EXPERIMENT-1

Student Name: Mohd Shahid
UID: 23BCS10258
Branch: BE-CSE
Section/Group: KRG_1-B
Semester: 5th
Date of Performance: 22/07/2025
Subject Name: ADBMS
Subject Code: 23CSP-333

1. Aim:

--- Easy Level Problem ---

a) Author-Book Relationship Using Joins and Basic SQL Operations

Procedure (Step-by-Step):

1. Design two tables — one for storing author details and the other for book details.
2. Ensure a foreign key relationship from the book to its respective author.
3. Insert at least three records in each table.
4. Perform an INNER JOIN to link each book with its author using the common author ID.
5. Select the book title, author name, and author's country.

--- Medium Level Problem ---

b) Department-Course Subquery and Access Control.

1. Design normalized tables for departments and the courses they offer, maintaining a foreign key relationship.
2. Insert five departments and at least ten courses across those departments.
3. Use a subquery to count the number of courses under each department.
4. Filter and retrieve only those departments that offer more than two courses.
5. Grant SELECT-only access on the courses table to a specific user.

2. Platform Used:

Microsoft SQL Server Management Studio

3. SQL Code:

a)
```
CREATE TABLE TBL_AUTHOR (
    AUTHOR_ID INT PRIMARY KEY,
    AUTHOR_NAME VARCHAR(50),
    AUTHOR_COUNTRY VARCHAR(50)
);

CREATE TABLE TBL_BOOK (
    BOOK_ID INT PRIMARY KEY,
    BOOK_TITLE VARCHAR(50),
    AUTHOR_ID INT,
    FOREIGN KEY (AUTHOR_ID) REFERENCES TBL_AUTHOR(AUTHOR_ID)
);

INSERT INTO TBL_AUTHOR (AUTHOR_ID, AUTHOR_NAME, AUTHOR_COUNTRY) VALUES
(1, 'C.J. Date', 'USA'),
(2, 'Silberschatz', 'Germany'),
(3, 'A. Tanenbaum', 'Netherlands');

INSERT INTO TBL_BOOK (BOOK_ID, BOOK_TITLE, AUTHOR_ID) VALUES
(101, 'Database Systems Concepts', 2),
(102, 'Modern Operating Systems', 3),
(103, 'An Introduction to Database Systems', 1),
(104, 'Computer Architecture', 3),
(105, 'Advanced Database Techniques', 1);

SELECT
    B.BOOK_TITLE,
    A.AUTHOR_NAME,
    A.AUTHOR_COUNTRY
FROM
    TBL_BOOK AS B
INNER JOIN
    TBL_AUTHOR AS A
ON
    B.AUTHOR_ID = A.AUTHOR_ID;
```

b)
```
CREATE TABLE Departments (
    department_id INT PRIMARY KEY,
    department_name VARCHAR(100) NOT NULL
);

CREATE TABLE Courses (
    course_id INT PRIMARY KEY,
    course_name VARCHAR(100) NOT NULL,
    department_id INT,
    FOREIGN KEY (department_id) REFERENCES Departments(department_id)
);

INSERT INTO Departments (department_id, department_name) VALUES
(1, 'Computer Science'),
(2, 'Mechanical Engineering'),
(3, 'Electrical Engineering'),
(4, 'Civil Engineering'),
(5, 'Mathematics');

INSERT INTO Courses (course_id, course_name, department_id) VALUES
(101, 'Data Structures', 1),
(102, 'Operating Systems', 1),
(103, 'Machine Learning', 1),
(104, 'Thermodynamics', 2),
(105, 'Fluid Mechanics', 2),
(106, 'Circuits and Systems', 3),
(107, 'Control Systems', 3),
(108, 'Structural Analysis', 4),
(109, 'Linear Algebra', 5),
(110, 'Calculus', 5),
(111, 'Probability Theory', 5);

SELECT
    department_name,
    (SELECT COUNT(*)
     FROM Courses c
     WHERE c.department_id = d.department_id) AS course_count
FROM Departments d;
```

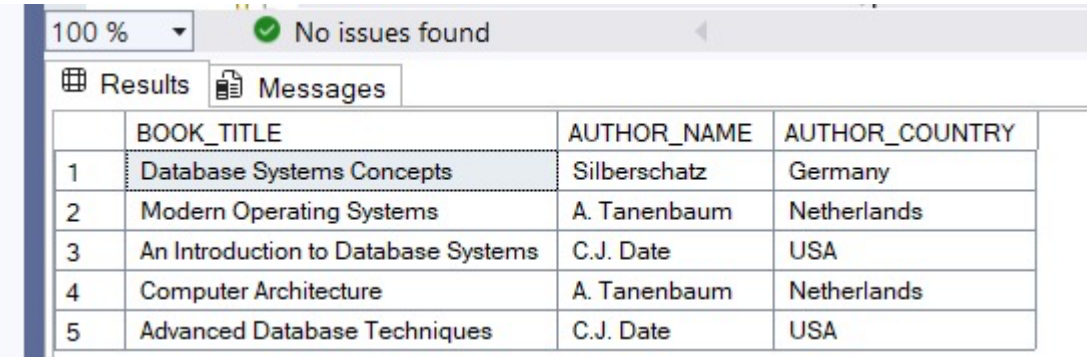
```
SELECT
   department_name,
   (SELECT COUNT(*)
    FROM Courses c
    WHERE c.department_id = d.department_id) AS course_count
FROM Departments d
WHERE (SELECT COUNT(*)
      FROM Courses c
      WHERE c.department_id = d.department_id) > 2;

CREATE LOGIN shahid WITH PASSWORD = 'Password';
CREATE USER shahid FOR LOGIN shahid;

GRANT SELECT ON Courses TO shahid;
```

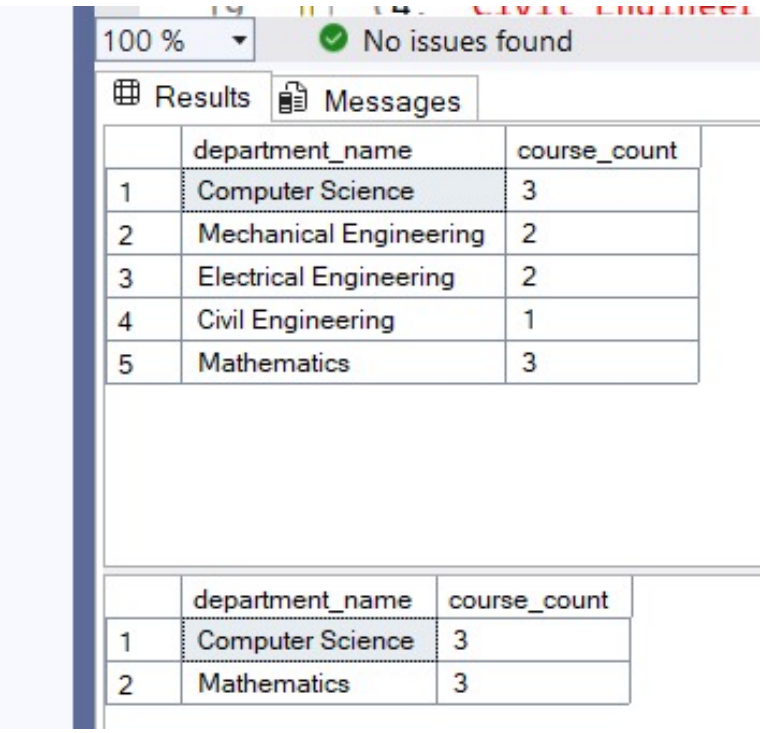
4. Output:

a)



	BOOK_TITLE	AUTHOR_NAME	AUTHOR_COUNTRY
1	Database Systems Concepts	Silberschatz	Germany
2	Modern Operating Systems	A. Tanenbaum	Netherlands
3	An Introduction to Database Systems	C.J. Date	USA
4	Computer Architecture	A. Tanenbaum	Netherlands
5	Advanced Database Techniques	C.J. Date	USA

b)



	department_name	course_count
1	Computer Science	3
2	Mechanical Engineering	2
3	Electrical Engineering	2
4	Civil Engineering	1
5	Mathematics	3

	department_name	course_count
1	Computer Science	3
2	Mathematics	3