# SQL Commands

**SQL Commands:**

- SQL commands are like instructions to a table. It is used to interact with the database with some operations.
- It is also used to perform specific tasks, functions, and queries of data.
- SQL can perform various tasks like creating a table, adding data to tables, dropping the table, modifying the table, set permission for users using these commands.

**Types of SQL Commands:**

These SQL commands are mainly categorized into five categories,

1. DDL – Data Definition Language
2. DQL – Data Query Language
3. DML – Data Manipulation Language
4. DCL – Data Control Language
5. TCL – Transaction Control Language

**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.
- DDL is a set of SQL commands used to create, modify, and delete database structures but not data.



List of DDL Commands

Some DDL commands and their syntax are:

**1. CREATE:**

To create databases, schemas or its objects (table, index, function, views, store procedure, and triggers)

General Syntax:

```
CREATE SCHEMA schema_name;
CREATE TABLE table_name (column1 data_type, column2 data_type, ...);
CREATE OBJECT object_name object_defination;
```

**2. DROP:**

To delete objects from the database

General Syntax:

```
DROP TABLE table_name;
```

**3. ALTER:**

To alter the structure of the database, adding, removing, dropping columns, changing datatype of a column, adding and removing constraints, renaming any object.
General Syntax:
ALTER TABLE table_name ADD COLUMN column_name data_type;

**4. TRUNCATE:**
To remove all records from a table, including all spaces allocated for the records are removed.
General Syntax:
TRUNCATE TABLE table_name;

**5. COMMENT:**
To add comments to the data dictionary
General Syntax:
COMMENT 'comment_text' ON TABLE table_name;
6. RENAME Rename an object existing in the database RENAME TABLE old_table_name TO new_table_name;

**DQL (Data Query Language)**

- DQL statements are used for performing queries on the data within schema objects.
- The purpose of the DQL Command is to get some schema relation based on the query passed to it. We can define DQL as follows it is a component of SQL statement that allows getting data from the database and imposing order upon it. It includes the SELECT statement.
- This command allows getting the data out of the database to perform operations with it. When a SELECT is fired against a table or tables the result is compiled into a further temporary table, which is displayed or perhaps received by the program i.e. a front-end.



**1. SELECT:**
It is used to retrieve data from the database
General Syntax:
SELECT column1, column2, ...FROM table_name WHERE condition;

**DML(Data Manipulation Language)**

- The SQL commands that deal with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements.
- It is the component of the SQL statement that controls access to data and to the database. Basically, DCL statements are grouped with DML statements.

List of DML commands
**1. INSERT:**
To insert data into a table.
General Syntax:

INSERT INTO table_name (column1, column2, ...) VALUES (value1, value2, ...);

**2. UPDATE:**
To update existing data within a table.
General Syntax:
UPDATE table_name SET column1 = value1, column2 = value2 WHERE condition;

**3. DELETE:**
To delete records from a database table.
General Syntax:
DELETE FROM table_name WHERE condition;

**DCL (Data Control Language)**

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

List of DCL commands:
Two important DCL commands and their syntax are:

**1. GRANT:**
To assigns new privileges to a user account, allowing access to specific database objects, actions, or functions.
General Syntax:
GRANT privilege_type [(column_list)] ON [object_type] object_name TO user [WITH GRANT OPTION];

**2. REVOKE:**
To removes previously granted privileges from a user account, taking away their access to certain database objects or actions.
General Syntax:
REVOKE [GRANT OPTION FOR] privilege_type [(column_list)] ON [object_type] object_name FROM user [CASCADE];

**TCL (Transaction Control Language)**

- Transactions group a set of tasks into a single execution unit. Each transaction begins with a specific task and ends when all the tasks in the group are successfully completed.
- If any of the tasks fail, the transaction fails.
- Therefore, a transaction has only two results: success or failure.

List of TCL Commands

**1. BEGIN TRANSACTION:**
To starts a new transaction.
General Syntax:
BEGIN TRANSACTION [transaction_name];

**2. COMMIT:**
To saves all changes made during the transaction
General Syntax:

COMMIT;

**3. ROLLBACK:**

To undoes all changes made during the transaction.

General Syntax:

ROLLBACK;

**4. SAVEPOINT:**

To creates a savepoint within the current transaction.

General Syntax:

SAVEPOINT savepoint_name;

**Important SQL Commands**

Some of the most important SQL commands are:

SELECT: Used to retrieve data from a database.

INSERT: Used to add new data to a database.

UPDATE: Used to modify existing data in a database.

DELETE: Used to remove data from a database.

CREATE TABLE: Used to create a new table in a database.

ALTER TABLE: Used to modify the structure of an existing table.

DROP TABLE: Used to delete an entire table from a database.

WHERE: Used to filter rows based on a specified condition.

ORDER BY: Used to sort the result set in ascending or descending order.

JOIN: Used to combine rows from two or more tables based on a related column between them.

SQL Commands With Examples

The examples demonstrates how to use an SQL command. Here is the list of popular SQL commands with Examples.



## SQL Clauses

**SQL Clauses:**

- SQL clauses are like the conditional statements we use in other programming languages.
- SQL clause helps us to retrieve a set or bundles of records from the table.
- SQL clause helps us to specify a condition on the columns or the records of a table.

They can also be used in combination to create complex queries.

Types of SQL Clauses

The following are the various SQL clauses:

1. Group By
2. Having
3. Order By
4. Where By
5. Top
6. With
7. Like

8. From
9. Limit
10. End
11. Or

**GROUP BY**
The GROUP BY clause in SQL groups the data based on one or more columns. We can group rows with similar values together, and it is typically used in conjunction with aggregate functions like SUM, COUNT, AVG, MIN, and MAX.

**HAVING**
The HAVING clause in SQL filters the data after the GROUP BY clause has grouped it. It filters the grouped rows based on a specific condition and is typically used with aggregate functions like SUM, COUNT, AVG, MIN, and MAX.

**Order By**
The ORDER BY clause in SQL sorts the data based on one or more columns. It arranges the rows in a specific order, either in ascending or descending order.

**Where By**
The WHERE clause in SQL filters rows from a table based on specified conditions before the data is retrieved.

**Top**
The TOP clause retrieves a specified number or percentage of rows from a result set, useful for limiting the number of rows returned.
**With**
The WITH clause, also known as Common Table Expression (CTE), creates a temporary result set that can be referenced within a SQL query to simplify complex queries.

**Like**
The LIKE operator is used in a WHERE clause to search for a specified pattern in a column, often used with wildcard characters for pattern matching.
From. The FROM clause specifies the table or tables from which data should be retrieved in a SQL query.

**Limit**
The LIMIT clause, commonly used in databases like MySQL and PostgreSQL, restricts the number of rows returned in a query result.

**End**
"END" is often used to terminate a block of code in SQL, such as the end of a stored procedure or a conditional statement.

**Or**

The OR operator is used in a WHERE clause to retrieve rows that meet at least one of multiple specified conditions. It provides flexibility in querying data with multiple criteria.

# SQL Aggregate Functions

**SQL Aggregate Functions**

- An aggregate function is a function that performs a calculation on a set of values, and returns a single value.
- Aggregate functions are often used with the GROUP BY clause of the SELECT statement. Can also use without a GROUP BY clause.
- The GROUP BY clause splits the result-set into groups of values and the aggregate function can be used to return a single value for each group.

The most commonly used SQL aggregate functions are:

1. MIN() - returns the smallest value within the selected column
2. MAX() - returns the largest value within the selected column
3. COUNT() - returns the number of rows in a set
4. SUM() - returns the total sum of a numerical column
5. AVG() - returns the average value of a numerical column
6. Aggregate functions ignore null values (except for COUNT()).
7. STDEV() - Calculates the standard deviation of values in a column.
8. VARIANCE() - Calculates the variance of values in a column.