



# COMPUTER SYSTEMS & PROGRAMMING

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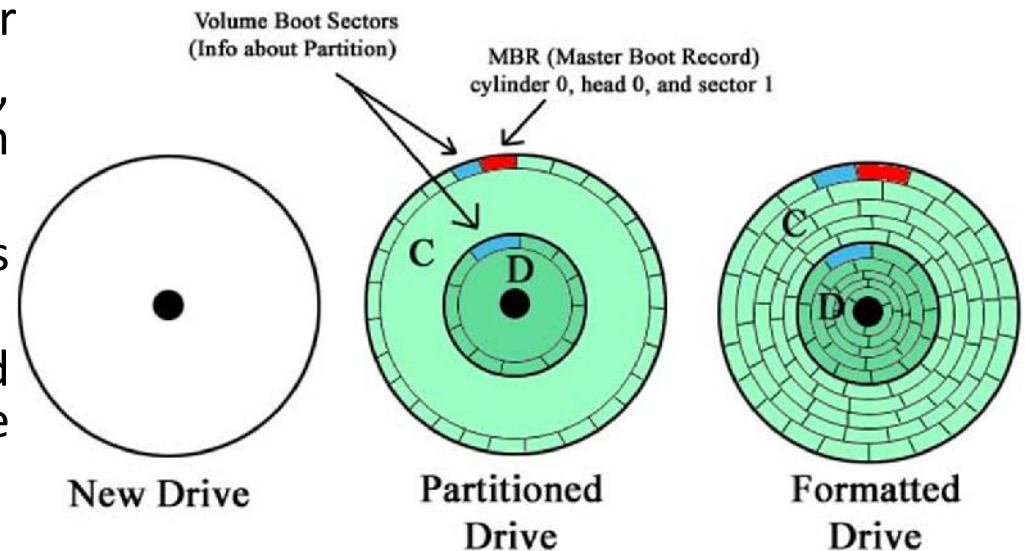
## Hard Disk Drive

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# Introduction

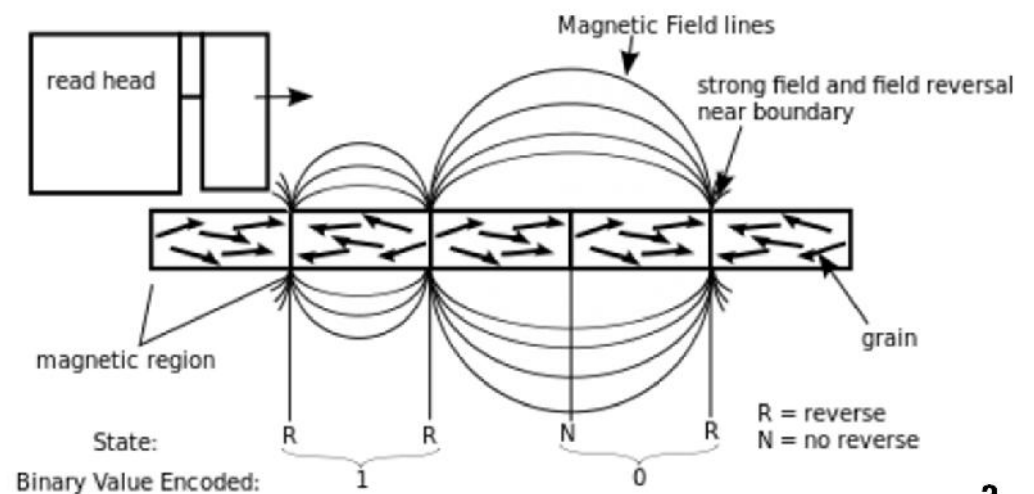
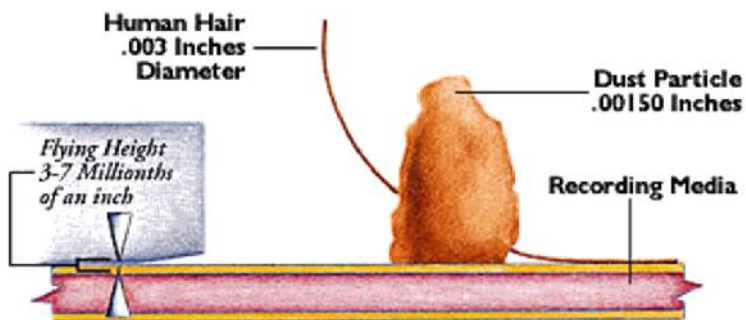
- Based on magnetic phenomenon, introduced by IBM in 1956
- variant:
  - Semiconductor Storage Device (SSD) based on flash memory technology
- Responsible for bulk storage, non-volatile
- Hard disk is responsible for storage and Hard drive is responsible for performing operations
- Platters are responsible to carry data in magnetized form represented in cylinder, track, sector and cluster
- 1<sup>st</sup> record of HDD contains MBR, which tracks operating system on the HDD
- Starting record contains information about the partition
- Files are stored on records and OS is responsible to manage those using File Allocation Table





# Hard Disk Drive

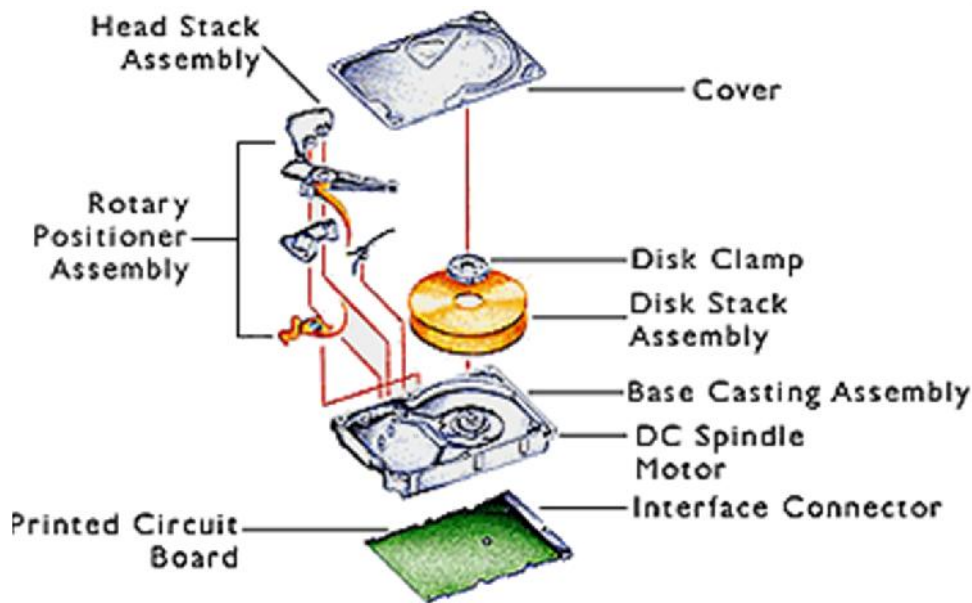
- Platters are made of aluminum + glass coated with chromium, magnetic layer (platinum and nickel) and final tough coating with carbon
- The head is used as magnetic flux sensor in reading operation and becomes magnet to magnetize a particular cluster
- If difference in magnetic flux is sensed then 1 is considered else, 0
- Head doesn't touches the platter, there is gap of 10nm
- If head touches, head crush will occur
- Head crush will result all or some of data loss
- Bad sectors occurs due to head crush or most frequent use of cluster





# Components of HDD

- HDD is tightly sealed so that air or particles cannot enter
- Internal HDD can be connected via Advanced Technology Attachment (ATA), Integrated Drive Electronics (IDE) or Serial ATA (SATA) interface
- External HDD can be connected via USB or eSATA interface
- IDE HDDs can be connected in:
  - Master-slave fashion
  - Chip-select fashion





# Factors of HDD

- HDD significance can be considered by several factors including:
  - Latency – waiting time to read/write by head
  - Seek Time – waiting time for head to be placed at proper location
  - Storage – Amount of data to be stored
  - RPM – Rotations Per Minute, describes speed of read/write operation



# Questions

