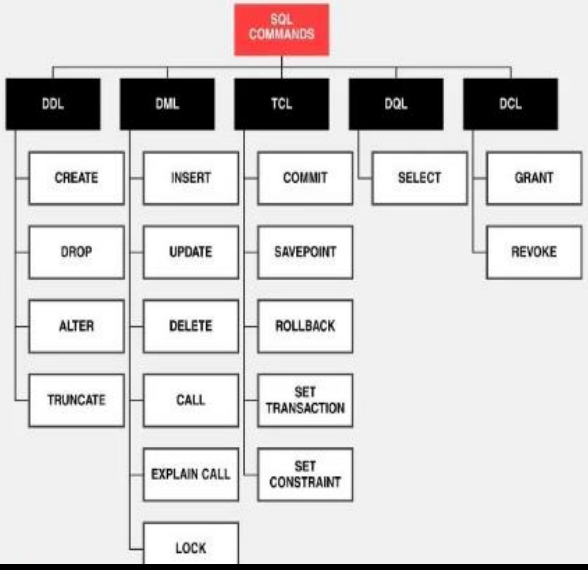
SQL
Short Notes
For Data Science

1. What is SQL:

SQL (Structured Query Language) is a domain-specific language used for managing and manipulating relational databases. It provides a standardized way to interact with databases, enabling users to create, retrieve, update, and delete data.

2. Types of Commands:

DDL (Data Definition Language): Used to define and manage the structure of the database.
DML (Data Manipulation Language): Used to manipulate the data stored in the database.
DCL (Data Control Language): Deals with user access rights and permissions.
TCL (Transaction Control Language): Manages transactions within a database



DDL Commands

CREATE:

- **Usage Definition:** Used to create a new database object (table, index, view, etc.).
- **Syntax: CREATE [OBJECT_TYPE] [OBJECT_NAME] (column1 datatype1, column2 datatype2, ...);**
- **Example: CREATE TABLE** Employees (ID **INT,** Name **VARCHAR(255),** Salary **INT);**

ALTER:

- **Usage Definition:** Modifies the structure of an existing database object.
- **Syntax: ALTER [OBJECT_TYPE] [OBJECT_NAME] [MODIFICATION];**
- **Example: ALTER TABLE** Employees **ADD COLUMN** Department **VARCHAR(50);**

DDL Commands

DROP:

- **Usage Definition:** Deletes an existing database object.
- **Syntax: DROP [OBJECT_TYPE] [OBJECT_NAME];**
- **Example: DROP TABLE** Employees**;**

TRUNCATE:

- **Usage Definition:** Removes all records from a table but retains the structure.
- **Syntax: TRUNCATE TABLE [TABLE_NAME];**
- **Example: TRUNCATE TABLE** Employees;

COMMENT:

- **Usage Definition:** Adds comments to the data dictionary for a specific table or column.
- **Syntax: COMMENT ON [OBJECT_TYPE] [OBJECT_NAME] IS 'Your comment here';**
- **Example: COMMENT ON COLUMN** Employees**.**Name **IS** 'Employee Full Name'**;**

DML Commands

DELETE:

- **Usage Definition:** Removes records from a table.
- **Syntax: DELETE FROM [table] WHERE [condition];**
- **Example: DELETE FROM** Employees **WHERE** Salary < 50000;

MERGE:

- **Usage Definition:** Combines insert, update, and delete operations based on a specified condition.
- **Syntax: MERGE INTO target_table USING source_table ON condition WHEN MATCHED THEN UPDATE SET ... WHEN NOT MATCHED THEN INSERT ...;**
- **Example: MERGE INTO** Employees **USING** TempEmployees **ON** Employees.ID = TempEmployees.ID **WHEN MATCHED THEN UPDATE SET** Salary = TempEmployees.Salary **WHEN NOT MATCHED THEN INSERT** (ID, Name, Salary) **VALUES (**TempEmployees.ID, TempEmployees.Name, TempEmployees.Salary);

DCL Commands

GRANT:

- **Usage Definition:** Provides specific privileges to database users.
- **Syntax: GRANT [privilege] ON [object] TO [user];**
- **Example: GRANT SELECT, INSERT ON** Employees **TO** JohnDoe**;**

REVOKE:

- **Usage Definition:** Removes specified privileges from database users.
- **Syntax: REVOKE [privilege] ON [object] FROM [user];**
- **Example: REVOKE INSERT ON** Employees **FROM** JohnDoe**;**

TCL Commands

COMMIT:

- **Usage Definition:** Saves all the changes made during the current transaction.
- **Syntax: COMMIT;**
- **Example: COMMIT;**

ROLLBACK:

- **Usage Definition:** Undoes changes made during the current transaction.
- **Syntax: ROLLBACK;**
- **Example: ROLLBACK;**

SAVEPOINT:

- **Usage Definition:** Sets a point within a transaction to which you can later roll back.
- **Syntax: SAVEPOINT [savepoint_name];**
- **Example: SAVEPOINT** before_update**;**

SET TRANSACTION:

- **Usage Definition:** Configures properties for the current transaction.
- **Syntax: SET TRANSACTION [property_name] [value];**
- **Example: SET TRANSACTION ISOLATION LEVEL SERIALIZABLE;**

RESOURCES TO LEARN MORE

1. **W3Schools SQL Tutorial**
2. **MDN Web Docs - SQL**
3. **Khan Academy -** Intro to SQL: Querying and managing data
4. **SQLZoo**
5. **Mode Analytics SQL Tutorial**
6. **SQL for Web Developers (freeCodeCamp)**
7. **Coursera - SQL for Data Science (University of California, Davis)**
8. **SQLCourse.com**
9. **Books:**
    - "Learning SQL" by Alan Beaulieu
    - "SQL Performance Explained" by Markus Winand
    - "SQL Antipatterns: Avoiding the Pitfalls of Database Programming" by Bill Karwin