|  |  |  |
| --- | --- | --- |
| Primary Storage | Secondary Storage | Tertiary Storage |
| RAM or Cache   * Volatile * Fast | Hard disk   * Magnetic tape, optical storage * Non-volatile * Slow | Hard disk   * Offline storage * Big servers |
| Currently used data | Main database | Historic data |

# File organizational method

* Heap Files
  + Search algorithm is **Linear Complexity**
  + Advantageous when getting **all the data at once**
* Sorted Files
  + Can implement Binary search
    - Log(n)
  + Maintaining Sorted order is difficult when doing **Insert, Remove or update**
  + Best if records must be retrieved **in some order, or range**
* Indexed
  + No form of structured order but access is easily looked by **index pointers**
    - Ordered Index
      * When search keys are stored in some order
    - Hash Index
      * Search keys are distributed uniformly across “buckets” using **hash function**

# Downside of Indexing

* Additional I/O to manage
* Index must be updated when table is modified
  + This can be costly, dependant on Index structure