

Department of UIC

Database Management Systems

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FILE ORGANIZATION

File organization in DBMS

- File organization means arranging/managing the records in a file.
- It establish the relationship of the key of the record to the physical location of that record in the computer file.
- A file is a complete set of records for a specific application or purpose.

Advantages of File Organization

- Fast access to single record or collection of related records.
- Easy record adding/update/removal, without disrupting.
- Storage efficiency.
- Lesser Redundancy(duplicasy)

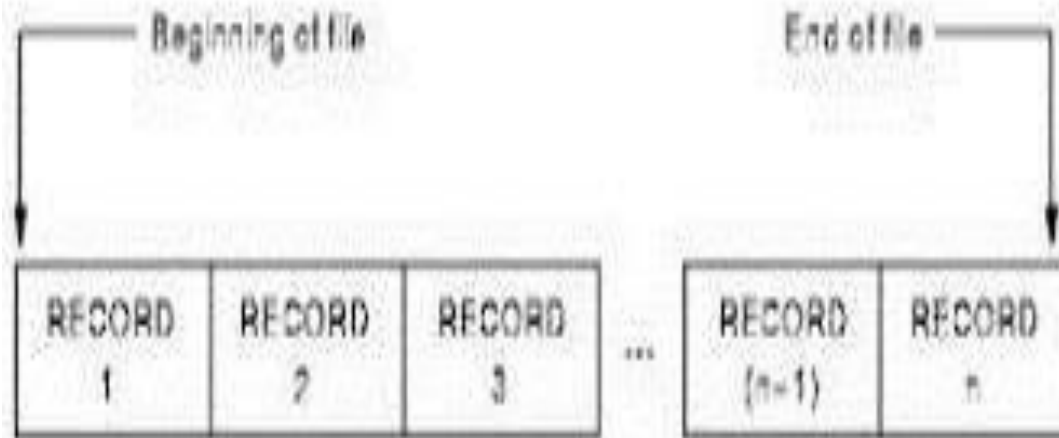
Types of File Organization

- Sequential File
- Indexed Sequential
- Direct file / Hash file

The Sequential Files

- A sequential file maintains the records in the logical sequence of its primary key values.
- A sequential file can be stored on old devices like magnetic tape that allow sequential access.
- In this organization records are written consecutively when the file is created. Records in a sequential file can be stored in *two ways*.
 - **Pile file (Heap File):** Records are placed one after another as they arrive (no sorting of any kind).
 - **Sorted file:** Records are placed in ascending or descending values of the primary key.

The Sequential File



Operations on Sequential file

- **Inserting a record**
- **Deleting a record**
- **modifying a record**

Advantages of Sequential File Organization

- It is fast and efficient when dealing with large volumes of data that need to be processed periodically
- Simple file design
- Very efficient when most of the records must be processed e.g. Payroll
- Very efficient if the data has a natural order
- Can be stored on inexpensive devices like magnetic tape

Disadvantages of Sequential File Organization

- Requires that all new transactions be sorted into the proper sequence for sequential access processing.
- Locating, storing, modifying, deleting, or adding records in the file require rearranging the file.
- This method is too slow to handle applications requiring immediate updation.

Direct File Organization

1. Records are read directly from or written on to the file.
2. The records are stored at known address.
3. Address is calculated by applying a mathematical function to the key field.
4. Such file are also known as hashing organization /hashed files/random files.
5. Files in his type are stored in direct access storage devices such as magnetic disk, using an identifying key.
6. The computer can directly locate the key to find the desired record without having to search through any other record first.
7. These are very useful in online system where the response and updation are fast.

Advantages of Direct File Organization

1. Records can be immediately accessed for updation.
2. Several files can be simultaneously updated during transaction processing.
3. Transaction need not be sorted.
4. Existing records can be amended or modified.
5. Most suitable for interactive online applications.—Very easy to handle random enquiries.

Disadvantages of Direct File Organization

1. Risk of loss of accuracy and breach of security.
2. Special backup and reconstruction procedures must be established.
3. Expensive hardware and software are required.
4. High complexity in programming.

Indexed File Organization

1. An indexed file contains records ordered by a *record key*.
2. Each record contains a field that contains the record key.
3. The record key uniquely identifies the record and determines the sequence in which it is accessed with respect to other records.
4. A record key for a record might be, for example, an employee number or an invoice number.
5. An indexed file can also use *alternate indexes*, that is, record keys that let you access the file using a different logical arrangement of the records.
6. *For example*, you could access the file through employee department rather than through employee number.
7. The record transmission (access) modes allowed for indexed files are sequential, random, or dynamic. When indexed files are read or written sequentially, the sequence is that of the key values.

Advantages of Indexed File Organization

1. Quite easy to process,
2. With proper selection of a key field, records in a large file can be searched and accessed in very quickly.

Disadvantages Of Indexed Files

1. Extra data structures have to be maintained .
2. The indexed files have to be reorganized from time to time to get rid of deleted records and improve performance that gets gradually decreased with addition of new records.

Reference Books



- Fundamentals of Database Systems by R.Elmasri and S.B.Navathe, 3rd Edition, Pearson Education, New Delhi.
- An Introduction to Database Systems by C.J. Date, 7th Edition, Pearson Education, New Delhi.
- A Guide to the SQL Standard, Data, C. and Darwen, H.3rd Edition, Reading, Addison-Wesley Publications, New Delhi.
- Introduction to Database Management system by Bipin Desai, Galgotia Pub, New Delhi.
- Database System Concepts by A. Silberschatz, H.F.Korth and S.Sudarshan, 3rd Edition, McGraw-Hill, International Edition.
- SQL / PL/SQL, by Ivan Bayross, BPB Publications.

THANK YOU