Secondary Storage Revision – Magnetic Drives

Secondary storage is any **non-volatile** storage that can not be directly accessed by the CPU. This includes hard drives, CDs and DVDs and memory sticks. These can be inside the computer (such as a hard drive) or they can be removable.

Non-volatile means that the data remains stored when the computer is turned off.

Magnetic storage includes hard disk drives (HDDs), floppy disks and magnetic tape. Each of these use data that is stored magnetically and read using a magnet.

Q. Explain how a magnetic disk drive (HDD) operates (4 marks):

- a HDD can contain multiple platters (disks) – these are round, metal sheets;
- each platter is divided into sectors;
- the disks spin at a very high speed – this means that the read/write heads can get to all parts of the platter;
- read/write heads move across the disk to read and write data;
- there is one read/write head for each side of a platter i.e. two heads per platter;
- data is stored on the disk by magnetising microscopic regions of it;
- magnetic charge can be positive or negative – representing 1s and 0s;
- data is organised in **concentric rings** called tracks (not like on a vinyl record or optical disk where it's one groove that runs from outside to inside – these are a series of independent rings);
- there is a small circuit board on the drive that controls the reading and writing of data;
- data is transferred from and to the disk via a cable.

The idea of a set of concentric rings is a good way to you're your understanding

A little more detail:

The read/write head contains a magnet. This is used to tell what the magnetic charge of each part of the platter is.

Advantages of Magnetic Disks:

- established technology – desktop computers are set up to include them as standard;
- cheap;
- large capacity – easily 1TB+;
- can be moved between machines;
- tape is reliable as a backup for long-term storage.

This understanding might come into a question where they provide two different computer setups and ask you to compare them

Backup tape is used to backup servers. This is a cheap and quick way to back up lots of data

Disadvantages of Magnetic Disks:

- drives have moving parts so are more likely to fail;
- slow to read/write data;
- larger and heavier than SSD drives – less suitable for mobile devices;
- noisy;
- movement creates more heat – which need cooling;
- use more energy than SSD – problem for mobile devices.

Generally we're comparing HDD with SSD here