Overview of RDBMS and SQL

Database Management System (DBMS)

- A **database** is a collection of related data organized in a way that data can be easily accessed ,managed and updated
- To overcome the limitations of the traditional file processing system,DBMS was created
- A general-purpose Database Management System(DBMS) is a software system intended to organize, store and retrieve large amounts of data
- Some examples for database management systems are MySql,Oracle,Microsoft SQL server,MS Foxpro,SQLite, FileMaker Pro
- The primary goal of a Database Management System(DBMS) is to provide a convenient and efficient way to store and retrieve database information
- Relational DBMS (RDBMS) is the most successfully used Data Base Management System

Relational Database Management System

- In relational model, data is stored in database objects called **tables**
- The table is a collection of related data entities and it consists of **rows** and **columns**
- A **tuple**, also called a row of data, is each individual entry or record that exists in a table
- Every table is broken up into smaller entities called **fields**. A field is a column in a table that is designed to maintain specific information about every record in the table
- A **column** is a vertical entity in a table that contains all information associated with a specific field in a table

ID	NAME	AGE
101	Rahul	23
102	Neha	25
103	Saurav	21

Figure 1a) Sample Column of Table Employee

ID	NAME	AGE
101	Rahul	23
102	Neha	25
103	Saurav	21

Figure 1b) Sample Row of Table Employee

ID	NAME	AGE
101	Rahul	23
102	Neha	25
103	Saurav	21

Figure 1c) Sample fields of Table Employee

Structured Query Language

Structured Query Language or SQL is a standard querying language for organizing, managing, and retrieving data stored in relational database. SQL is pronounced as 'sequel' which was previously known as 'Structured English Query Language '

SQL is mainly used to perform the below tasks

- Querying data
- Inserting, updating, and deleting rows in a table
- Creating, replacing, altering, and dropping objects
- Controlling access to the database and its objects
- Guaranteeing database consistency and integrity

SQL Statements can be broadly classified into below categories:

- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- Transaction Control Language (TCL)
- Data Control Language (DCL)
- Data Query Language (DQL) or Data Retrieval Language (DRL) (SELECT statements which in most cases are also referred to as DML statement)

Constraints

Constraints are the rules enforced on data columns of table. These are used to limit the type of data that can go into a table.

Constraints help to ensure accuracy and reliability of the data in the database.

Following are commonly used constraints available in SQL :

- **PRIMARY Key :** Uniquely identifies each row/record in a database table
- **FOREIGN Key (Referential Constraint):** Foreign key field of one table references values from primary key field of other table
- **NOT NULL :** Ensures that a column cannot have NULL value
- **DEFAULT :** Provides a default value for a column when none is specified
- **UNIQUE :** Ensures that all values in a column are different
- **CHECK :** The CHECK constraint ensures that all values in a column satisfy certain conditions

Keys in DBMS

In addition to primary and foreign keys, below shown are the commonly used keys in database.

- **Composite Key :** A primary key that is made up of more than one attribute is known as a composite key

- **Surrogate Key :** Surrogate keys are auto generated keys that have no business meaning and are solely used to identify a record in the table. Such keys are either database generated (like using sequence in Oracle) or system generated