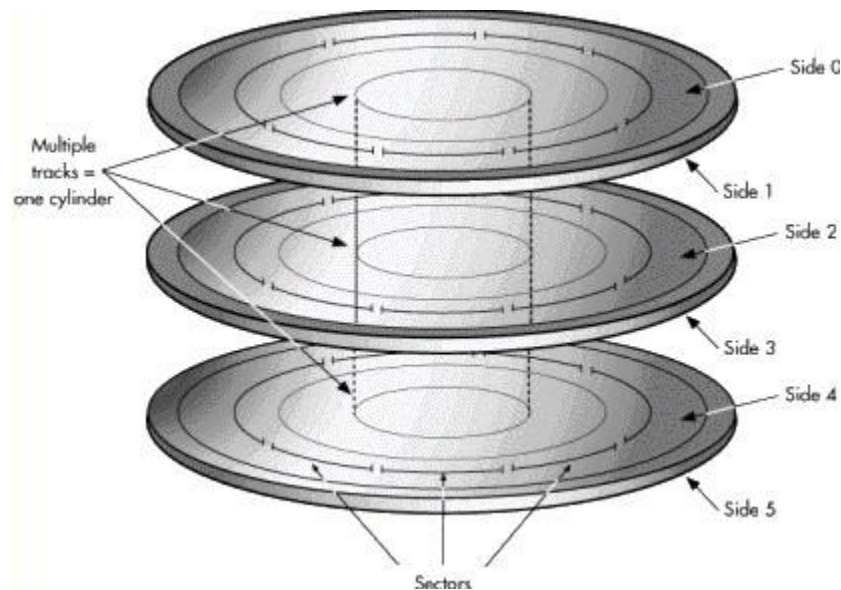Topics:
-External storage(Disks)
-Files&Records

External storage(Disk)
- CPU cache(L1/L2) register
- Memory
- SSD
- Disk
- Tape: back up

Spindle,
Cylinder,
platter, track,
page/block,
Disk arm, head

Side 0
Side 1
Side 2
Side 3
Side 4
Side 5

Multiple tracks = one cylinder

Sectors

Disk I/O time - fread()
Random IO: Time seek + Time rotation + Time transfer
Sequential IO:
Maximize sequential IO:
    increase your "block" size a block consisting of multiple pages
    extent-based file system

File&Record
1. how to store the record in files?

Random Heap files
Ordered Sequential files
Hashed files