

# External Storage

- Primary Storage : Main Memory (RAM).
- Secondary Storage: Peripheral Devices
  - Disk Drives
  - Tape Drives
- Secondary storage is CHEAP.
- Secondary storage is SLOW, about 250,000 times slower. (i.e. can do 250,000 CPU instructions in one I/O time).
- Primary storage is volatile.
- Secondary storage is permanent.

# Golden Rule of File Processing

**Minimize the number of disk accesses!!**

- Arrange information so that you get what you want with few disk accesses.
- Arrange information so you minimize future disk accesses.
- An organization for data on disk is often called a file structure.
- Disk based space/time tradeoff: Compress information to save time by reducing disk accesses.

# Disk Drives

- Track - a circle around a disk that holds information.
- Sector - arc portion of a track.
- Interleaving factor - Physical distance between logically adjacent sectors on a track, to allow for processing of sector data.
- Locality of Reference - If a record is read from a disk, the next request is likely to come from near the same place in the file.
- Cluster - smallest unit of allocation; usually several sectors.
- Extent - group of physically contiguous clusters
- Internal Fragmentation - wasted space within a sector if the record size is not the sector size.