GCSE Computer Science
Topic 1.2 Memory

Computer memory is a physical device capable of storing information temporarily or permanently.

ROM stands for Read Only Memory.

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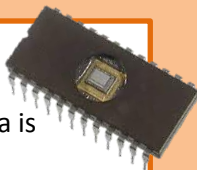
ROM is read-only. This means that the data inside ROM is fixed. It can only be read, not written to.

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.

Virtual memory is an area of the hard-drive used as temporary RAM, when RAM is full.

DISADVANTAGE

The read-write speeds of a hard drive is much slower than RAM. Therefore it takes longer to fetch data to the CPU to be processed.

There will be a significant drop in system performance if the system has to rely heavily on virtual memory.

If the OS is constantly swapping data between RAM and the hard drive, programs will run more SLOWLY. *This is called disc thrashing.*

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.

RAM is often removable. You can upgrade many computers by adding more RAM.

WHY?

If there are too many programs open at once or a particularly memory intensive program is open, there may not be enough space in RAM to hold all of the program data.

The OS swaps out some of the data from RAM to secondary storage (hard drive) to make room for the new data.
If there was no virtual memory the OS would have to say: *"Sorry, you can not load any more applications. Please close another application to load a new one."*

Usually the LEAST recently used data is swapped out to virtual memory. When the data is needed again it is transferred back to RAM to be accessed by the CPU.

The more RAM a computer system has, the less virtual memory will be needed. ***Adding more RAM can significantly improve the performance of a computer***.

What I need to know:

Define memory.
State what RAM stands for.
State what ROM stands for.
Describe the main differences between ROM and RAM.
Explain RAM's purpose in a computer system.
Explain ROM's purpose in a computer system.
Define virtual memory.
Explain why virtual memory is needed.
Describe the main disadvantage of using virtual memory.
Explain why adding more RAM could improve the performance of a computer system.

Describe the difference between volatile and non-volatile memory.
....
....
[Total 2 marks]

Explain why the BIOS is stored in ROM instead of RAM.
....
....
[2]

When many programs are running at once a computer may have to use virtual memory.

c) Explain how virtual memory works.

....
....
[2]

d) Explain **one** disadvantage of using virtual memory.

....
....
[2]

Fergus' computer has 8 GB of RAM. State the purpose of RAM in a computer.

....
....
[1 mark]

Jane is using her laptop to watch a movie she has downloaded in a multimedia player.

(a) What would be held in RAM when the movie is playing?

....
....
....
....
[3]

When a computer is switched on the BIOS runs. The BIOS is stored in the computer's ROM.

a) State **two** functions of the BIOS.

1 ....
2 ....
[2]