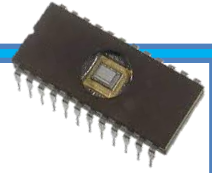# Year 8
Computer Science 8.1

Computer memory (**primary storage**) is a physical device capable of storing data temporarily or permanently.

ROM stands for Read Only Memory.
ROM is non-volatile. This means that without power, data is retained. (safe/stored)
ROM is read-only. This means that the data inside ROM is fixed. It can only be read, not written to.

ROM stores the instructions required to boot up the computer.
These instructions are called the BIOS.
(Basic Input Output System)
The BIOS checks the hardware is functioning and loads the operating system into RAM.

RAM stands for Random Access Memory
RAM is volatile. This means that without power, data is lost.
RAM is editable. This means that what is stored in RAM read from and written to.
e.g. data moved in and out.
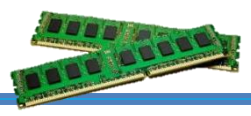
RAM stores the Operating System once the computer has booted up.
RAM also stores any program instructions and data that are open / running or in use.
any program/app that is open on your computer system is moved into RAM.

Secondary storage is non-volatile hardware which stores data when not in use.

Secondary storage characteristics

Capacity
How much data the storage device can store.

Read-Write Speeds
How fast data can be written to (saved) and read from (opened) the device

Portability
How easy the device is to carry around.

Durability
How resistant to damage the device is.

Reliability
How long the device will last. (life span)

Cost
How much money the device is to buy.

- **Optical** storage uses discs.
  - A CD (Compact disc) can hold up to 700Mb. (40p)
  - A DVD (Digital Versatile Disc) can hold 4.7 Gb.(80p)
  - A BLURAY disc can hold 25Gb. (£3)
- Optical discs use a laser to read and write data.
- The data is encoded as a series of bumps in a spiral track running from the inside to the outside of the disc.

✓	✗
✓ Portable	✗ Low capacity
✓ Waterproof	✗ Scratched easy
✓ Shockproof	✗ Very slow read-write speeds
✓ Cheap	

- Hard disk drives are the traditional internal storage in PCs and laptops.
- A hard disk drive is made up of magnetic metal disks which spin very fast (5,400 – 15,000 revolutions per minute)
- Data is stored magnetically in small areas called sectors.
- The read write head on a moving arm reads data from and writes data to the sectors on the disk.
- External hard disk drives are also available.

✓	£50 2TB	✗
✓ Reliable		✗ Not very durable.
✓ Cheap per Gb		
✓ High capacity		
✓ Fast read-write speeds.		

- Solid state memory is made of flash memory.
- Flash memory is non-volatile memory that can be electronically erased and reprogrammed.
- Flash memory uses transistors (switches) that can either be ON (1) or OFF (0).
- Data is stored as binary on flash memory.
- 8 GB of flash memory requires 32billion transistors.

✓	✗
✓ Fast	✗ Expensive for high capacity
✓ Durable	✗ Limited life span.
✓ Portable	
✓ Moderate capacity	

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What I need to know:

Question			
What is memory/ primary storage?			
What does RAM stand for? What does ROM stand for?			
What are the main differences between RAM and ROM?			
What is RAMs purpose in a computer system?			
What is ROMs purpose in a computer system?			
What is secondary storage?			
What are the 3 categories of secondary storage?			
Describe optical storage.			
How is data stored on optical storage?			
What are the advantages and disadvantages of optical storage?			
Describe magnetic storage.			
How is data stored on magnetic storage?			
What are the advantages and disadvantages of magnetic storage?			
Describe solid state storage.			
How is data stored on solid-state storage?			
What are the advantages and disadvantages of solid state storage?			
Define capacity. Which storage devices have the highest and lowest capacity?			
Define speed. Which storage devices have the highest and lowest speed?			
Define portability. Which storage devices are the most and least portable?			
Define durability. Which storage devices are the most and least durable?			
Define reliability. Which storage devices are the most and least reliable?			
Define cost. Which storage devices are the most and least expensive.			