SQL (Structured Query Language)

SQL is a standard Database language which is used to create, maintain and retrieve data in relational database (RDBMS).

i.e., SQL is standard language to communicate with RDBMS.

RDBMS like -> MS Access, SQL Server, MySQL, Oracle, Sybase, Postgres uses SQL.

Databases that are not relational (or do not use fixed structure tables to store data) do not use SQL. Such databases are called NO SQL databases.

E.g.: MongoDB, DynamoDB, Cassandra etc.

SQL is case insensitive. But it is a recommended practice to use keywords (like SELECT, UPDATE, CREATE, etc) in capital letters and use user defined things (liked table name, column name, etc) in small letters.

Comments in SQL

We can write comments in SQL using “–” (double hyphen) at the beginning of any line.

RDBMS (Relational Database Management System)

RDBMS is a database system that stores and retrieves data in tabular format organized in form of rows and columns.

RDBMS maintains data integrity by simulating following features:

1. Entity Integrity

No two records of database table can be completely duplicate.

1. Referential Integrity

Only the rows of those tables can be deleted which are not used by other tables. Otherwise, it may lead to data inconsistency.

1. Domain Integrity

The columns of tables are enclosed with some structured limits, based on default values, type of data or ranges.

1. User Defined Integrity

Rules defined by users based on confidentiality and access.

Characteristics of RDBMS:

1. Data must be stored or retrieved in tabular form (Tables or Relations) in DB file i.e., should be organized in form of rows and columns.
2. Each row of table is called **Record/Tuple**
3. Each column of table is called **Attribute/Field.**
4. The number of Attribute in relation is called **Degree** of relation.
5. The number of tuples in relation is called **Cardinality** of relation.
6. No two rows of database table can be same. Data duplicity is avoided by using candidate key. Candidate key is a minimum set of attributes required to identify each record uniquely.
7. Tables are related to each other by foreign keys.

Advantages of RDBMS

1. Easy to manage: Each table can be independently manipulated without affecting other tables.
2. Secure: Access of data can be limited.
3. Users: RDBMS supports client-side architecture storing multiple users together and facilitates storage and retrieval of large amount of data.
4. Easy Data Handling
   1. Data fetching is faster because of relational architecture.
   2. Data redundancy/ duplicity is avoided due to keys, indexes and normalization principles.
   3. Data consistency is ensured because RDBMS is based on ACID properties for data transactions.
5. Fault Tolerance: Replication of database provides simultaneous access and helps the system recover in disasters.

Disadvantages of RDBMS

1. High costs and extensive hardware and software support
2. Scalability: in case of addition more data, servers along with additional power and memory are required.
3. Structured Limits: the fields of RDBMS is enclosed within various limits, which may lead to loss of data.
4. Complexity: Huge data creates complexity in understanding of relations and may lower down the performance.

The queries deal with relational database is divided into following types:

1. DDL (Data Definition Language)
2. DML (Data Manipulation Language)
3. DQL (Data Query Language)

DDL:

The queries which define the structure of the database/Relation/Tables.

E.g.: Create, Alter, Add Column, Drop etc.

DML:

The queries which manipulate data in relations.

E.g.: Insert, Update, Delete etc.

DQL:

The queries which used select/retrieve data from the relations.

E.g.: Select