Experiment - 1

Student Name:	Shivansh Bhatt	**UID:**	23BCS10552
Branch:	BE-CSE	**Section/Group:**	KRG-1 (B)
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Aim:

Q1. Author-Book Relationship Using Joins and Basic SQL Operations

Implement the following operations:

- Design two tables - one for storing author details and the other for book details.
- Ensure a foreign key relationship from the book to its respective author.
- Insert at least three records in each table. Perform an INNER JOIN to link each book with its author using the common author ID.
- Select the book title, author name, and author's country.
- Expected Output: Each book title along with its author's name and country.

Q2. Department-Course Subquery and Access Control

Implement the following operations:

- Design normalized tables for departments and the courses they offer, maintaining a foreign key relationship.
- Insert five departments and at least ten courses across those departments.
- Use a subquery to count the number of courses under each department.
- Display only departments that offer more than 2 courses.

Objective:

Q1: Author-Book Relationship Using Joins and Basic SQL Operations

The objective of this task is to establish a relationship between authors and books using fundamental SQL operations. Two relational tables will be designed - one to store author details and another to hold book information. A foreign key will be implemented in the books table to reference the corresponding author's ID, ensuring referential integrity. The goal is to insert at least three records into each table and then use an INNER JOIN to combine data based on the shared author ID. The final output should present a list of book titles along with the respective author's name and country, demonstrating how join operations can be used to fetch related data across tables.

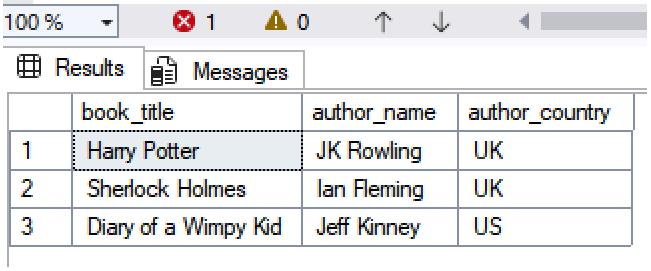
Q2: Department-Course Subquery and Access Control

This task focuses on creating a normalized database structure for departments and the courses they offer, emphasizing the use of subqueries and basic access filtering. Two tables will be designed - one for departments and another for courses - with a foreign key linking each course to its respective department. A minimum of five departments and ten courses will be inserted to provide sufficient data for analysis. A subquery will be employed to count the number of courses associated with each department. The final query will display only those departments that offer more than two courses, demonstrating how subqueries and filtering can be used for meaningful data extraction and control.

DBMS Code & Output:

Q1: Author-Book Relationship Using Joins and Basic SQL Operations

```
-- Database creation
create database KRG_1B;
use KRG_1B;

-- Authors table
create table Authors (
   author_id int primary key,
   name varchar(100),
   country varchar(50)
);

-- Books table with a foreign key referencing Authors
create table Books (
   book_id int primary key,
   title varchar(100),
   author_id int,
   foreign key (author_id) references Authors(author_id)
);

-- Sample data for Authors
insert into Authors
values
   (1, 'JK Rowling', 'UK'),
   (2, 'Ian Fleming', 'UK'),
   (3, 'Jeff Kinney', 'US');

-- Sample data for Books
insert into Books
values
   (101, 'Harry Potter', 1),
   (102, 'Sherlock Holmes', 2),
   (103, 'Diary of a Wimpy Kid', 3);

-- Output inner join
select
   b.title as 'book_title',
   a.name as 'author_name',
   a.country as 'author_country'
from
   Books b
inner join
   Authors a on b.author_id = a.author_id;
```

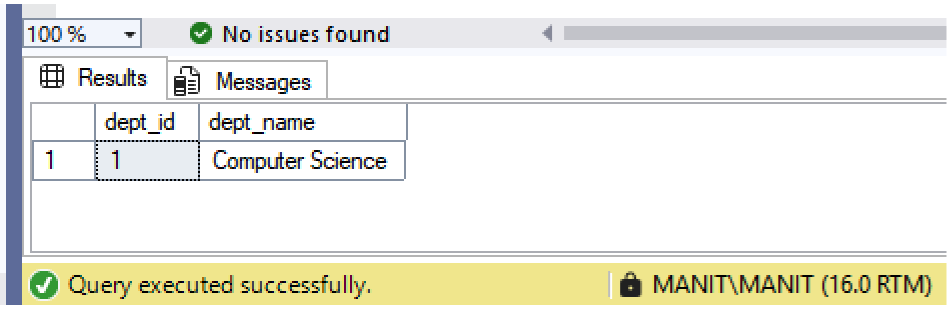


	book_title	author_name	author_country
1	Harry Potter	JK Rowling	UK
2	Sherlock Holmes	Ian Fleming	UK
3	Diary of a Wimpy Kid	Jeff Kinney	US

Q2: Department-Course Subquery and Access Control

```
use KRG_1B;

-- Departments table
create table Departments (
    dept_id int primary key,
    dept_name varchar(100)
);

-- Courses table with foreign key referencing Departments
create table Courses (
    course_id int primary key,
    course_name varchar(100),
    dept_id int,
    foreign key (dept_id) references Departments(dept_id)
);

-- Data for Departments
insert into Departments
values
    (1, 'Computer Science'),
    (2, 'Electrical Engineering'),
    (3, 'Mechanical Engineering'),
    (4, 'Civil Engineering'),
    (5, 'Mathematics');

-- Data for Courses
insert into Courses
values
    (201, 'Data Structures', 1),
    (202, 'Operating Systems', 1),
    (203, 'Database Systems', 1),
    (204, 'Circuits', 2),
    (205, 'Signals and Systems', 2),
    (206, 'Thermodynamics', 3),
    (207, 'Fluid Mechanics', 3),
    (208, 'Statics', 4),
    (209, 'Linear Algebra', 5),
    (210, 'Calculus', 5);
```

```
-- Subquery to get departments offering more than 2 courses
select
    d.dept_id,
    d.dept_name
from
    Departments d
where (
    select count(*)
    from
        Courses c
    where
        c.dept_id = d.dept_id
) > 2;
```



	dept_id	dept_name
1	1	Computer Science

Query executed successfully.

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