DATABASES

GS WEB APPLICATION DEVELOPMENT

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Curs 2025/26

What is SQL?

SQL is a standard language for accessing and manipulating databases.

- **SQL** stands for Structured Query Language
- **SQL** lets you access and manipulate databases
- **SQL** became a standard of the American National Standards Institute (ANSI) in 1986, and of the International Organization for Standardization (ISO) in 1987

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

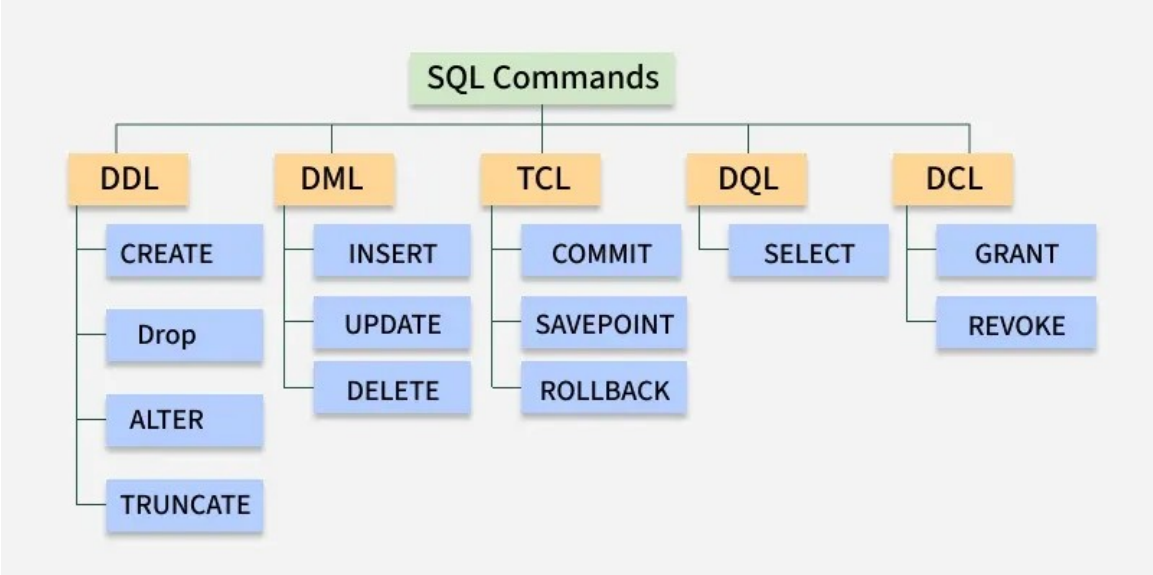
What is RDBMS?

- **RDBMS** stands for Relational Database Management System.
- **RDBMS** is the basis for SQL, and for all modern database systems such as MS SQL Server, IBM DB2, Oracle, MySQL, and Microsoft Access.
- The data in **RDBMS** is stored in database objects called tables. A table is a collection of related data entries and it consists of columns and rows.

SQL Commands | DDL, DQL, DML, DCL and TCL Commands

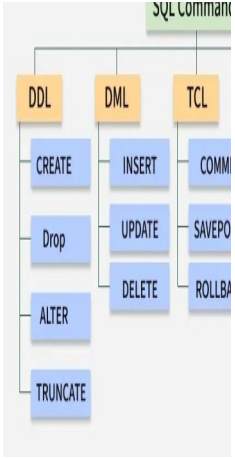
SQL commands are fundamental building blocks used to perform given operations on database. The operations include queries of data. creating a table, adding data to tables, dropping the table, modifying the table and set permission for users.

SQL Commands are mainly categorized into five categories:



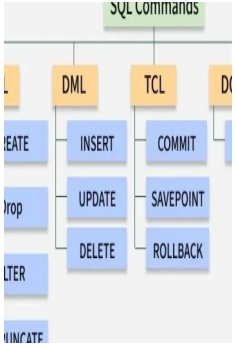
SQL Commands | DDL, DQL, DML, DCL and TCL Commands

DDL - Data Definition Language



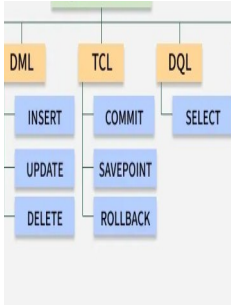
DDL (Data Definition Language) actually consists of SQL commands that can be used for defining, altering and deleting database structures such as tables, indexes and schemas. It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the database

DML - Data Manipulation Language



DML commands are used to manipulate the data stored in database tables. With DML, you can insert new records, update existing ones, delete unwanted data or retrieve information.

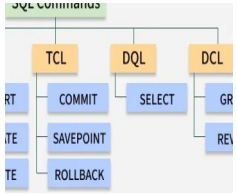
TCL - Transaction Control Language



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, transaction fails. Therefore, a transaction has only two results: success or failure.

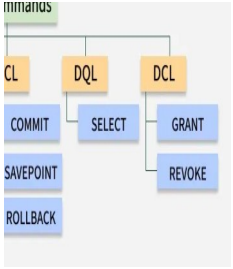
SQL Commands | DDL, DQL, DML, DCL and TCL Commands

DQL - Data Query Language



DQL is used to fetch data from the database. The main command is SELECT, which retrieves records based on the query. The output is returned as a result set (a temporary table) that can be viewed or used in applications.

DCL - Data Control Language



DCL (Data Control Language) includes commands such as GRANT and REVOKE which mainly deal with the rights, permissions and other controls of the database system. These commands are used to control access to data in the database by granting or revoking permissions.

What is MySQL?

MySQL is a very popular open-source relational database management system (RDBMS).

- **MySQL** is a relational database management system
- **MySQL** is open-source
- **MySQL** is free
- **MySQL** is ideal for both small and large applications
- **MySQL** is very fast, reliable, scalable, and easy to use
- **MySQL** is cross-platform
- **MySQL** is compliant with the ANSI SQL standard
- **MySQL** was first released in 1995
- **MySQL** is developed, distributed, and supported by Oracle Corporation
- **MySQL** is named after co-founder Ulf Michael "Monty" Widenius's daughter: My

Who Uses MySQL?

- Huge websites like Facebook, Twitter, Airbnb, Booking.com, Uber, GitHub, YouTube, etc.
- Content Management Systems like WordPress, Drupal, Joomla!, Contao, etc.
- A very large number of web developers around the world

SQL Syntax

Most of the actions you need to perform on a database are done with SQL statements.

SQL statements consist of keywords that are easy to understand.

The following SQL statement returns all records from a table named "Customers":

Example

Select all records from the Customers table:

```
SELECT * FROM Customers;
```

Database Tables

A database most often contains one or more tables. Each table is identified by a name (e.g. "Customers" or "Orders"), and contain records (rows) with data.

In this tutorial we will use the well-known Northwind sample database (included in MS Access and MS SQL Server).

Below is a selection from the **Customers** table used in the examples:

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

The table above contains five records (one for each customer) and seven columns (CustomerID, CustomerName, ContactName, Address, City, PostalCode, and Country).

Keep in Mind That...

SQL keywords are NOT case sensitive: select is the same as SELECT

Semicolon after SQL Statements?

- Some database systems require a semicolon at the end of each SQL statement.
- Semicolon is the standard way to separate each SQL statement in database systems that allow more than one SQL statement to be executed in the same call to the server.

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