Reading a Disk Sector (1)

CPU initiates a disk read by writing a command, logical block number, and destination memory address to a port (address) associated with disk controller.
Reading a Disk Sector (3)

When the DMA transfer completes, the disk controller notifies the CPU with an interrupt (i.e., asserts a special “interrupt” pin on the CPU)
Reading a Disk Sector (2)

Disk controller reads the sector and performs a direct memory access (DMA) transfer into main memory.

CPU chip

register file

ALU

bus interface

main memory

I/O bus

USB controller

mouse keyboard

graphics adapter

monitor
disk controller
disk

disk controller
Compare the hard disk with floppy disk

1-Hard disks *store much more data* per square inch of recording surface.

2-The hard disks to *have more tracks* per radial inch and to write more bits per inch along each track.

3-Hard disks can transfer data faster than floppy disks.

4-Access times are also faster for hard disks than floppy disks.

5-Floppy disks are *transportable* while the hard disk is *not transportable*. 
Hard disks disadvantages

1- They tend to be noisier than floppy disk drives.

2- More important is the sensitivity of hard disks. Head crashes can be caused by a bent disk, dust or cigarette smoke inside the drive, or a good thump to the side of the drive.

3- The hard disk drives cost much higher than floppy disk drives.
Optical disks

- Compact Disc (CD)
- Digital Versatile Disc (DVD)
- Blu-ray Disc (BD)
The Compact Disc

1- Have 700 MB capacity.
2- low cost.
3- good reliability.
Thus CD ROMs suffer from the same long access time as floppy disks because of the high rotational latency.
The recordable surface of a CD-ROM is divided into the following three sections:-
1-The lead-in.
2-The data area.
3-The lead-out.
The Digital Versatile Disc
(Digital Video Disc)

An optical digital disc for storing movies and data
Features of DVD

1-The DVD uses the same diameter platters as a CD (120mm/4.75" diameter)

2-Holds 4.7GB rather than 700MB

3-DVDs can be recorded on both sides as well as in dual layers in each side for a total capacity of 17 GB.

4-The DVD player is backwardly compatible
Blu-ray Disc

1- Blu-ray technology uses a blue-violet laser.
2- Blu-ray products can easily be made backwards compatible.
3- Storing large amount of data more than five times the storage capacity of traditional DVDs.
4- The disc have the same size as a CD and DVD.