

Memory and Storage

Scan this QR code to watch some YouTube videos about memory and storage

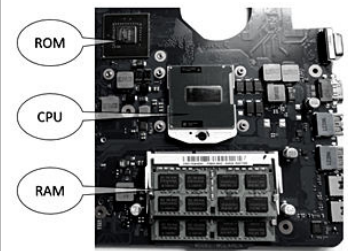


Read Only Memory (ROM)

This is stored in a chip directly connected to the CPU through dedicated busses and as the name suggests it can be read from but it cannot be written to; it is "read only".

Random Access Memory (RAM)

RAM holds the data and instructions which the computer is currently using and acts as a buffer to the secondary memory. It is **volatile** which means the data is lost when the power source is removed.



The purpose of ROM

The ROM chip contains all the instructions that are set up by the manufacturer when the chip is created and includes instructions for how to start the computer, access the built-in hardware such as the hard drive and load the operating system into RAM. This type of programming is called firmware as it is permanent software that is programmed into the circuitry of the ROM chip and cannot be altered easily. The contents of the ROM chip are not lost when power supply is switched off so is referred to as **non-volatile** memory.

The purpose of RAM

After the computer system has booted up, each application that the user opens (i.e. a word processor, e-mail program and web browser) is loaded into the RAM memory while it is running. If too many applications are opened at once this can cause the computer to slow down as the RAM memory has to start transferring some of the data back to the secondary memory to cope with the large amount of data it has to work with.

VIRTUAL MEMORY

There is a limited amount of space in RAM if it becomes full, the operating system has the opportunity of dedicating a small amount of the secondary storage to be used as RAM. This temporary space on the secondary storage that is working as a form of RAM is known as virtual memory.

SECONDARY STORAGE...

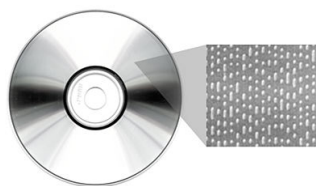
...is long term storage of data, files, software and the operating system.

In order to calculate how much space you need to dedicate for your secondary storage you need to know the size of the files you work with.

FLASH MEMORY

Flash memory is used for easy and fast information storage in computers, digital cameras and home video game consoles.

Optical storage



The surface of a CD is covered in microscopic dots. A laser would skim across the surface reading these. As the laser passes over, the pattern on the surface is picked up. If the laser hits a dot it is reflected differently to if there were no dot present.

Magnetic storage

Magnetic hard drives use silver coloured disks which are covered on both sides with a magnetic film divided into billions of tiny areas. Each one of those areas can be independently magnetized (to store a 1) or demagnetized (to store a 0). The read/write heads would flicker quickly over the surface as it reads and writes the data. Several platters would be installed in one hard drive to give greater storage capacity.



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Solid state storage

Solid-state secondary storage does not have any moving parts. It can be found in USB drives, SD card for camcorders and digital cameras and card drives (used for promotional purposes). Solid state secondary storage stores data using circuit chips. They are sometimes called **flash drives**.



	Magnetic	Optical	Solid State
Storage capacity	200 GB to 1 TB is common but can be much larger.	700 MB to 8.5 GB is common.	512 GB for a digital camera card but hard drives go up to 4 TB.
Advantages	Very fast access. Relatively cheap in terms of capacity per unit price. Very large capacity.	The data cannot be accidentally deleted or edited. Cheap. Portable.	Faster read/write times than either magnetic or optical storage devices. Silent as there are no moving parts. They are resistant to knocks.
Disadvantages	It is not very portable as it can be damaged easily if knocked or near magnetic fields.	You cannot edit or add to the data on a CD-ROM.	They are expensive compared to magnetic media in terms of data capacity per unit.

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Revise it

Highlight

Highlight key words (maximum of 2 per sentence) and then cover the page and try to write down all the key words you can remember. Go back and fill in all the ones you have missed.

Mind map

Using the handout, draw a mind map and include as many colours, images and diagrams as you can to illustrate it

Read through the handout, watch the videos and then select a revision technique from those described in this section, you can even do more than one if you want!



Post-it notes

Write a key word and the definition on a post-it note and stick them around your study area as a reminder of the terminology.

Record your notes

Re-write the handout in your own words and record yourself using your phone as you read your notes aloud.

BULLET POINTS

Write the main headings (leaving space between each) and then write bullet points of the main key points you need to remember under each heading. Re-read the handout and add any missed points to your list.

TEST YOURSELF

Cover your notes and the answer before you attempt to answer this practice exam question.

A laptop computer is supplied with 8 gigabytes of RAM.

- Briefly explain how a computer makes use of RAM [2 marks]
- Give a reason why a computer with 8 gigabytes of RAM could run faster than a computer with 2 gigabytes of RAM [2 marks]

Mark your answer

4 marks available with a maximum of 2 marks for each section.

Part a:

- A computer uses RAM to store programs (and data) ... [1 mark]
- ... while they are being currently used and executed by the CPU [1 mark]

Part b:

- There is more room in RAM which will allow all the programs and data currently being used to be stored there [1 mark]
- Less data would not need to be stored in virtual memory (in secondary storage) which is closer to the CPU so the journey is faster [1 mark]

