Lecture-5

SQL Commands

SQL commands are categorized into four main types: **DDL, DML, DCL, and TCL**. Each serves a specific purpose in database management.

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1. DDL (Data Definition Language)

Used to define or modify the structure of database objects like tables, schemas, or indexes.

- **CREATE**: Creates new database objects like tables or databases.
  Example: Create a table named employees with columns id (integer), name (string), and salary (decimal).
  CREATE TABLE employees (id INT, name VARCHAR(50), salary DECIMAL(10, 2));

- **DROP**: Deletes existing database objects like tables or databases.
  Example: Drop the employees table.
  DROP TABLE employees;

- **ALTER**: Modifies the structure of an existing table.
  Example: Add a new column department to the employees table.
  ALTER TABLE employees ADD department VARCHAR(50);

- **TRUNCATE**: Removes all rows from a table without deleting its structure.
  Example: Truncate the employees table.
  TRUNCATE TABLE employees;

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2. DML (Data Manipulation Language)

Used to manipulate data stored in database tables.

- **INSERT**: Adds new records into a table.
  Example: Insert a record into the employees table.
  INSERT INTO employees (id, name, salary) VALUES (1, 'John', 5000.00);

- **SELECT**: Retrieves data from one or more tables.
  Example: Select all records from the employees table.
  SELECT * FROM employees;

- **UPDATE**: Updates existing records in a table.
  Example: Update the salary of the employee with `id = 1`.
  UPDATE employees SET salary = 6000.00 WHERE id = 1;

- **DELETE**: Deletes specific records from a table.
  Example: Delete the record of the employee with `id = 1`.
  DELETE FROM employees WHERE id = 1;

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3. DCL (Data Control Language)

Used to control access and permissions in the database.

- **GRANT**: Grants specific privileges to a user.
  Example: Grant `SELECT` and `INSERT` privileges on the `employees` table to `user1`.
  GRANT SELECT, INSERT ON employees TO user1;

- **REVOKE**: Removes privileges previously granted to a user.
  Example: Revoke the `INSERT` privilege on the `employees` table from `user1`.
  REVOKE INSERT ON employees FROM user1;

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4. TCL (Transaction Control Language)

Used to manage and control transactions in the database.

- **BEGIN**: Starts a transaction.
  Example: Begin a transaction.
  BEGIN;

- **COMMIT**: Saves all changes made during the transaction permanently.
  Example: Commit the transaction.
  COMMIT;

- **ROLLBACK**: Reverts changes made during a transaction to the last committed state.
  Example: Rollback the transaction.
  ROLLBACK;

- **SAVEPOINT**: Creates a specific point within a transaction to which a rollback can occur.
  Example: Set a savepoint in the transaction.
  SAVEPOINT sp1;

  - - After Doing some transaction
  Rollback sp1   - - Rollback to checkpoint sp1 (simply undoing the transactions)