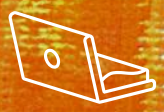
The Central Processing Unit (CPU)

Understanding computers

3rd Edition



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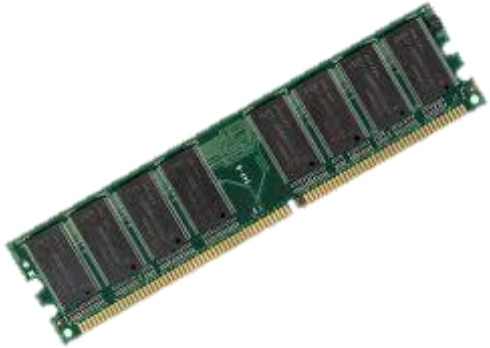
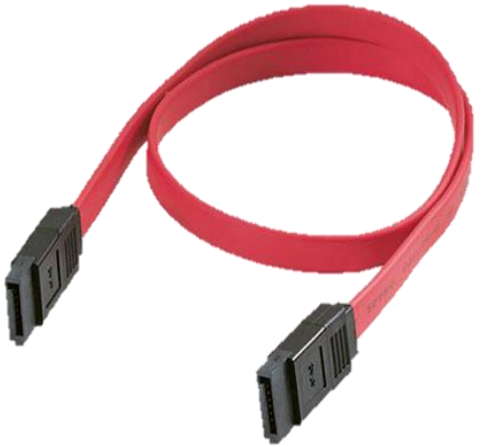
Objectives

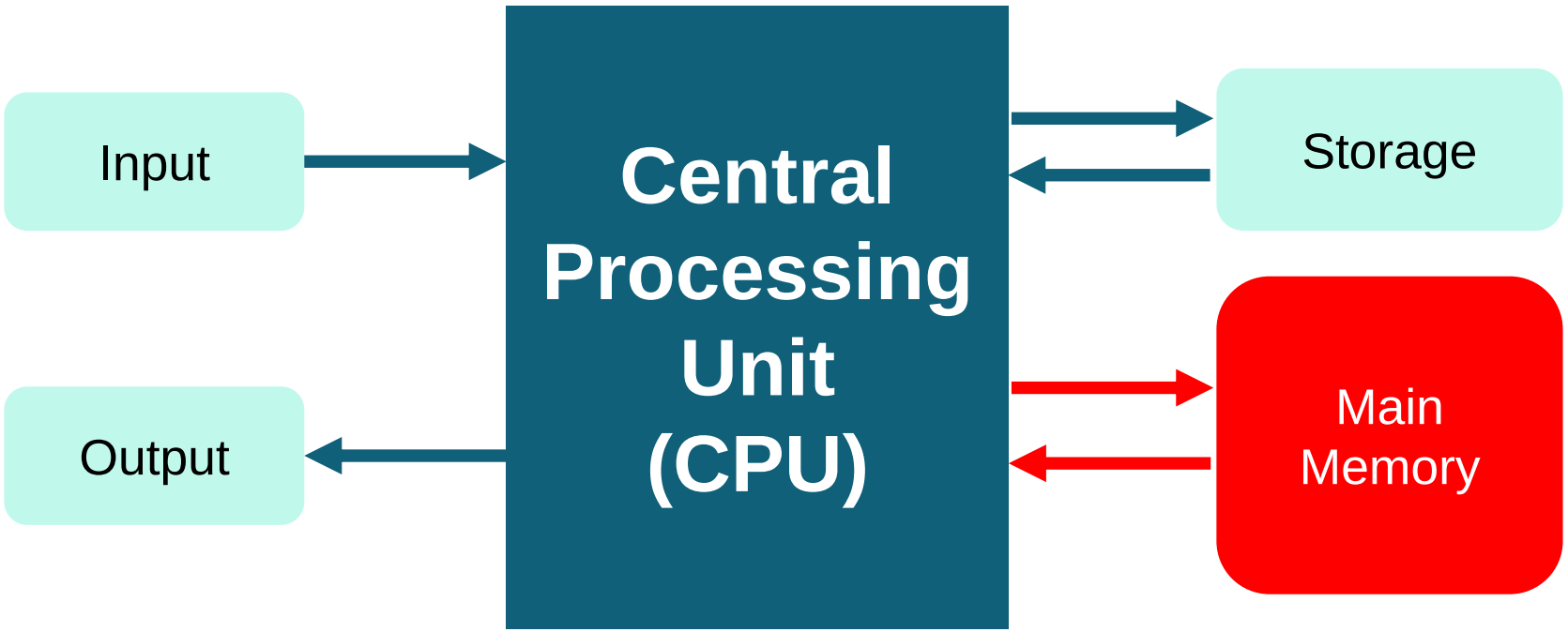
- Draw a block diagram of the main components of a computer: input, processor, output and storage
- Explain what RAM and ROM are used for
- Distinguish between main memory and permanent storage devices
- Name the three stages in the Fetch Execute Cycle
- Define Hz, MHz and GHz and state how these relate to the speed of the processor

What are these components?

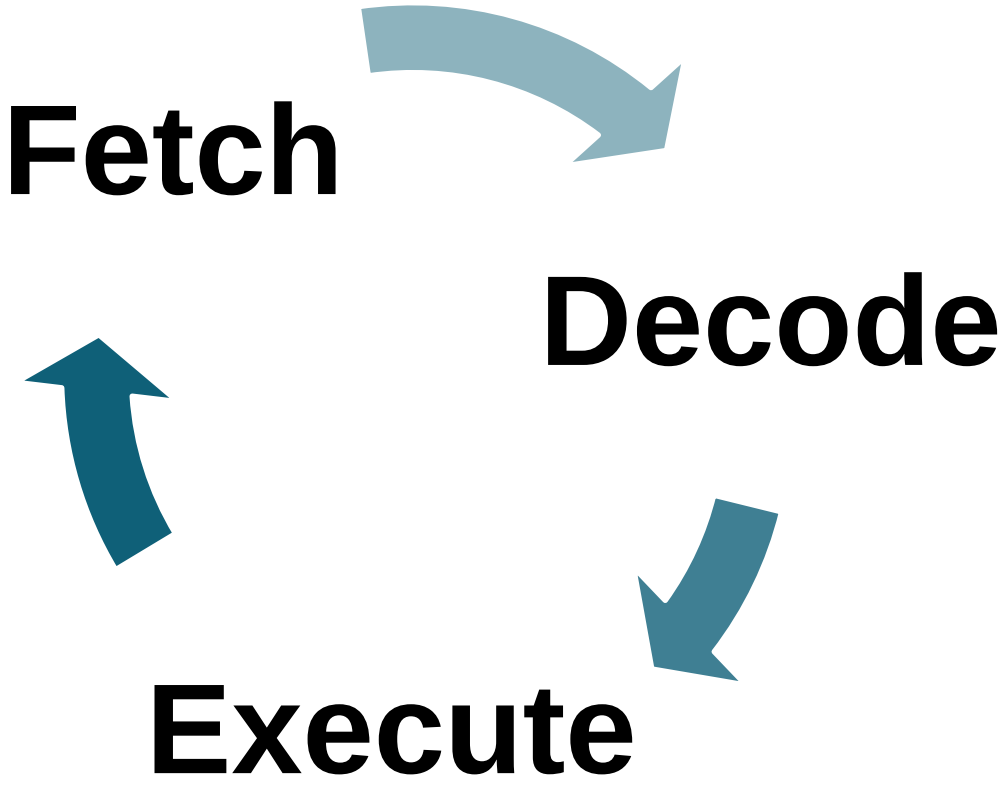




The components of a computer



Fetch – Decode – Execute cycle



Fetch – Decode – Execute cycle

- The computer has a list of instructions in memory to carry out:
- CPU **Fetches** top instruction from the list
- Instructions are passed to **Decoder** to interpret
- **Decoder** passes on the instruction
- Each instruction is **Executed** or carried out
- CPU **Fetches** top instruction from the list…

Activity

- **Pupil 1** – holds instructions in the order they are to be processed
- **Pupil 2** – fetches an instruction and gives to Pupil 3
- **Pupil 3** – decodes instruction and tells Pupil 4 what to do
- **Pupil 4** – executes the instruction

Processor speed

- One cycle per second = 1 Hertz (Hz) = 1 instruction carried out each second
- 1 Kilohertz (kHz) = 1000 cycles per second
- 1 Megahertz (MHz) = 1,000,000 cycles per second
- 1 Gigahertz (GHz) = 1,000,000,000 (1 Billion) cycles per second
  - How fast is your computer's processor?

Worksheet 2

- Use the Internet to find answers to the questions on the worksheet.

RAM vs ROM

- **RAM** stands for **Random Access Memory**
- **ROM** stands for **Read Only Memory**
- Some data needs to be permanently held in memory, even when the machine is switched off
  - What does a computer do when you turn it on?
  - Where are these instructions held?

Starting up a computer

- When you switch on a computer, a small program held in ROM called the **bootstrap loader** is automatically executed
- The program performs some self-tests, and loads the operating system into memory

Plenary

- What is memory?
- What is the difference between a hard disk and memory?
- What is a processor?

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