Study on disc storage devices :

Hard Disks

• Hard drives used in today's microcomputers have their origin in the hard drives of early mainframe computers of the 1970s.

• These drives consisted of large platters or disks that were much larger and thicker than phonograph records. Several platters were stacked together with enough room to allow read/write heads to move back and forth between the platters.
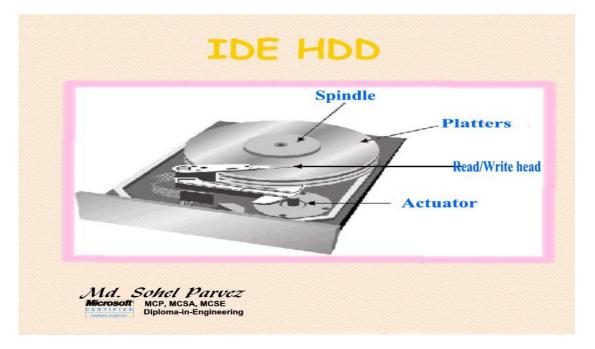
• A drive requires a controller board filled with ROM programming to instruct the heads how to move across the platters and write and read data. All heads moved in unison while the platters spun at a fast speed.

• Application programmers of the 1970s wrote their programs so that data was spaced evenly over the disks, so that the heads moved as little as possible while reading or writing a file.

• In today's systems, there are several layers of software between data stored on a drive or disk and the application software that might be reading its data from or writing its data to the drive. Thus, application programmers do not need to concern themselves with how data is stored on a hard drive.

• Hard drive structure and function have not changed, however. Modern hard drives have two or more platters that are stacked together and spin in unison. Read/write heads are controlled by an actuator and move in unison back and forth across the disk surfaces as the disks rotate on a spindle.

• There are several types of hard drives for PCs, all using a magnetic medium; the data on all of them is stored in tracks and sectors. Just as with disks, data files are addressed on the hard drive in clusters made up of one or more sectors.
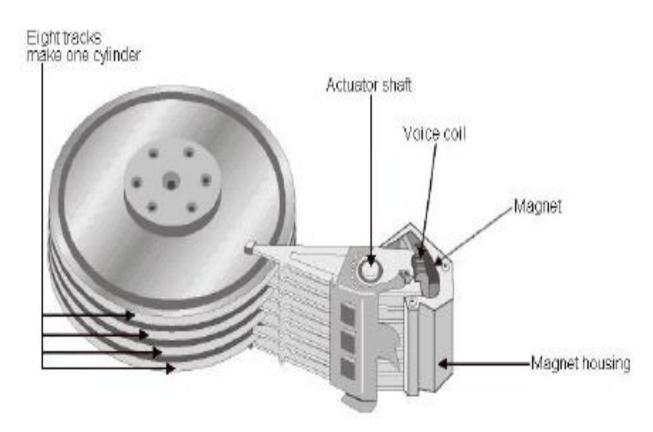

• The figure above shows a hard drive with four platters. All eight sides of these four platters are used to store data, although on some hard drives the

top side of the first platter just holds information used to track the data and manage the disk.

• Each side or surface of one platter has a **head**, the electromagnetic device used to read data from or write data to the surface. The drive in the above figure has eight heads.

• Each side of each platter is divided into tracks and sectors. A cylinder is comprised of a stack of identical tracks from each surface. For example, if you took the outermost track from each surface and stacked them one on top of each other that would be a cylinder.

• The number of tracks in a cylinder depends on the number of platters on the drive. If a disk has 300 tracks per surface, then it also has that same number of cylinders.

• Data is written to the drive beginning at the outermost track, just as with disks. The entire first cylinder is filled before the read/write heads move inward and begin filling the second cylinder.

• For older hard drives, the tracks closer to the center of a platter are smaller, but have to store the same amount of data as the larger tracks toward the outside of a platter. At some point as the heads move toward the center of the drive and the tracks get smaller and smaller, the read/write heads have to adjust the way they write data so that sectors store a consistent number of bytes, even if they are different physical sizes.

• Two methods can be used to adjust for the smaller tracks: write pre-compensation and reduced write current.