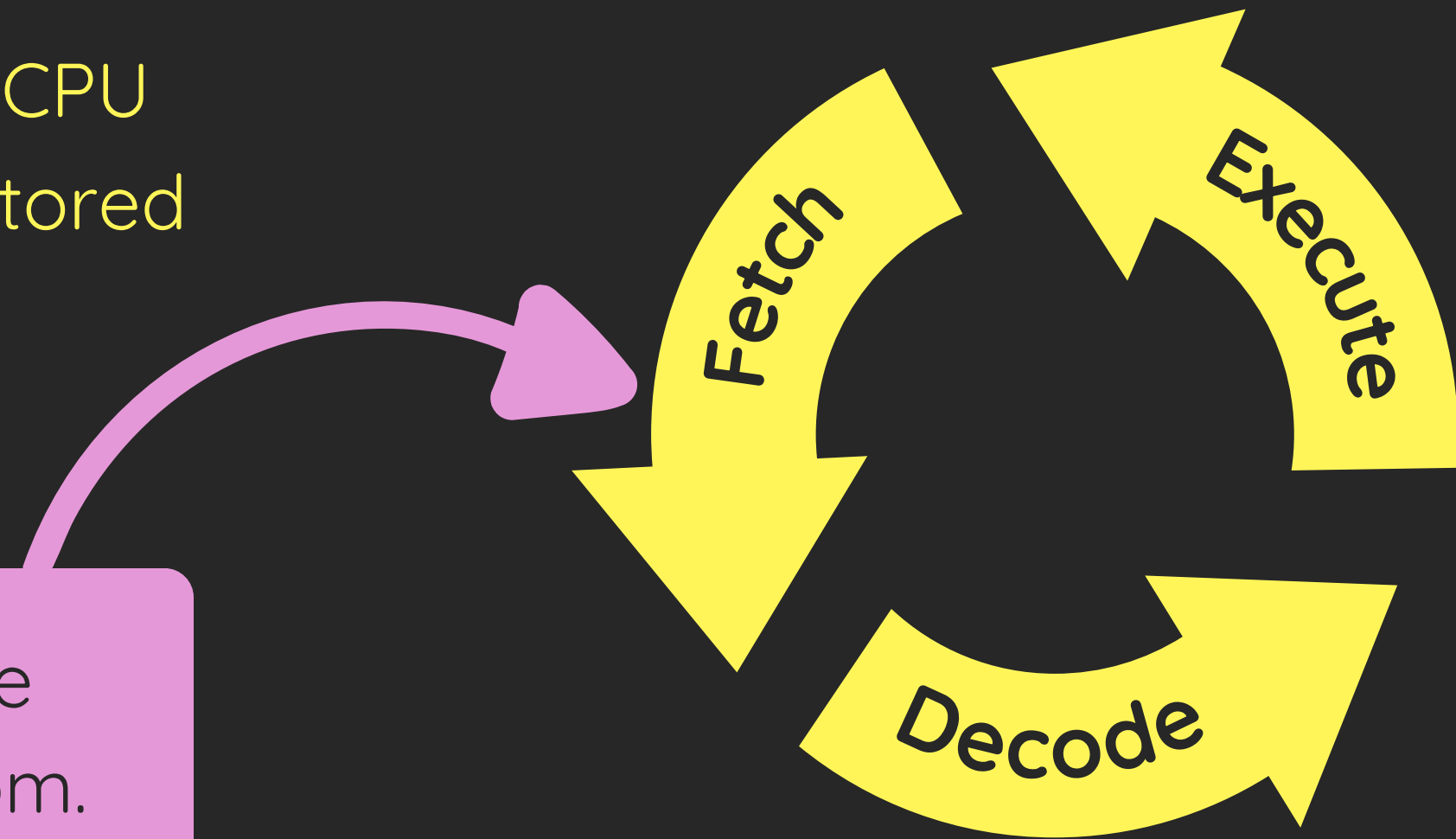
Think of it as the computer's working or short term memory.



The Role of Main Memory

In the Fetch-Execute cycle, the CPU continually reads instructions stored in main memory and executes them.

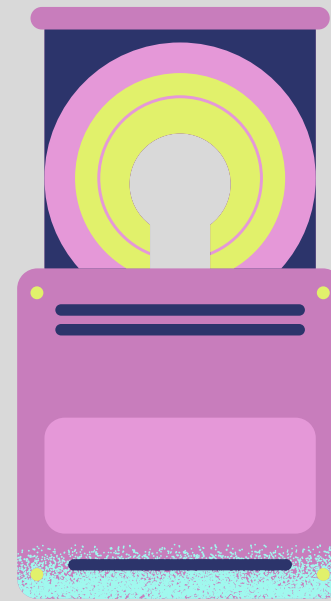
The main memory is where instructions are 'fetched' from.



Types of Main Memory

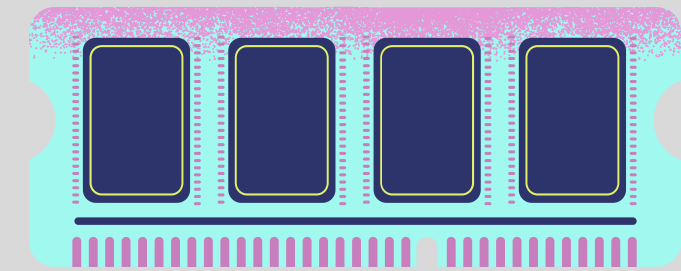
There are two types of main memory that are directly accessible by the CPU.

ROM



Read-Only Memory

RAM



Random Access
Memory

RAM is volatile memory, meaning its contents are lost when the power is turned off.

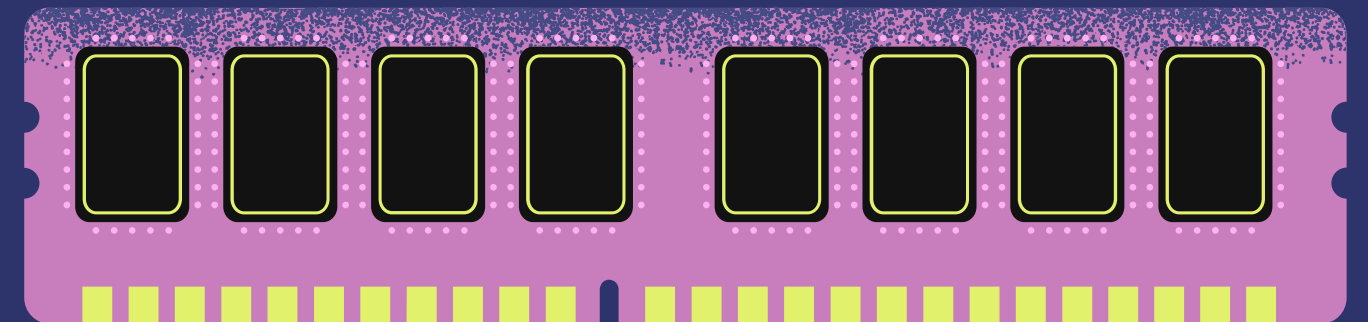
RAM allows both read and write, meaning data can be both stored and retrieved from it.

RAM has fast access times, as it is designed for rapid data access during program execution.

RAM is available in small capacities starting at 1GB and ranging up to 256GB.

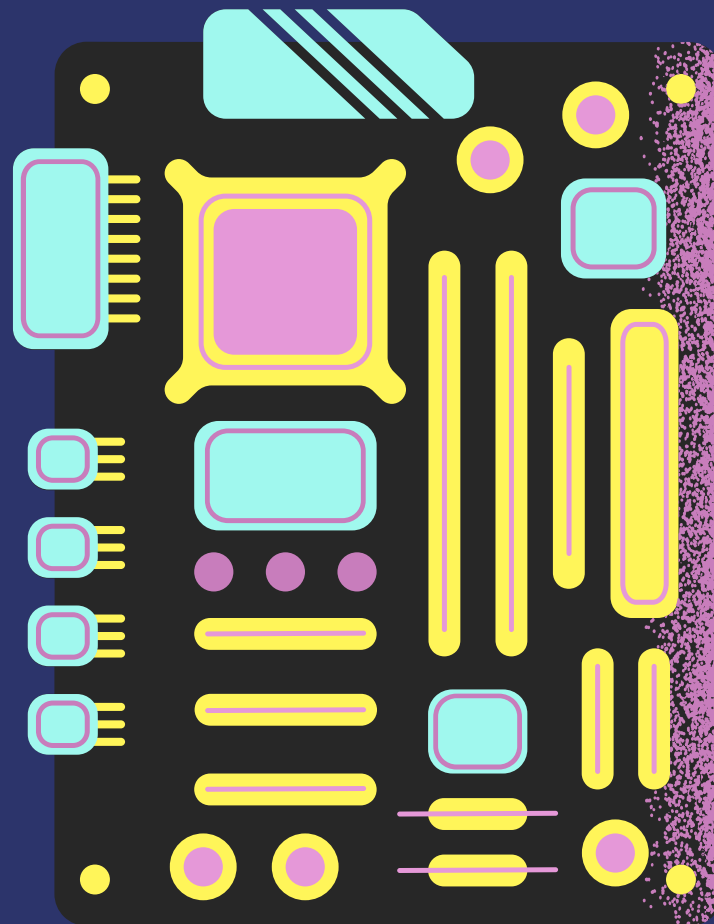
RAM

Random Access Memory



ROM

Read-Only Memory



ROM is non-volatile memory, meaning its contents remain when the power is turned off.

ROM is typically read-only, meaning data can be read from it but not written to it.

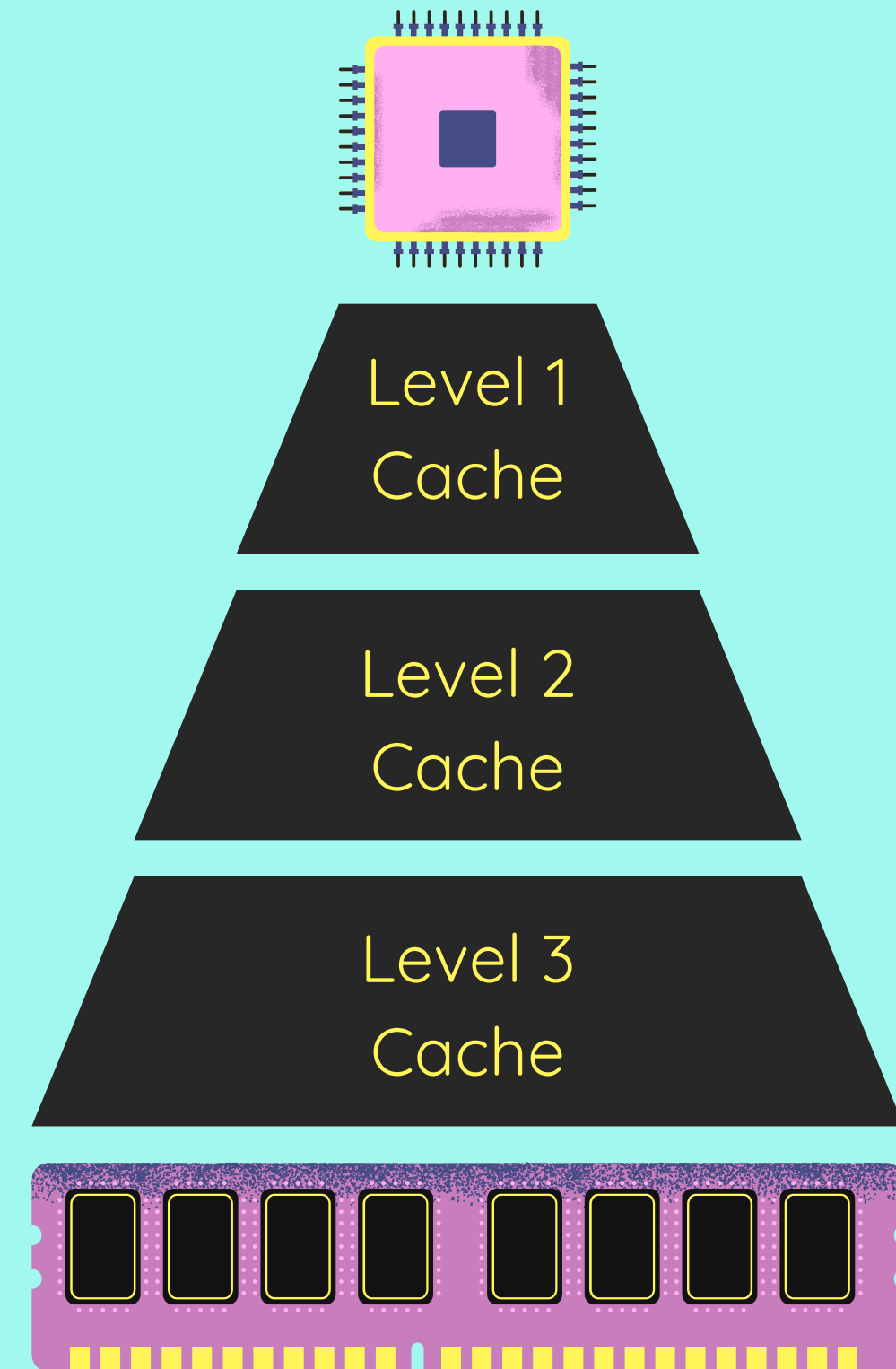
ROM is used for storing firmware or permanent instructions that are required for boot up.

ROM does not need to store much and therefore only has a capacity of a few MB.

Cache

Cache is an additional type of main memory. It stores frequently used instructions for the CPU to quickly retrieve.

There are different levels of cache. Those closer to the CPU are quicker to access but typically smaller in size.



For each type of main memory, complete the comparative chart.

What is its full name?

RAM

Type here

ROM

Type here

Is it volatile or non-volatile?

Type here

Type here

Is it read, write or both?

Type here

Type here

What is its purpose?

Type here

Type here

How fast is it?

Type here

Type here

How much data can it store?

Type here

Type here

For each type of main memory, complete the comparative chart.

	<i>RAM</i>	<i>ROM</i>
What is its full name?	Random Access Memory	Read-Only Memory
Is it volatile or non-volatile?	Volatile	Non-volatile
Is it read, write or both?	Read and write	Read-only
What is its purpose?	Working memory for applications	Boot up and I/O instructions
How fast is it?	Fast but slower than cache	Slower than RAM
How much data can it store?	1GB - 256GB	4MB - 6MB