

PRIMARY MEMORY

Key Revision Facts: GCSE Computer Science

Random Access Memory (RAM)

Otherwise known as main memory, this is the component of a computer that stores programs currently being executed, or data needed for immediate use. RAM is volatile, meaning its contents are lost if the computer loses power.

Overview:

- Volatile
- Used to hold programs and data currently in use
- Used to hold the operating system when the computer is switched on

Read Only Memory (ROM)

Some parts of a computer's memory are marked 'read only', which means their contents cannot be changed or deleted. The contents of ROM are safe when a computer loses power (non-volatile). For these reasons, ROM is ideal for storing instructions that must not be lost or overwritten, such as the BIOS (Basic Input Output System) or the MAC address (in a network card).

Overview:

- Non-volatile
- Can be read from, but not written to
- ROM is used to hold basic computer hardware settings and, in the past, it held the BIOS to boot up the computer

Virtual memory

Virtual memory is a section of volatile memory created temporarily on the storage drive. It is created when a computer is running many processes at once and RAM is running low.

The operating system makes part of the storage drive available to use as RAM. Virtual memory is much slower than main memory because processing power is being taken up by moving data around, rather than just executing instructions. Latency is increased when the computer needs to use virtual memory because of swapping. Swapping is the process the OS uses to move data between RAM and virtual memory. The OS moves data from processes that are not immediately needed out of the RAM and stores them in virtual memory. It copies the data back into RAM when the process is needed again.

Cache

RAM is comparatively slow to access when compared to the speed at which registers work. So, to help speed up the processing time, cache memory is used to store instructions or data that are either frequently used, have recently been used or are about to be used. This means they don't have to be fetched directly from RAM.