EXP 8 : PostgreSQL

Aim : Set up a PostgreSQL database and create tables to store relational data. Perform basic CRUD operations using SQL queries.

Theory :

1. Setting Up PostgreSQL

- **PostgreSQL** is an open-source, object-relational database system.
- To get started, you install PostgreSQL on your computer or use a cloud-based service.
- After installation, you use tools like **pgAdmin** (GUI) or **psql** (CLI) to interact with your database.

2. Creating a Database

- A **database** is a container that stores organized data.
- You create a database to hold all your related tables, views, and relationships for a particular system (e.g., university management).
- Databases are isolated from each other and help manage different sets of data.

3. Creating Relational Tables

- A **table** stores data in rows and columns.
- **Relational tables** are connected using **keys**:
    - **Primary Key**: A unique identifier for each row in a table.
    - **Foreign Key**: A column that links to the primary key of another table, creating a relationship between tables.
- Example: A `students` table can reference a `teachers` table using a foreign key to represent the advisor-student relationship.

4. Performing CRUD Operations

CRUD stands for the four basic functions used to manage data in a database:

�� Create (C)

- Inserting new data into a table.
- Used when adding new entries like students, teachers, etc.

�� Read (R)

- Retrieving data from tables.
- Used to display records, filter results, and generate reports.

�� Update (U)

- Modifying existing records in a table.
- Used to correct or change information like a student's course.

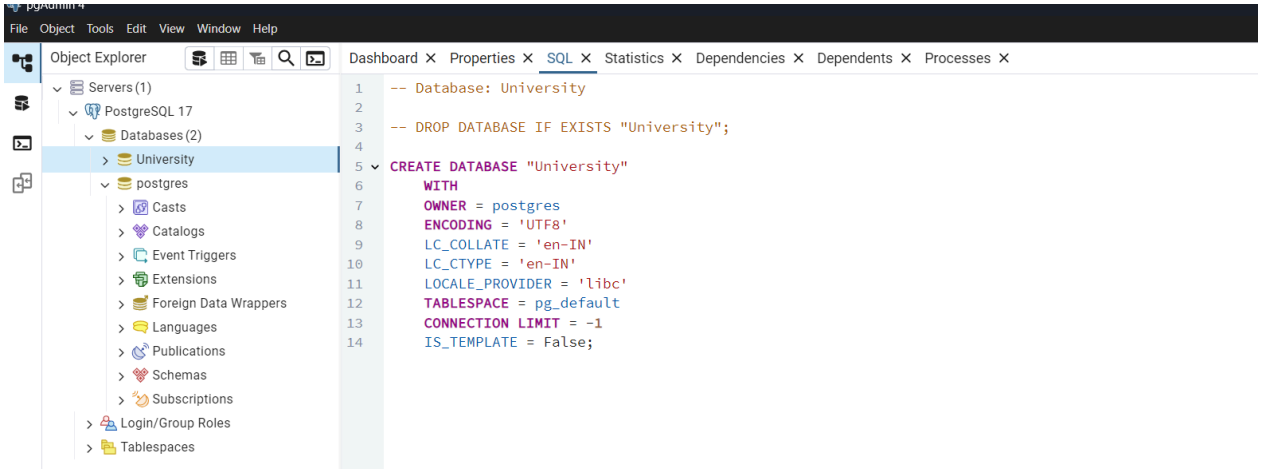
�� Delete (D)

- Removing records from a table.
- Used to eliminate outdated or incorrect data.

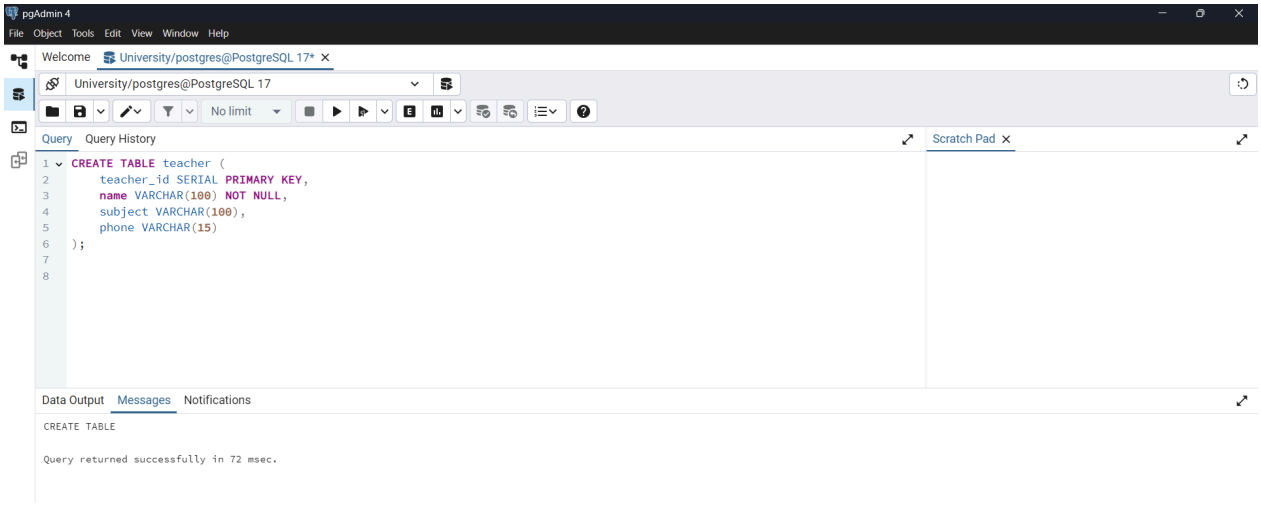
5. Benefits of Relational Design

- Ensures **data integrity** through relationships.
- Avoids **data duplication** using foreign keys and normalization.
- Supports **complex queries** across related tables using joins.

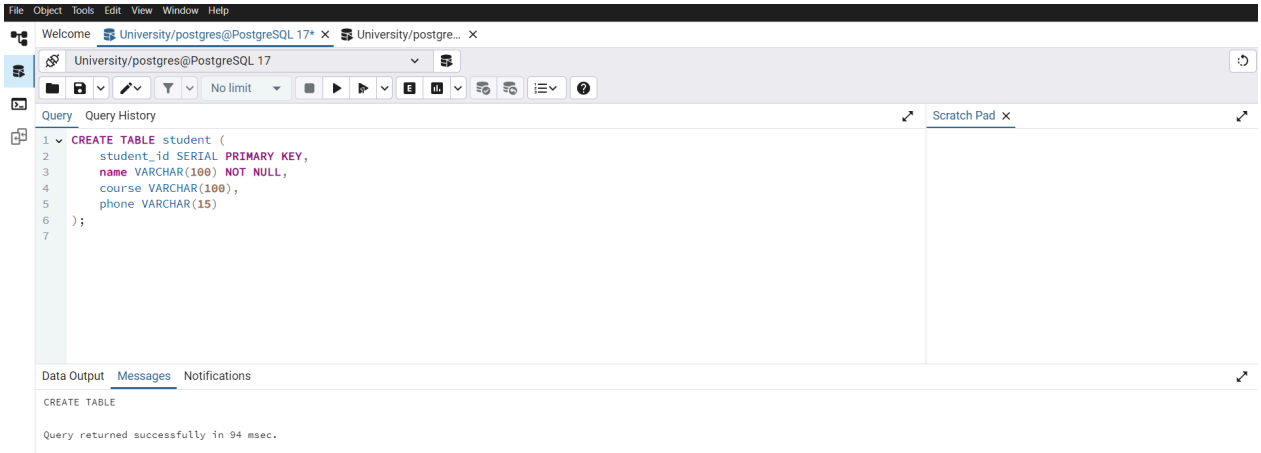
1.Creating an University Database in postrgresql using pgadmin4



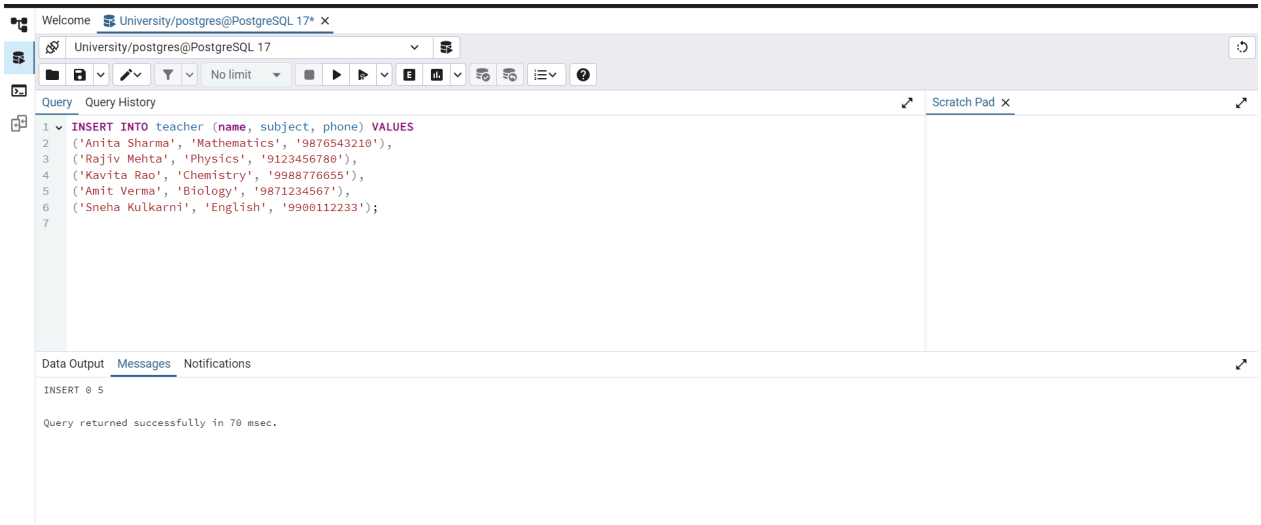
2.Creating teacher table



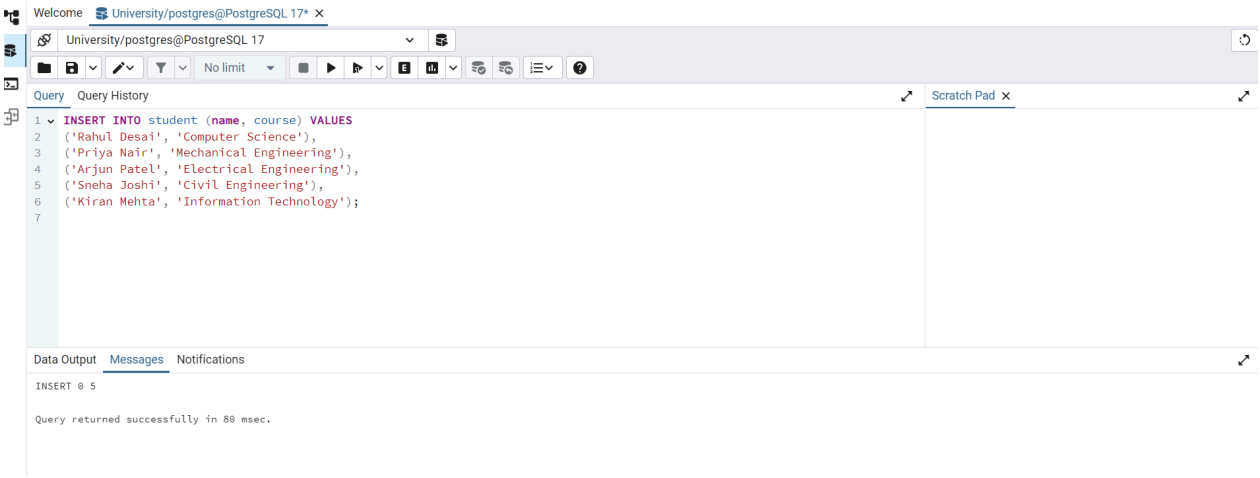
3.Creating student table



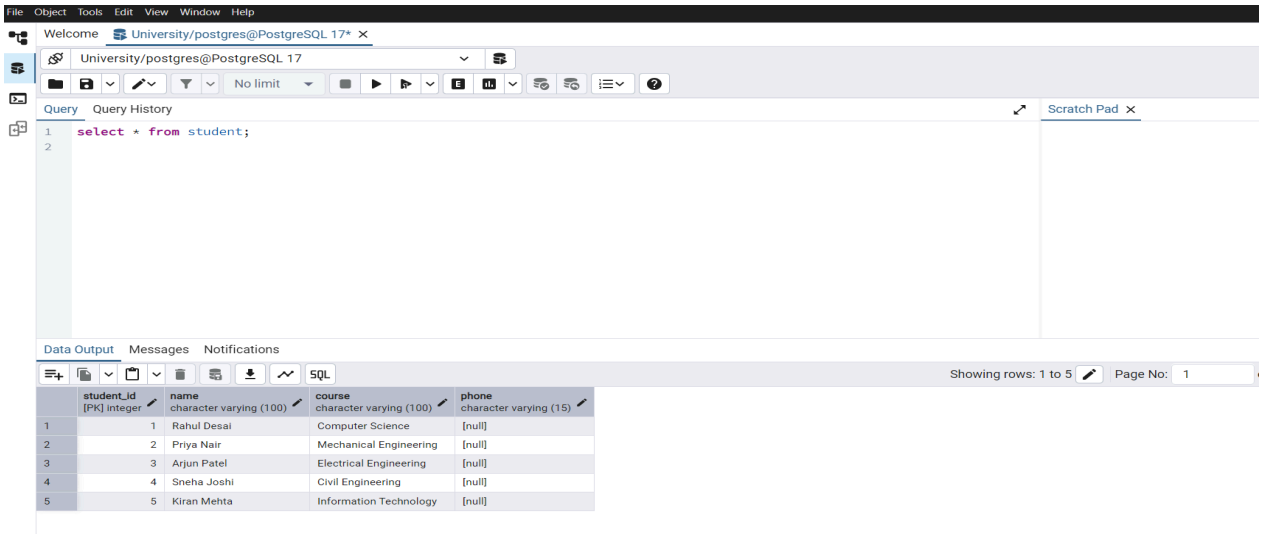
4.Inserting data in teachers table



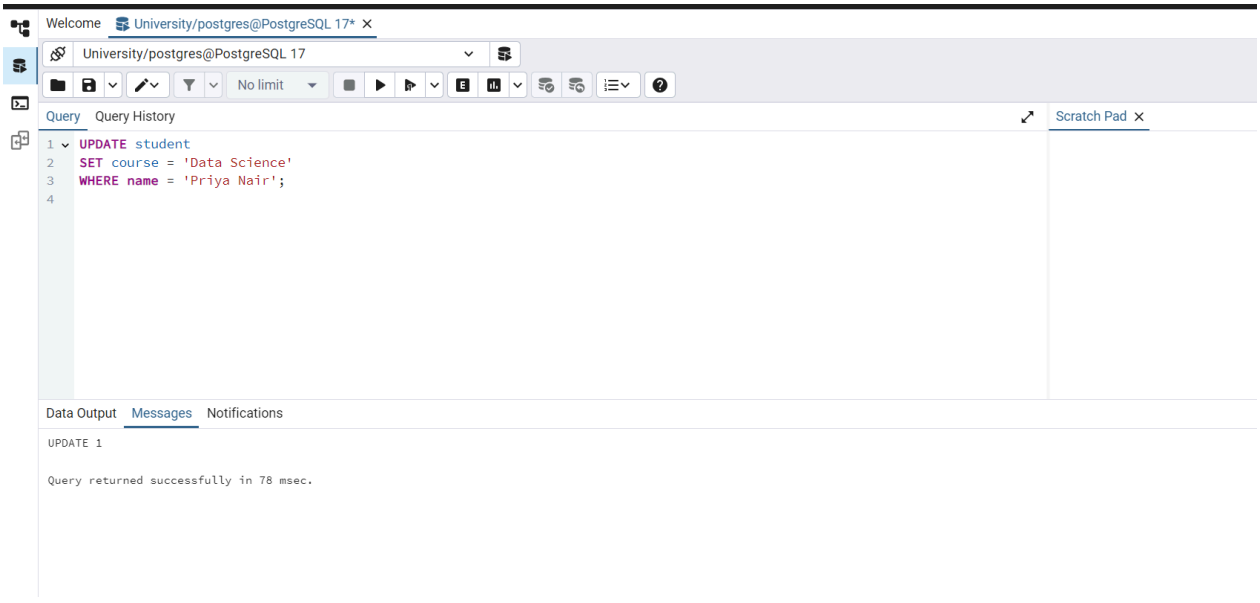
5.Inserting data in student table

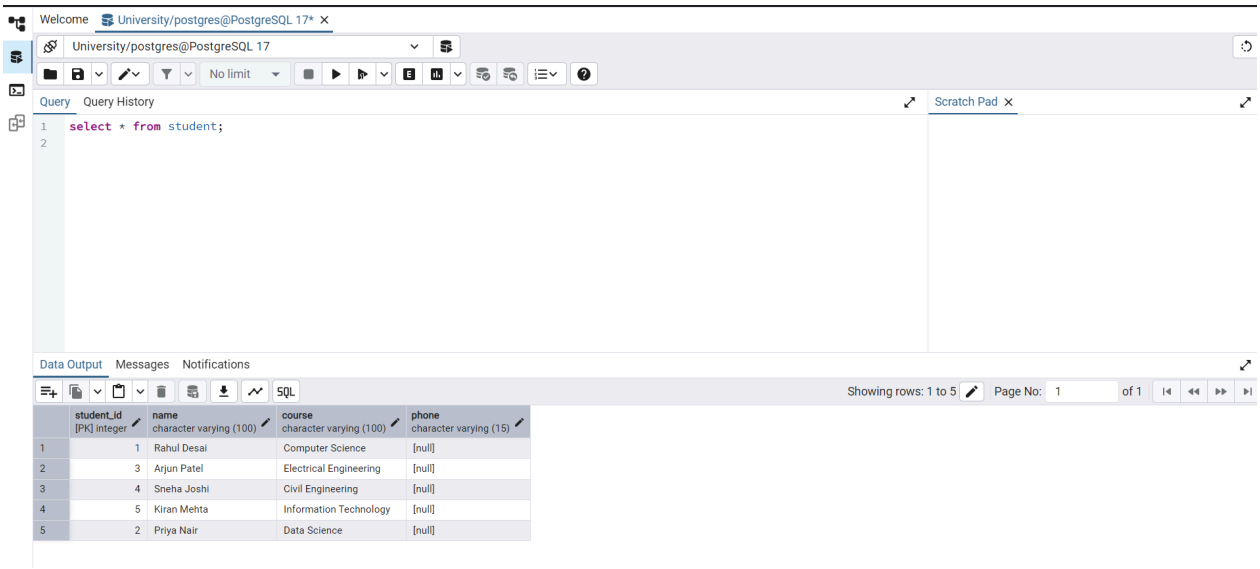


6.Reading data from student table



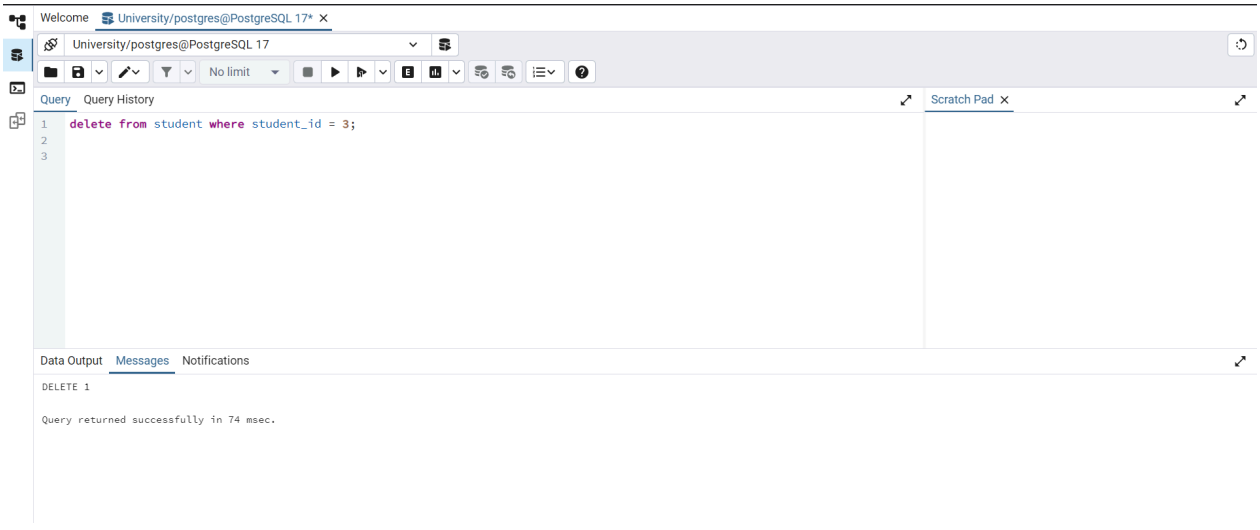
7.Updating student data

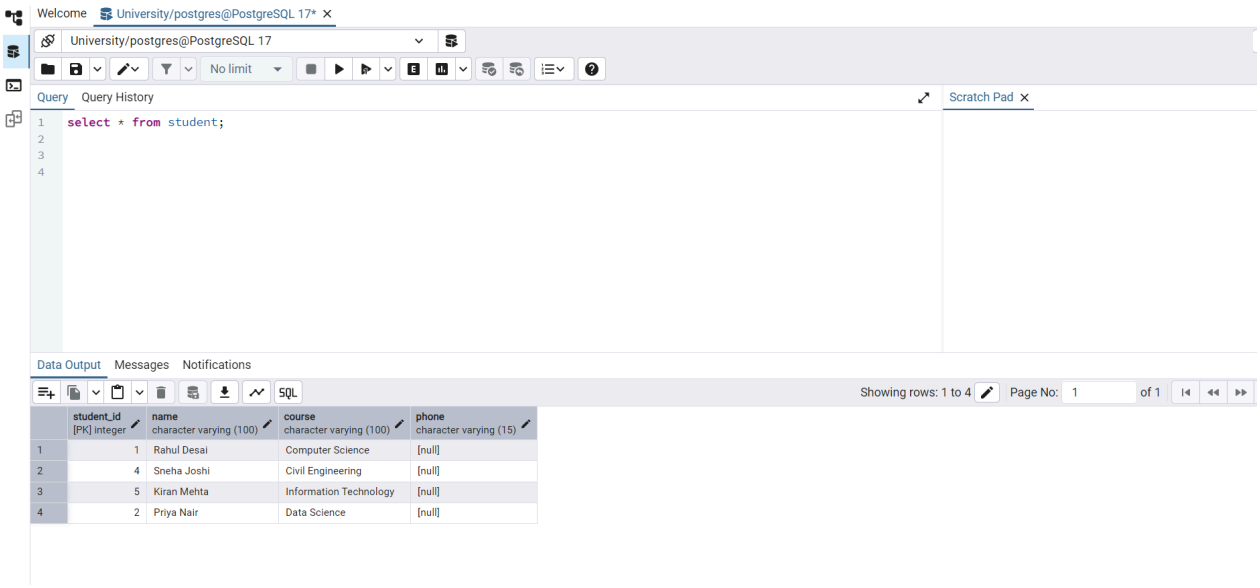




	student_id [PK] integer	name character varying (100)	course character varying (100)	phone character varying (15)
1	1	Rahul Desai	Computer Science	[null]
2	3	Arjun Patel	Electrical Engineering	[null]
3	4	Sneha Joshi	Civil Engineering	[null]
4	5	Kiran Mehta	Information Technology	[null]
5	2	Priya Nair	Data Science	[null]

8.Deleting student data





Conclusion : In this experiment, we successfully explored the process of setting up a PostgreSQL database and managing relational data through structured tables and basic SQL operations. By understanding the relational model, we were able to design interconnected tables using primary and foreign keys, ensuring data consistency and integrity. The implementation of CRUD operations—Create, Read, Update, and Delete—demonstrated how data can be efficiently inserted, retrieved, modified, and removed within the system.