Experiment 1

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1. Problem Title: Author-Book Relationship Using Joins and Basic SQL Operations.
2. Procedure (Step-by-Step):
a) Design two tables — one for storing author details and the other for book details.
b) Ensure a foreign key relationship from the book to its respective author.
c) Insert at least three records in each table.
d) Perform an INNER JOIN to link each book with its author using the common author ID.
e) Select the book title, author name, and author's country.
3. SQL Commands:

a. Create Tables Author and Books using the create table command. The attributes of the two are as following:

EASY - LEVEL

b. Insert values into the tables using insert into command:

c. Using inner join to get desired output having the book title, author name, and author's country:

4. Output:

Output of Inner Join on tables Author and Books
5. Learning Outcome:
a. I learnt how to create and manage relational databases using SQL.
b. I learnt how to define primary and foreign key constraints to link tables.
c. I learnt how to insert multiple records into SQL tables efficiently.
d. I learnt how to use INNER JOIN to retrieve combined data from related tables.

MEDIUM - LEVEL

1. Problem Title: Department Course Subquery and Access Control
2. Procedure (Step-by-Step):
a. Design normalized tables for departments and the courses they offer, maintaining a foreign key relationship.
b. Insert five departments and at least ten courses across those departments.
c. Use a subquery to count the number of courses under each department.
d. Filter and retrieve only those departments that offer more than two courses.
e. Grant SELECT-only access on the courses table to a specific user.
Sample Output Description: The result shows the names of departments which are associated with more than two courses in the system.
3. SQL Commands:
a. Create the tables Department and Course. The attributes of the two are as following:

b. Insert the values into the tables.

c. Filtering the data based of our requirement using subqueries, group by clause and WHERE condition:

d. Grant SELECT-only access on the courses table to a specific user Test_User:

4. Output:

Output of Department with courses>2

5. Learning Outcomes:

a. Learned to design normalized database schemas using primary and foreign keys to maintain referential integrity between related entities.

b. Developed proficiency in inserting and managing structured data across relational tables.

c. Mastered the use of correlated subqueries to dynamically count related records for each row in a parent table.

d. Applied scalar subqueries within SELECT and WHERE clauses to filter and compute aggregated results per row context.

e. Gained practical experience in implementing user-level access control, using GRANT to assign SELECT-only privileges and EXECUTE AS with REVERT to switch and restore user contexts securely.