UNIVERSITY INSTITUTE OF ENGINEERING

Advanced Database Management System

Experiment 1.1

23CSP-333

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Aim:

Problem 1 Title: 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.

Sample Output Description:

When the join is performed, we get a list where each book title is shown along with its author's name and their country.

Problem 2 Title: Department-Course Subquery and Access Control

Procedure (Step-by-Step):

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.

Sample Output Description:

The result shows the names of departments which are associated with more than two courses in the system.

Code:

Answer 1:

```
CREATE TABLE TBL_AUTHOR
(
AUTHOR_ID INT PRIMARY KEY,
AUTHOR_NAME VARCHAR(MAX),
COUNTRY VARCHAR(MAX)
)
CREATE TABLE TBL_BOOK
(
BOOK_ID INT PRIMARY KEY,
BOOK_TITLE VARCHAR(MAX),
AUTHORID INT
FOREIGN KEY (AUTHORID) REFERENCES
TBL_AUTHOR(AUTHOR_ID)
)
INSERT INTO TBL_AUTHOR VALUES(101,'JAMES
CLEAR','GERMANY')
```

```
INSERT INTO TBL_AUTHOR VALUES(102,'DENNY','CANADA')
INSERT INTO TBL_AUTHOR VALUES(103,'JASON
FRIED','AUSTRALIA')

INSERT INTO TBL_BOOK VALUES(56789,'REWORK', 101)
INSERT INTO TBL_BOOK VALUES(56790,'ALL AND ABOUT', 102)
INSERT INTO TBL_BOOK VALUES(56791,'THE ART', 103)

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

Answer 2:

```
CREATE TABLE TBL_DPT(
DPT_ID INT PRIMARY KEY,
DPT_NAME VARCHAR(MAX));

CREATE TABLE TBL_COURSEE(
COURSE_ID VARCHAR(20) PRIMARY KEY,
COURSE_NAME VARCHAR(MAX),
DPT_ID INT
FOREIGN KEY(DPT_ID) REFERENCES TBL_DPT(DPT_ID));

INSERT INTO TBL_DPT VALUES(101,'Civil Engineering');
INSERT INTO TBL_DPT VALUES(102,'Physics');
INSERT INTO TBL_DPT VALUES(103,'Computer Science');
INSERT INTO TBL_DPT VALUES(104,'Mechanical Engineering');
INSERT INTO TBL_DPT VALUES(105,'Electrical Engineering');

INSERT INTO TBL_COURSEE VALUES('25_CC_301','Data
Structures',103);
INSERT INTO TBL_COURSEE
VALUES('25_CC_302','Thermodynamics',104);
INSERT INTO TBL_COURSEE VALUES('25_CC_303','Fluid
Mechanics',104);
INSERT INTO TBL_COURSEE VALUES('25_CC_304','Machine
Learning',103);
INSERT INTO TBL_COURSEE VALUES('25_CC_305','Operating
Systems',103);
INSERT INTO TBL_COURSEE VALUES('25_CC_306','Geotechnical
Engineering',101);
INSERT INTO TBL_COURSEE VALUES('25_CC_307','Quantum
Mechanics',102);
INSERT INTO TBL_COURSEE VALUES('25_CC_308','Circuit
```

```
Analysis',105);
INSERT INTO TBL_COURSEE VALUES('25_CC_309','Control
Systems',105);
INSERT INTO TBL_COURSEE VALUES('25_CC_310','Power
Systems',105);

SELECT
D.DPT_ID AS [DEPARTMENT ID],
D.DPT_NAME AS [DEPARTMENT NAME],
(
SELECT COUNT(*)
FROM TBL_COURSEE C
WHERE C.DPT_ID = D.DPT_ID
) AS [NUMBER OF COURSES]
FROM TBL_DPT D;

SELECT D.DPT_ID AS [DEPARTMENT ID], D.DPT_NAME
[DEPARTMNET NAME], COUNT(C.COURSE_ID) AS [NUMBER OF
COURSES]
FROM TBL_DPT AS D
INNER JOIN
TBL_COURSEE AS C
ON
D.DPT_ID = C.DPT_ID
GROUP BY D.DPT_ID, D.DPT_NAME
HAVING COUNT(C.COURSE_ID) > 2;
```
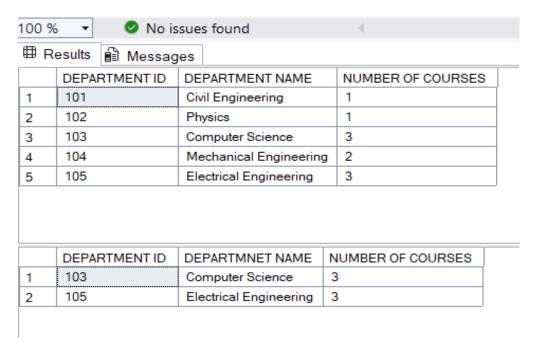
Output 1:

	BOOK_TITLE	AUTHOR_NAME	COUNTRY
1	REWORK	JAMES CLEAR	GERMANY
2	ALL AND ABOUT	DENNY	CANADA
3	THE ART	JASON FRIED	AUSTRALIA

Output 2:

	DEPARTMENT ID	DEPARTMENT NAME	NUMBER OF COURSES
1	101	Civil Engineering	1
2	102	Physics	1
3	103	Computer Science	3
4	104	Mechanical Engineering	2
5	105	Electrical Engineering	3

	DEPARTMENT ID	DEPARTMNET NAME	NUMBER OF COURSES
1	103	Computer Science	3
2	105	Electrical Engineering	3

Conclusion :

In this experiment, we successfully demonstrated the use of SQL for managing relational data and implementing key database operations. In Problem 1, we established a one-to-many relationship between authors and books using foreign keys and performed an INNER JOIN to retrieve combined data from both tables, effectively showing how relationships across entities can be queried. In Problem 2, we normalized departmental and course data, used subqueries and aggregate functions to analyze departmental course counts, and applied access control using the GRANT command. These tasks reinforced concepts such as joins, subqueries, foreign key constraints, and privilege management, which are essential for efficient and secure database design and querying.