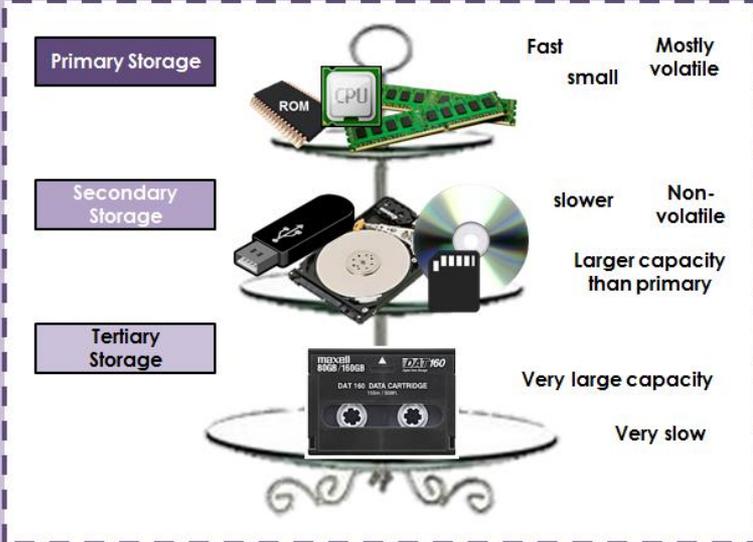


# GCSE Computer Science

## Topic 1.3 Storage



**Primary Storage** is memory that can be accessed directly by the CPU: Registers, Cache, RAM, ROM.

**Secondary storage** is non-volatile hardware where data is stored when it is NOT in use.

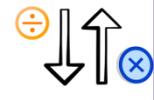
The CPU can't access secondary storage directly, so program data is swapped into primary storage when opened.

**Tertiary storage** is HIGH capacity, non-volatile hardware used for storing data long term (i.e. back up data).

**Bit, Nibble, Byte, Kilobyte, Megabyte, Gigabyte, Terabyte, Petabyte.**



1 Kilobyte =	1000 Bytes
1 Megabyte =	1000 Kilobytes
1 Gigabyte =	1000 Megabytes
1 Terabyte =	1000 Gigabytes



**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 stored as a series of pits (laser burns) in a spiral track running from the inside to the outside of the disc.



- ✓ Portable
- ✓ Waterproof
- ✓ Shockproof
- ✓ Cheap

- ✗ Low capacity
- ✗ Scratched easy
- ✗ Very slow read-write speeds

- 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.

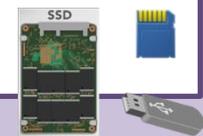
- ✓ Reliable
- ✓ Cheap
- ✓ High capacity
- ✓ Fast read-write speeds.

£50  
2TB

- ✗ Not very durable.



- 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
- ✓ Durable
- ✓ Portable
- ✓ Moderate capacity

- ✗ Expensive for high capacity
- ✗ Limited life span.



# GCSE Computer Science - Topic 1.3 Storage

## What I need to know:

Define primary storage
Define secondary storage
Define tertiary storage
Describe the differences between primary, secondary and tertiary storage.
Describe how data is stored /read on optical storage.
Explain the advantages and disadvantages of optical storage
Describe how data is stored/read on magnetic storage.
Explain the advantages and disadvantages of magnetic storage
Describe how data is stored/ read on solid state storage.
Explain the advantages and disadvantages of solid state storage.
Define capacity.
State which storage devices have the highest and lowest capacity.
Define read-write speed.
State which storage devices have the highest and lowest read-write speed.
Define portability.
State which storage devices are the most and least portable.
Define durability.
State which storage devices are the most and least durable.
Define reliability.
State which storage devices are the most and least reliable.
Define cost.
State which storage devices are the most and least expensive.
List the order of binary units from smallest to largest
Calculate how many Kb are in 6.7Mb. Show your working.
Calculate how much data 3 CD-ROMs can hold in MB. State how many Gb this is.
Calculate how many Kb are in 2Tb.

Jason has bought a new laptop.  
The laptop contains 3 GB RAM and 128 GB secondary storage.

a) Explain why secondary storage is needed in addition to RAM.

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[3]

Caley is getting a custom-built computer. She has a choice of two options for secondary storage: A 500 GB HDD (10 000 rpm) or a 128 GB SSD. For each storage option, give reasons why Caley may choose it over the other option.

500 GB HDD .....

.....

128 GB SSD .....

.....

[Total 4 marks]

William transfers the videos to a computer for editing.

(i) The computer has 1GB of storage free.

Calculate the number of videos that could be stored on the computer if each video was 100MB in size.

Show your working.

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[2]

Explain why a magnetic hard disk would be an unsuitable storage type for an action camera.

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[2]