Topic: File Organization for DBMS

Assigned reading: Section 8.4 from Raghu Ramakrishnan's book

File organization refers to how records are ordered in a file. Simplest file organization is a heap file where records are stored in a random order. Do not confuse heap file organization with the heap data structure. Both of them are completely different concepts and have no relation with each other.

Next is the sorted file organization where records are ordered based on a particular attribute. A DBMS can use the external merge sort algorithm discussed in the previous note to maintain this sorted order. Both heap and sorted file organizations assume that there is no index built over the data.

If we build an index over the data, it can be of two types: clustered or unclustered. An index is clustered if the data file is sorted based on the same attribute as the index attribute. For example, we can have a data file sorted on attribute 'M'. Now if we build a B+ tree index on this data file with attribute 'M' then it is a clustered index. Note that a data file can have only one clustered index.

An index is unclustered if the order of records in the file does not correspond to the index attribute. For example, we can have a data file sorted on attribute 'M'. Now if we build a B+ tree index on this data file with any other attribute then it will be an unclustered index. Hash index is generally unclustered as data is not kept sorted based on hash value.

We are going to study five file organizations and five operations on each one of them. Please refer to Figure 8.4 from Ramakrishnan's book. For the sake of simplicity, assume that all records are of the same size. The most important observation from the Figure 8.4 is that no single file organization is the best. Depending on the nature of operations that we expect to perform on our data, we have to choose an appropriate file organization.