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Department of Information Technology
Lab Assignment-1
IT 38513: Data Base Management System

What is SQL?

SQL (Structured Query Language) is a standard programming language used to manage and manipulate relational databases. It allows you to create, read, update, and delete data stored in a database.

Applications of SQL:

- Managing data in database systems (like MySQL, PostgreSQL, SQL Server)

- Retrieving specific information using queries

- Creating and modifying database structures (tables, indexes)

- Controlling access and permissions

- Performing complex data analysis and reporting

Define DDL,DML,DCL,DQL.

DDL	Data Definition Language: Commands to define or alter database structure (e.g., CREATE, ALTER, DROP)
DML	Data Manipulation Language: Commands to manipulate data stored in tables (e.g., INSERT, UPDATE, DELETE)
DCL	Data Control Language: Commands to control access and permissions (e.g., GRANT, REVOKE)
DQL	Data Query Language: Commands to query data (e.g., SELECT)

Difference between DDL and DML:

Aspect	DDL (Data Definition Language)	DML (Data Manipulation Language)
Purpose	Defines or modifies database schema	Manipulates data within the schema
Commands	CREATE, ALTER, DROP	INSERT, UPDATE, DELETE
Effect	Changes database structure	Changes the data inside tables
Transactional	Usually auto-committed (can't rollback easily)	Can be rolled back or committed

What is a Schema?
A **schema** is the structure or blueprint of a database that defines how data is organized. It includes definitions of tables, columns, data types, relationships, constraints, etc.

Explain these commands:
CREATE: Creates a new database object like a table

```
CREATE TABLE students (
    student_id VARCHAR(50),
    full_name VARCHAR(50),
    date_of_birth DATE,
    email VARCHAR(100),
    subject VARCHAR(50),
    marks int
);
```

INSERT: Adds new data (rows) into a table

```
INSERT INTO students (student_id, full_name, date_of_birth, email, subject, marks) VALUES
('0801IT231119', 'SHIVA KHANNA', '2003-01-01', 'SHIVA@GMAIL.COM', 'DBMS', 91),
('0801IT231119', 'SHIVA KHANNA', '2003-01-01', 'SHIVA@GMAIL.COM', 'Math', 85),
('0801IT231119', 'SHIVA KHANNA', '2003-01-01', 'SHIVA@GMAIL.COM', 'English', 78),
```
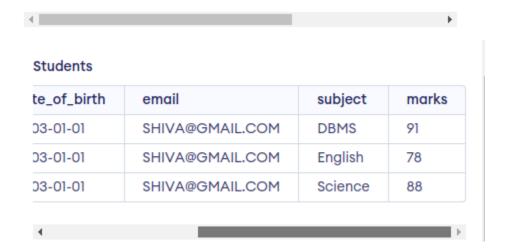
UPDATE: Modifies existing data in a table
UPDATE students SET full_name = 'Shiva' WHERE student_id = '0801IT231119';

DELETE: Removes data (rows) from a table

DELETE FROM students WHERE subject = 'Math';

Students

student_id	full_name	date_of_birth	email
0801IT231119	Shiva	2003-01-01	SHIVA@G
0801IT231119	Shiva	2003-01-01	SHIVA@G
0801IT231119	Shiva	2003-01-01	SHIVA@G

Students

te_of_birth	email	subject	marks
03-01-01	SHIVA@GMAIL.COM	DBMS	91
03-01-01	SHIVA@GMAIL.COM	English	78
03-01-01	SHIVA@GMAIL.COM	Science	88

Explanation of Aggregate Commands:

- **MIN()**: Returns the smallest value in a column

- **MAX()**: Returns the largest value in a column

- **SUM()**: Adds up all numeric values in a column

- **COUNT()**: Counts the number of rows (or non-null values)

- **AVG()**: Calculates the average (mean) of numeric values

- **FIRST()**: Returns the first value in a set

- **LAST()**: Returns the last value in a set

Example:-

SELECT student_id, full_name, SUM(marks) AS total_marks
FROM students
GROUP BY student_id, full_name;

SELECT student_id, full_name, AVG(marks) AS average_marks
FROM students
GROUP BY student_id, full_name;

SELECT student_id, full_name, MAX(marks) AS highest_mark
FROM students
GROUP BY student_id, full_name;

SELECT student_id, full_name, MIN(marks) AS lowest_mark
FROM students
GROUP BY student_id, full_name;

SELECT student_id, full_name, COUNT(marks) AS count_mark
FROM students
GROUP BY student_id, full_name;

Output

student_id	full_name	total_marks
0801IT231119	SHIVA KHANNA	342

student_id	full_name	average_marks
0801IT231119	SHIVA KHANNA	85.5

student_id	full_name	highest_mark
0801IT231119	SHIVA KHANNA	91

student_id	full_name	lowest_mark
0801IT231119	SHIVA KHANNA	78

student_id	full_name	count_mark
0801IT231119	SHIVA KHANNA	4