Operating Systems W12L2 - File Systems II

Class	Operating Systems
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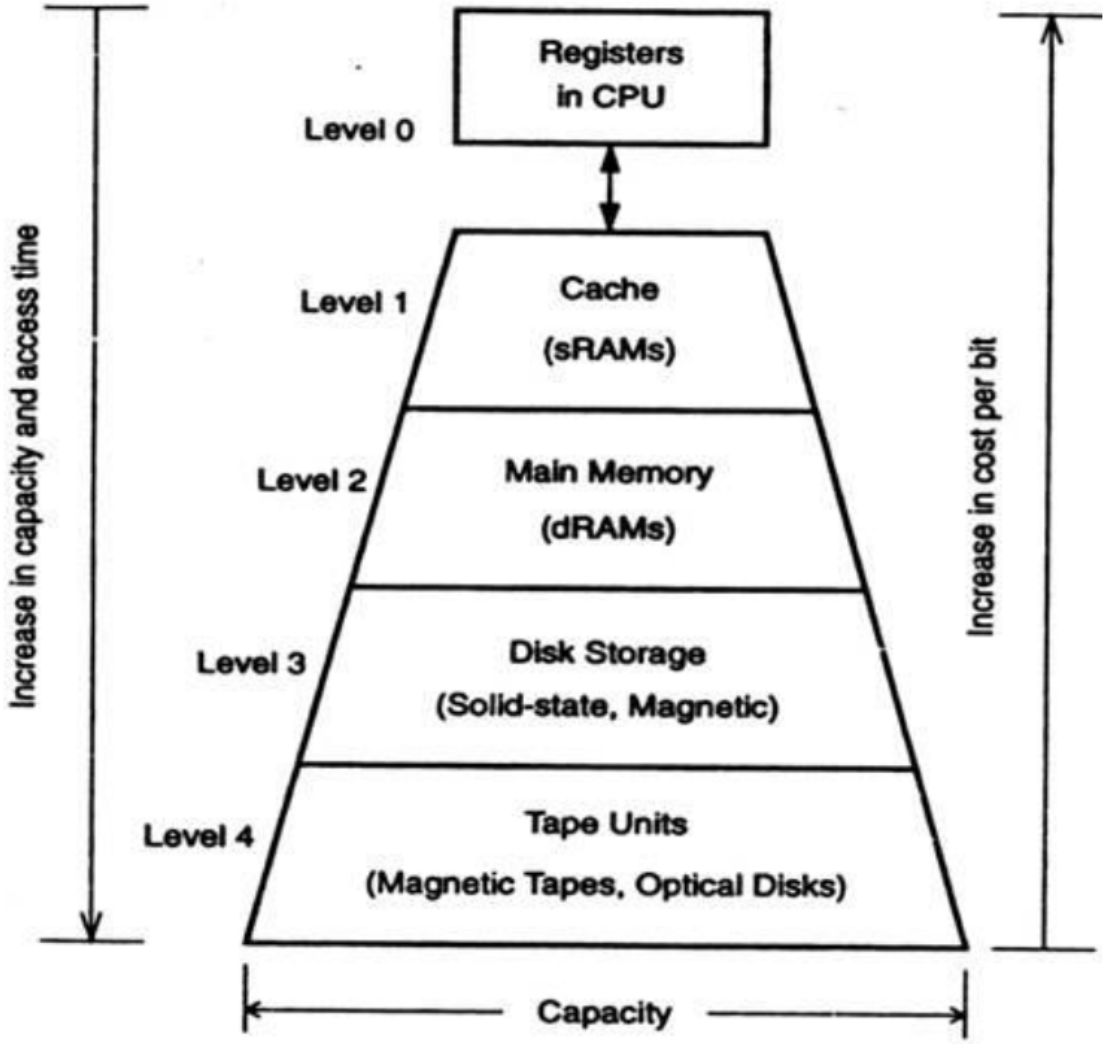
Materials	10 - File Systems II.pdf
Reviewed	☐
Type	Lecture

Initial Discussion

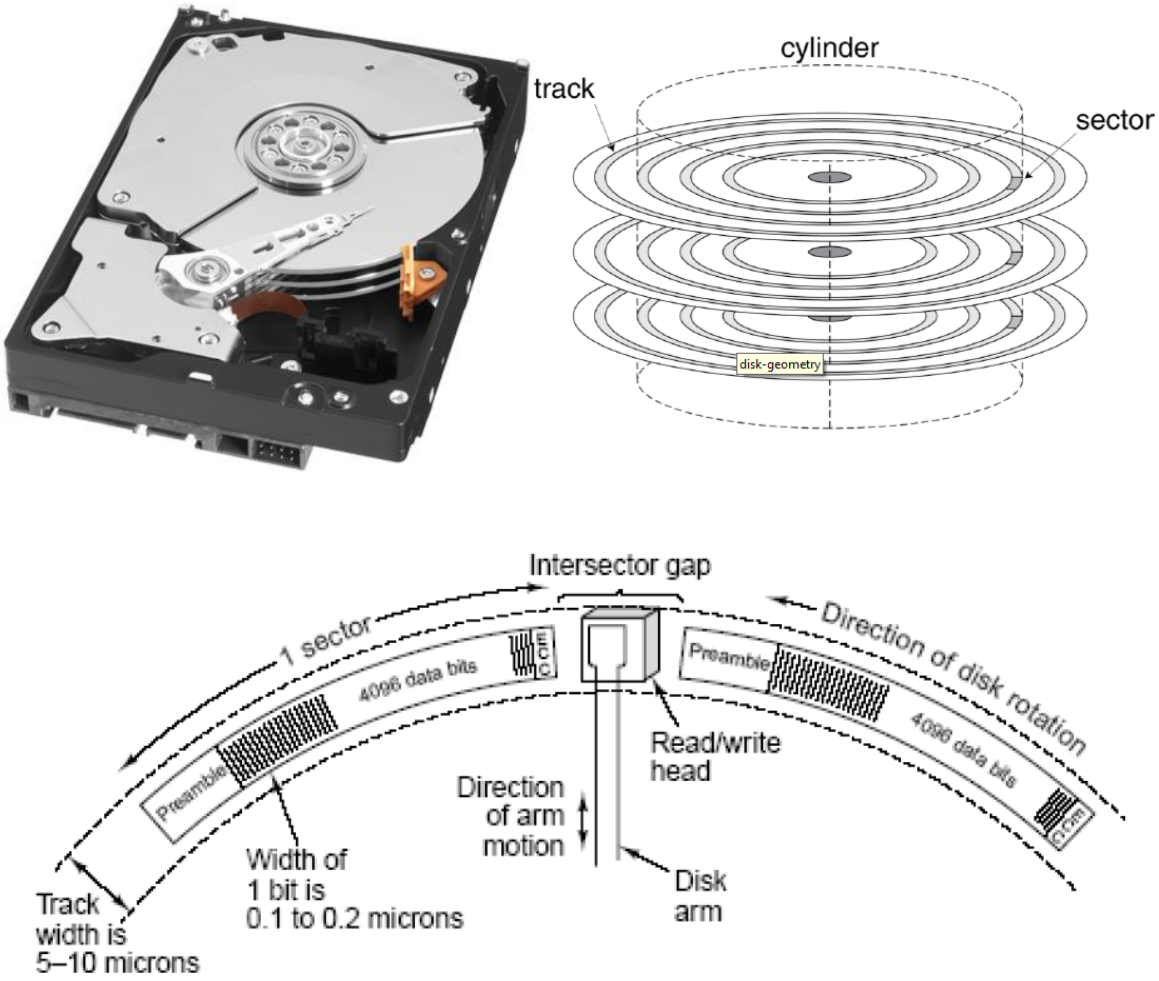
▼ Storage Capacity Hierarchy

Disk storage is abstracted by OS as *files*



- Going over hard disks today first, SSDs will come later
- Mechanical movements automatically means slower speeds
- Lots of hard drive anatomy

▼ Surface is a group of tracks, track is a group of sectors, sector is a group of bytes, and cylinder is several tracks on corresponding surfaces

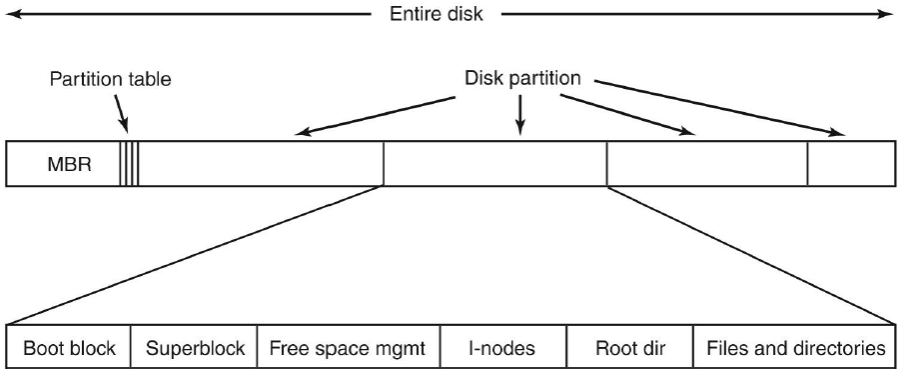


- Building a reliable program is difficult and part of what defines being "good" at CS (versus, say, programming in C)

MBR and Partition Table

- Starting and ending addresses of each partition
- BIOS executes MBR which finds active partition and executes *boot block*

▼ Diagram of disks and partitions



- A *superblock* records characteristics about file system — Its size is fixed for this since OS needs to depend on it

Implementing File Systems

▼ #1 - Contiguous Allocation

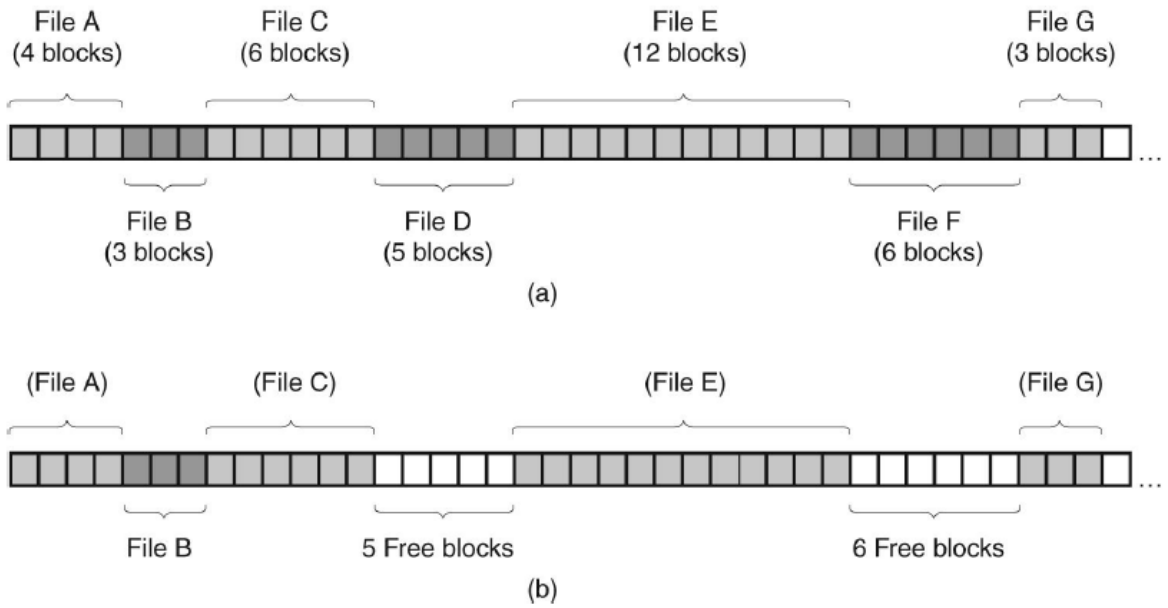
Each file is stored as a contiguous run of disk blocks

Advantages include...

- Simple implementation
- Great read speed

Disadvantages include...

- Disk could become fragmented
- Need to know size of file when created



After files D and F were deleted

▼ #2 - LinkedList Allocation

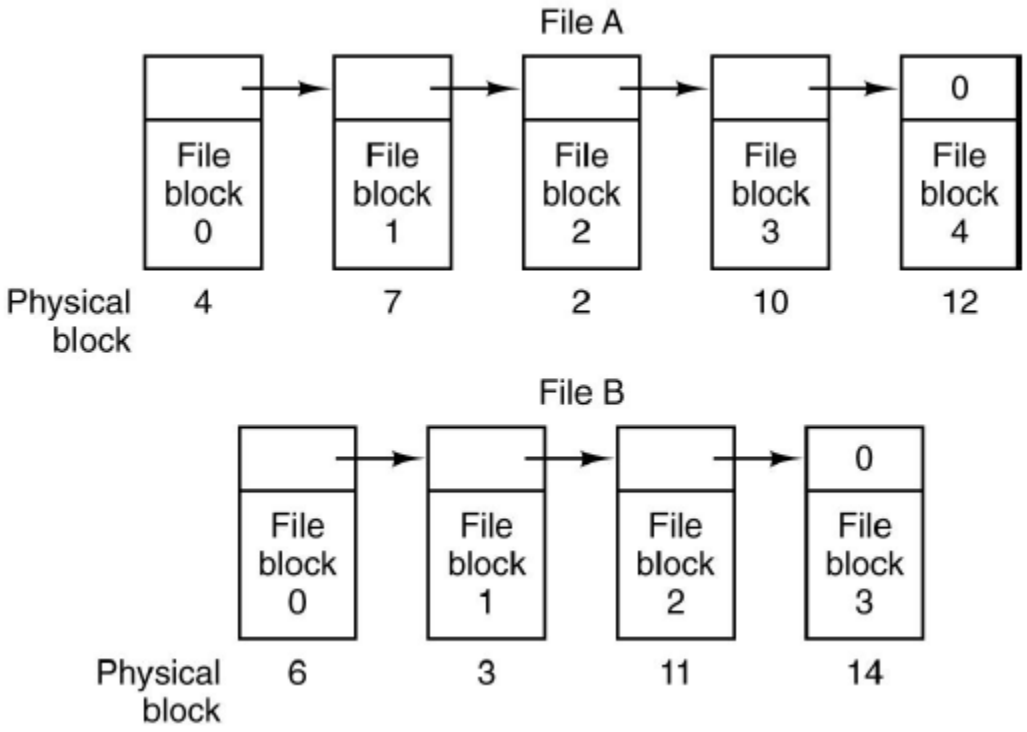
The first 'word' of each block is a pointer to the next

Advantages include...

- No (external) fragentation because empty blocks can be added to the next
- Directory only needs to store disk address of first block

Disadvantages include...

- Random access is extremely slow
- Data storage is no longer a power of two since pointer takes up a few bytes (Some binary numbers won't map to anything as a result)



> These will continue next week