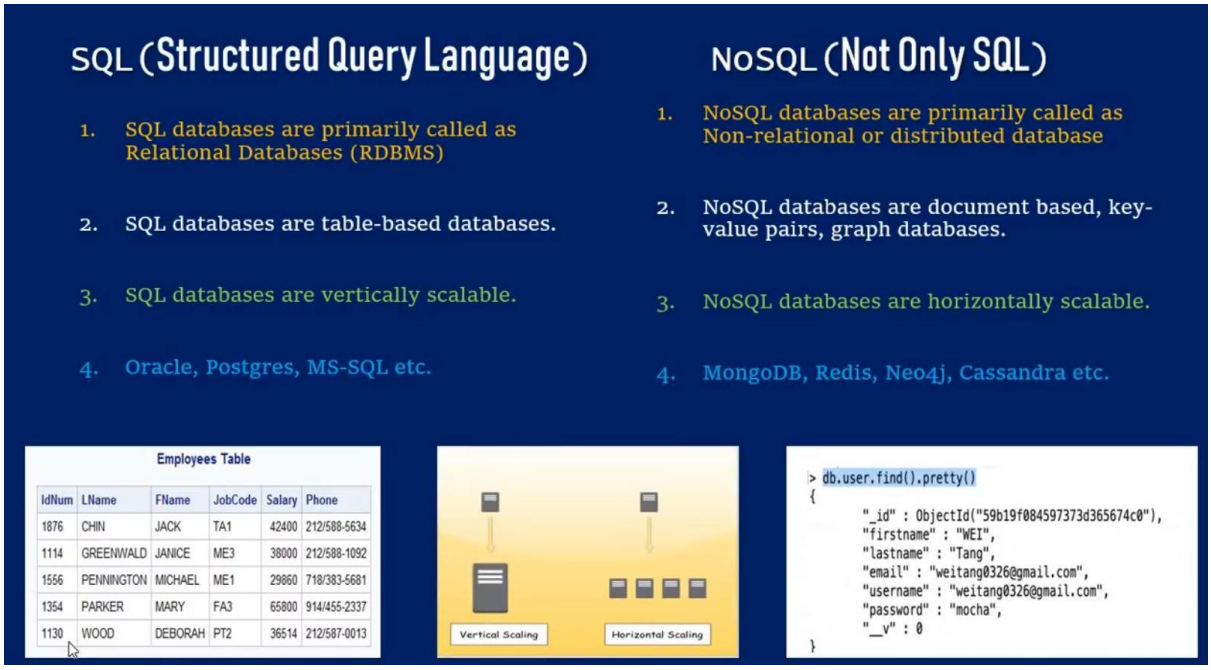
# Structured Query Language

## Introduction

SQL is a domain-specific language used in programming and designed for managing data held in a relational database management system, or for stream processing in a relational data stream management system.

## What Can SQL do?

- SQL can execute queries against a database
- SQL can retrieve data from a database
- SQL can insert records in a database
- SQL can update records in a database
- SQL can delete records from a database
- SQL can create new databases
- SQL can create new tables in a database
- SQL can create stored procedures in a database
- SQL can create views in a database
- SQL can set permissions on tables, procedures, and views




## Some of The Most Important SQL Commands

- **SELECT** - extracts data from a database
- **UPDATE** - updates data in a database
- **DELETE** - deletes data from a database
- **INSERT INTO** - inserts new data into a database
- **CREATE DATABASE** - creates a new database
- **ALTER DATABASE** - modifies a database
- **CREATE TABLE** - creates a new table
- **ALTER TABLE** - modifies a table
- **DROP TABLE** - deletes a table
- **CREATE INDEX** - creates an index (search key)
- **DROP INDEX** - deletes an index

## SQL Constraints

- SQL constraints are used to specify rules for the data in a table.
- Constraints are used to limit the type of data that can go into a table. This ensures the accuracy and reliability of the data in the table. If there is any violation between the constraint and the data action, the action is aborted.
- Constraints can be column level or table level. Column level constraints apply to a column, and table level constraints apply to the whole table.

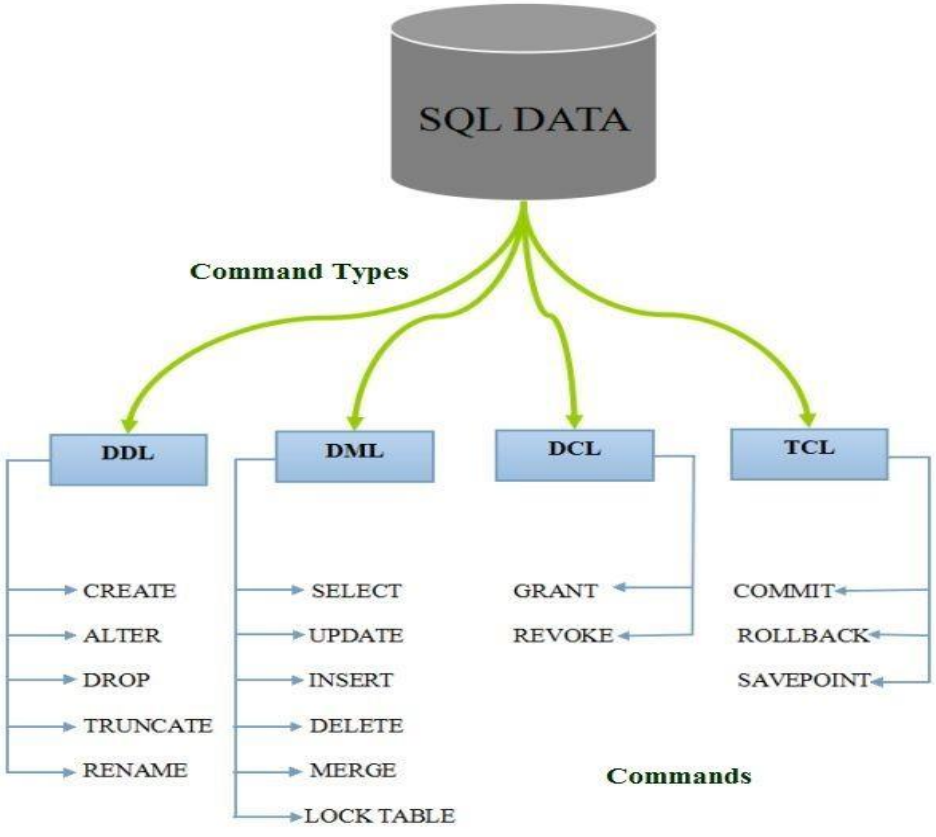
The following constraints are commonly used in SQL:

- **NOT NULL** - Ensures that a column cannot have a NULL value
- **UNIQUE** - Ensures that all values in a column are different
- **PRIMARY KEY** - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
- **FOREIGN KEY** - Uniquely identifies a row/record in another table
- **CHECK** - Ensures that all values in a column satisfies a specific condition
- **DEFAULT** - Sets a default value for a column when no value is specified
- **INDEX** - Used to create and retrieve data from the database very quickly

For more detail - https://www.w3schools.com/sql/sql_constraints.asp

## SQL Command Groups

- **DDL (Data Definition Language):** Creation of Objects
- **DML (Data Manipulation Language):** Manipulation of Objects
- **DCL (Data Control Language):** Assignment and removal of Permissions
- **TCL (Transaction Control Language):** Saving and restoring changes to a database



## DDL (Data Definition Language):

DDL or Data Definition Language actually consists of the SQL commands that can be used to define the database schema. It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the database.

**Examples of DDL commands:**

- **CREATE** - is used to create the database or its objects (like table, index, function, views, store procedure and triggers).
- **DROP** - is used to delete objects from the database.
- **ALTER** - is used to alter the structure of the database.
- **TRUNCATE** - is used to remove all records from a table, including all spaces allocated for the records are removed.
- **COMMENT** - is used to add comments to the data dictionary.
- **RENAME** - is used to rename an object existing in the database.

## DML (Data Manipulation Language):

DML statements are used for performing queries on the data within schema objects.

**Examples of DML commands:**

- **SELECT** - is used to retrieve data from database.
- **INSERT** - is used to insert data into table.
- **UPDATE** - is used to update existing data within a table.
- **DELETE** - is used to delete records from a database table.
- **MERGE** - is used to joins the target table to the source table by using a common column in both the tables.
- **LOCK TABLE** - is used to lock manually overrides automatic locking and permits or denies access to a table or view by other users for the duration of your operation.

## DCL (Data Control Language):

DCL includes commands such as GRANT and REVOKE which mainly deals with the rights, permissions and other controls of the database system.

**Examples of DCL commands:**

- **GRANT** - gives user's access privileges to database.
- **REVOKE** - withdraw user's access privileges given by using the GRANT command.

## TCL (Transaction Control Language):

TCL commands deals with the transaction within the database.

**Examples of TCL commands:**

- **COMMIT** - commits a Transaction.
- **ROLLBACK** - rollbacks a transaction in case of any error occurs.
- **SAVEPOINT** - sets a savepoint within a transaction.
- **SET TRANSACTION** - specify characteristics for the transaction.