

CLASS NOTES	
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Subject: Informatics Practices	Topic: Chapter 8: Database Concept

File Based System:

A file based system or a flat file or a flat database stores all the data in one big file. A file-based system:

- stores all the data in a one big file;
- there is no structure associated with the data;
- common data may be repeated a number of times.

A database may be defined as a collection of interrelated data stored together to serve multiple applications.

Limitations of the file-based system:

- (i) **Difficult in Access:** As there is no structure in file-based system, all the data are stored simply in file, to access such type of data, specific application program are required.
- (ii) **Data Redundancy:** Repeated data takes much time to typed in over and over, which again takes a lot of time.
- (iii) **Data inconsistency:** Multiple copies of the same data when they do not match , it is called data inconsistency.
- (iv) **Data isolation:** When data of a file cannot be mapped with the related data of other file , it is called data isolation.
- (v) **Data Dependence:** This is the close relationship between data stored in files and the software program that update and maintain those files.
- (vi) **Data sharing/security:** There is no provision in file-based system to have control over the access of data. All the data is available to all types of users.

Database Management System (DBMS): A DBMS is a software system designed to maintain a database and provide data management services.

Advantages of Databases:

- (i) Database reduce the data redundancy.
- (ii) Database can control data inconsistency.
- (iii) Database facilitate sharing of data.
- (iv) Databases enforces standards.
- (v) Database can ensure data security.
- (vi) Database ensures data independence.

Converting File system data to Database management system:

In order to convert from a flat file-system to a relation database, keep in mind that:

1. Relational databases do not store all the data in the same table.
2. Repeated data is moved into its own table.
3. Separated tables this way is linked through a common field in both the tables. This way of linking two tables is called relationship.

DBMS Key Concept:

1. Database schema:

Database schema means the structure or the design of the database. It represents database tables, table structures along with inter-table relationships. Schema is also called visual or logical architecture of a database.

2. Database instance:

A database instance is a snapshot of a database that exist at a particular time.

3. Metadata:

Metadata refers to data about data. In a database context, the data in tables have certain properties and attributes i.e type, length, description of the columns that allows the DBMS to process the data meaningfully.

4. Data Constraints:

Data stored in a database must fulfil some rules and conditions so that only validated and required data is stored. These rules and conditions of data are defined via data constraints.

5. Query:

A query is a type of command that retrieves data from a database stored on a server. A database query is usually written in SQL – a specific type of language created specially for query.

6. Data manipulation:

Data manipulation is the result of action queries discussed as part of queries. Data manipulation takes place when the data in tables is inserted, updated or deleted.

7. Database Engine:

A database engine is the underlying software component that a dbms uses to create , read, update and delete data from a database. It has two major components: The storage engine and the query processor. The storage engine writes data to and retrieve data from memory disks. The query processor accepts, parses and executes SQL command.

Components of a Database Table:

1. Byte: A byte is a group of eight bits and is used to store a character.
2. Data Item: A data item is the smallest unit of named data. It may consist of any number of bits or bytes.
3. Record: A record is a named collection of data items which represents a complete unit of information.
4. Table: A table is named collection of all occurrences of a given type of logical record.

Key in a database:

Primary key : A primary key is a set of one or more attributes that can uniquely identify tuples. The Primary key is non – redundant, it does not have a duplicate value in the same relation. It does not accepts null value.

Candidate key:

All attributes combinations inside a relation that can serve as primary key are called candidate keys as they are the candidate for the primary key position.

Alternate key:

A candidate key that is not a primary key is known as alternate key.

Foreign key:

A foreign key is a non-key attribute whose value is derived from primary key of another table. The table in which this foreign key attribute exist is called a foreign table, detail table or child table and the table that defines primary key is called primary table, master table or parent table.

MySQL:

Brief history of MySQL:

The chief inventor of MySQL was Michael Widenius. MySQL has been named after Monty's daughter My. The logo of MySQL , the dolphin, is named as 'Sakila'.

MySQL was created and supported by MySQL AB, a company based in Sweden. This company is now subsidiary of Sun Microsystems, which holds the copyright to most of codebase. On April 20th, 2009 Oracle corp., which develops and sell the proprietary of oracle database, announced a deal to acquire Sun Microsystems.

Some key features of MySQL are:

1. **Speed** : If the server hardware is optimal, MySQL runs very fast.
2. **Ease of use:** MySQL is high performance, relatively simple database system. From the beginning MySQL has typically configured, monitored and managed from the command line.
3. **Cost:** MySQL is available free of cost. It is an Open-Source database. MySQL is a part of LAMP(Linux/Apache/MySQL/Python).
4. **Query language support:** MySQL understands standard SQL.
5. **Portability:** MySQL provides portability as it has been tested with a broad range of different compilers and can work on many different platforms.
6. **Data Types:** MySQL provides many datatypes to support different types of data.
7. **Security:** MySQL offers a privilege and password system that is very flexible and secure and that allows host-based verification.
8. **Scalability and limits:** MySQL can handle large database. Some real-life database contains 50 million records, some have up to 60000 tables.
9. **Connectivity:** Clients can connect to MySQL server using several protocols.
10. **Localization:** The server can provide error messages to clients in many languages.