

Answer on Question #50721, Programming, Other

Describe how data is stored on a magnetic disk

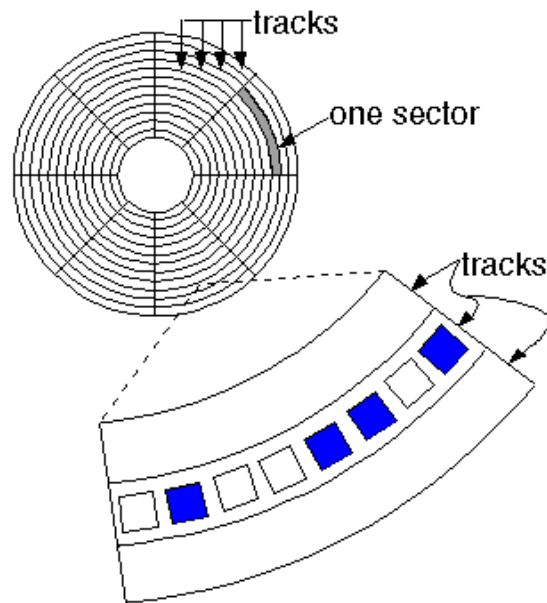
Solution:

The most common forms of permanent data storage used in modern computers – hard disks and archival tapes – represent data as magnetized “bars” on the surface of a thin medium, where writing and reading of data requires mechanical movement of the medium.

Diskettes and hard disks are magnetic media; that is, they are based on a technology of representing data as magnetized spots on the disk with a magnetized spot representing a 1 bit and the absence of such a spot representing a 0 bit.

The disk surface is divided into concentric tracks (circles within circles). The thinner the tracks, the more storage. The data bits are recorded as tiny magnetic spots on the tracks. The smaller the spot, the more bits per inch and the greater the storage.

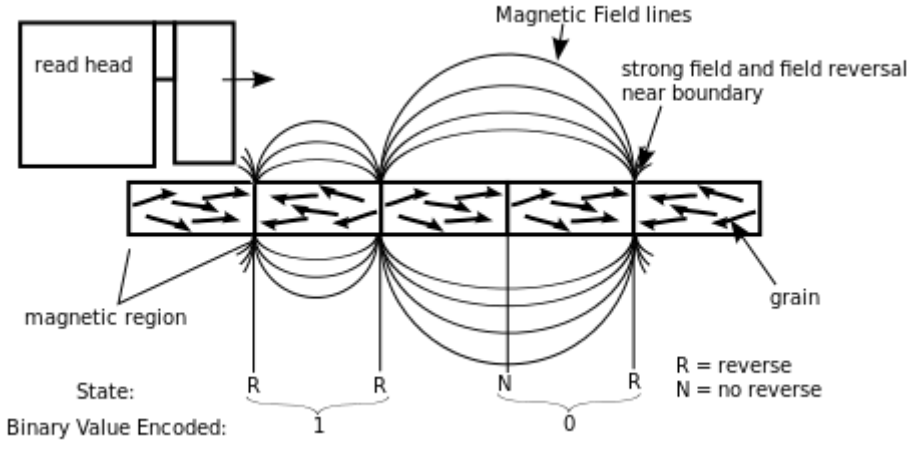
Tracks are further divided into sectors, which hold a block of data that is read or written at one time; for example, READ SECTOR 782, WRITE SECTOR 5448. In order to update the disk, one or more sectors are read into the computer, changed and written back to disk. The operating system figures out how to fit data into these fixed spaces.



Representation of digital information needs two states only. Thus, only two directions of magnetization are used, SN or NS in the direction of motion. The medium comprises a backing material which has a thin coating that adopts the magnetization that is applied to it. To write bits, the medium is moved past a recording head that is a tiny electromagnet. By changing the direction of current in the magnet’s wiring the medium is magnetized in one direction or the other along the track (sometimes, particularly with video-based devices, the head is moved as well so it is relative motion.) The track width is usually wider than the displacement representing a bit so the magnetized area is a bar, but, unlike a bar magnet, magnetized across the short axis.

An HDD records data by magnetizing a thin film of ferromagnetic material on a disk. Sequential changes in the direction of magnetization represent binary data bits. The data is read from the disk by detecting the transitions in magnetization. User data is encoded using an

encoding scheme, such as run-length limited encoding, which determines how the data is represented by the magnetic transitions.



Reading data from the disk means converting the magnetized data to electrical impulses that can be sent to the processor. Writing data to disk is the opposite: sending electrical impulses from the processor to be converted to magnetized spots on the disk.

Answer:

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