Storage Management,

Storage Management

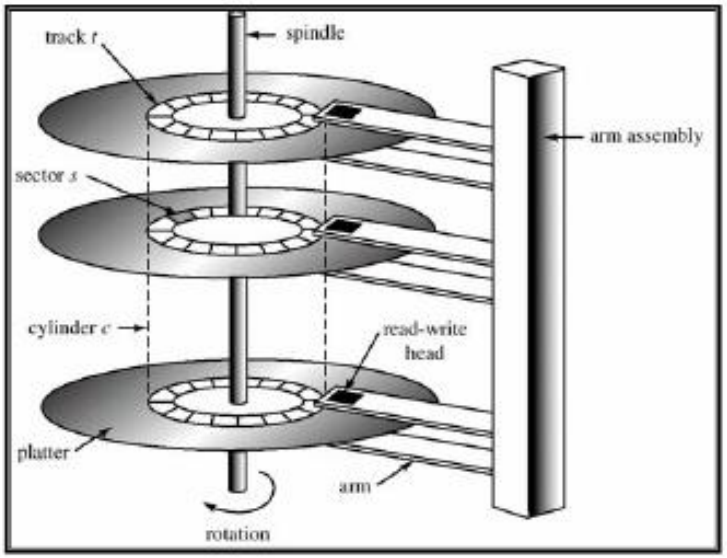
- OS provides uniform, logical view of information storage
  - Abstracts physical properties to logical storage unit - **file**
  - Each medium is controlled by device (i.e., disk drive, tape drive)
    - Varying properties include access speed, capacity, data-transfer rate, access method (sequential or random)
- File-System management
  - Files usually organized into directories
  - Access control on most systems to determine who can access what
  - OS activities include
    - Creating and deleting files and directories
    - Primitives to manipulate files and dirs
    - Mapping files onto secondary storage
    - Backup files onto stable (non-volatile) storage media

Mass-Storage Management

- Main memory – only large storage media that the CPU can access directly
- Why using disks?
  - Store data that does not fit in main memory
  - Store data that must be kept for a “long” period of time
- Proper management is of central importance
- Entire speed of computer operation hinges on disk subsystem and its algorithms
- OS activities
  - Free-space management
  - Storage allocation
  - Disk scheduling

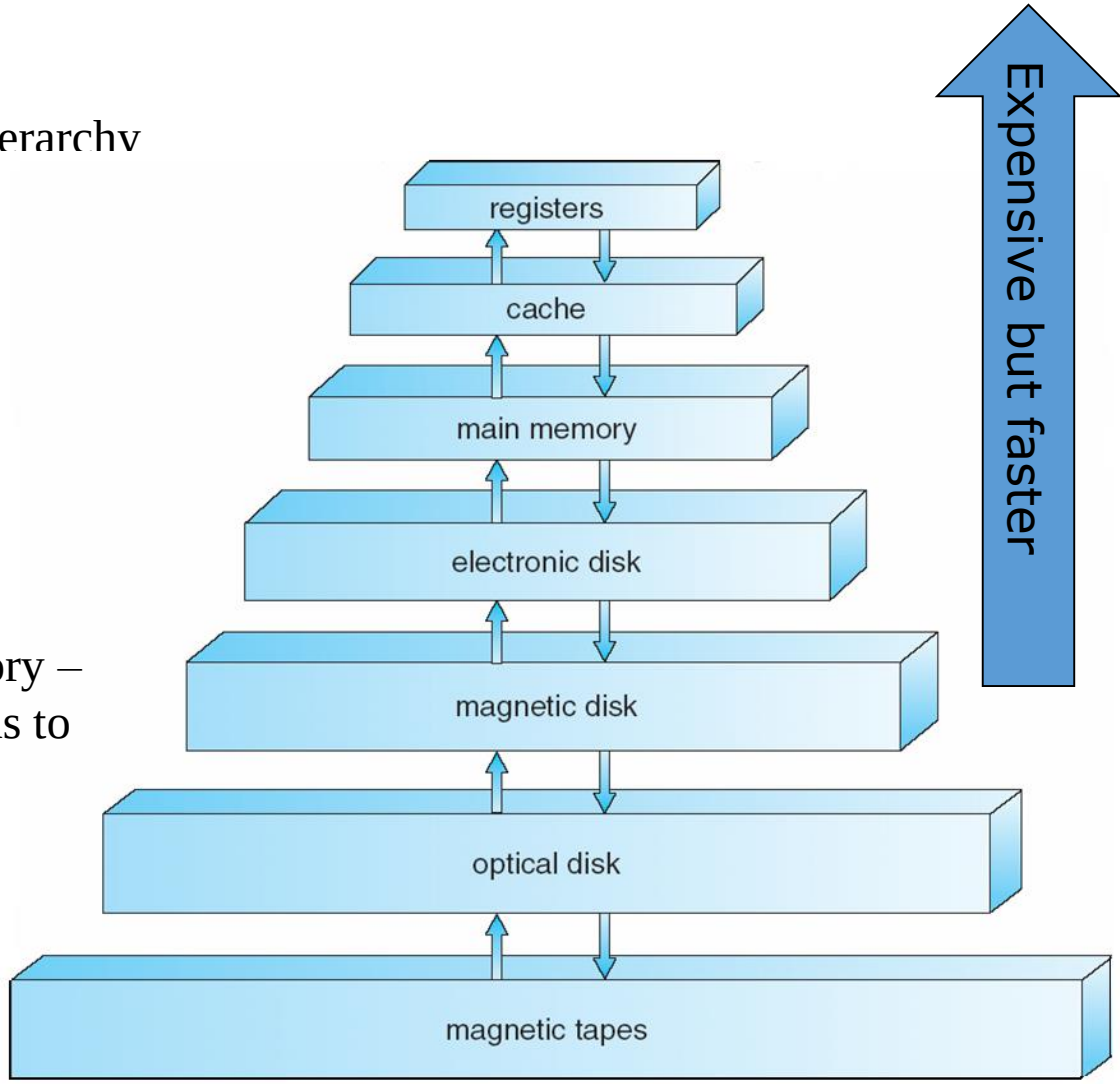
torage Structure

- Secondary storage:
  - Extension of main memory
  - Provides large nonvolatile storage capacity
- Magnetic disks – rigid metal or glass platters covered with magnetic recording material
  - Disk surface is logically divided into **tracks**, which are subdivided into **sectors**
  - The **disk controller** determines the logical interaction between the device and the computer



Storage Hierarchy

- Storage systems organized in hierarchy
  - Speed
  - Cost
  - Volatility



It takes some time (several CPU cycles) to read/write to main memory – in the meantime the processor needs to stall because it doesn't have the necessary data

Example

- Which of the following instructions should be privileged?
  - b. Read the clock.
  - c. Clear memory.
  - d. Issue a trap instruction.
  - e. Turn off interrupts.
  - f. Modify entries in device-status table.
  - g. Switch from user to kernel mode.
  - h. Access I/O device.

Answer

- Which of the following instructions should be privileged?

  b. Read the clock.

  c. Clear memory.

  d. Issue a trap instruction.

  e. Turn off interrupts.

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  g. Switch from user to kernel mode.

  h. Access I/O device.