

PG-DAC AUGUST 25
Assignment No- 5

Answers

Write Create a Employee ,Department & Project Tables .Add atleast 5 records in each table.

```
CREATE TABLE Department (DeptID INT PRIMARY KEY, DeptName VARCHAR(50), Location VARCHAR(50));
```

```
INSERT INTO Department VALUES (1,'HR','Mumbai'), (2,'Finance','Delhi'), (3,'IT','Bangalore'), (4,'Sales','Mumbai'), (5,'Marketing','Chennai');
```

```
CREATE TABLE Employee (EmpID INT PRIMARY KEY AUTO_INCREMENT, EmpName VARCHAR(50), Salary DECIMAL(10,2), DeptID INT, Designation VARCHAR(50), FOREIGN KEY (DeptID) REFERENCES Department(DeptID));
```

```
INSERT INTO Employee (EmpName,Salary,DeptID,Designation) VALUES ('Amit',55000,1,'HR Executive'), ('Priya',75000,3,'Developer'), ('Raj',45000,NULL,'Intern'), ('Sneha',80000,2,'Accountant'), ('Vikas',65000,4,'Sales Executive');
```

```
CREATE TABLE Project (ProjectID INT PRIMARY KEY, ProjectName VARCHAR(50), DeptID INT, Budget DECIMAL(12,2), FOREIGN KEY (DeptID) REFERENCES Department(DeptID));
```

```
INSERT INTO Project VALUES (101,'HR System Upgrade',1,200000), (102,'ERP Implementation',2,500000), (103,'Website Revamp',3,150000), (104,'Market Analysis',5,120000), (105,'Sales Automation',4,300000);
```

```
mysql> select * from Department;
+-----+-----+-----+
| DeptID | DeptName | Location |
+-----+-----+-----+
| 1      | HR       | Mumbai  |
| 2      | Finance  | Delhi    |
| 3      | IT       | Bangalore |
| 4      | Sales    | Mumbai  |
| 5      | Marketing | Chennai  |
+-----+-----+-----+
5 rows in set (0.01 sec)

mysql> select * from Employee;
+-----+-----+-----+-----+-----+
| EmpID | EmpName | Salary | DeptID | Designation |
+-----+-----+-----+-----+-----+
| 1      | Amit    | 55000.00 | 1      | HR Executive |
| 2      | Priya   | 75000.00 | 3      | Developer    |
| 3      | Raj     | 45000.00 | NULL   | Intern       |
| 4      | Sneha   | 80000.00 | 2      | Accountant   |
| 5      | Vikas   | 65000.00 | 4      | Sales Executive |
+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql> select * from Project;
+-----+-----+-----+-----+
| ProjectID | ProjectName | DeptID | Budget |
+-----+-----+-----+-----+
| 101      | HR System Upgrade | 1      | 200000.00 |
| 102      | ERP Implementation | 2      | 500000.00 |
| 103      | Website Revamp    | 3      | 150000.00 |
| 104      | Market Analysis   | 5      | 120000.00 |
| 105      | Sales Automation  | 4      | 300000.00 |
+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

Write a following Queries.

1. Write a Relational Algebra expression to perform **Cartesian Product (Cross Join)** between Emp and Dept tables.

Employee \times Department

2. Write a SQL query to perform an **INNER JOIN** between Emp and Dept tables displaying EmpName and DeptName.

SELECT E.EmpName,D.DeptName FROM Employee E INNER JOIN Department D ON E.DeptID=D.DeptID;

```
mysql> SELECT E.EmpName,D.DeptName FROM Employee E INNER JOIN Department D ON E.DeptID=D.DeptID;
+-----+-----+
| EmpName | DeptName |
+-----+-----+
| Amit    | HR       |
| Priya   | IT       |
| Sneha   | Finance  |
| Vikas   | Sales    |
+-----+-----+
4 rows in set (0.01 sec)
```

3. Write a SQL query to perform a **LEFT OUTER JOIN** between Emp and Dept tables to display all employees along with their department information, including employees without a department.

SELECT E.EmpName,D.DeptName,D.Location FROM Employee E LEFT JOIN Department D ON E.DeptID=D.DeptID;

```
mysql> SELECT E.EmpName,D.DeptName,D.Location FROM Employee E LEFT JOIN Department D ON E.DeptID=D.DeptID;
+-----+-----+-----+
| EmpName | DeptName | Location |
+-----+-----+-----+
| Amit    | HR       | Mumbai  |
| Priya   | IT       | Bangalore |
| Raj     | NULL     | NULL     |
| Sneha   | Finance  | Delhi    |
| Vikas   | Sales    | Mumbai  |
+-----+-----+-----+
5 rows in set (0.01 sec)
```

4. Write a SQL query to perform a **RIGHT OUTER JOIN** between Emp and Dept tables.

SELECT E.EmpName,D.DeptName FROM Employee E RIGHT JOIN Department D ON E.DeptID=D.DeptID;

```
mysql> SELECT E.EmpName,D.DeptName FROM Employee E RIGHT JOIN Department D ON E.DeptID=D.DeptID;
+-----+-----+
| EmpName | DeptName |
+-----+-----+
| Amit    | HR       |
| Sneha   | Finance  |
| Priya   | IT       |
| Vikas   | Sales    |
| NULL    | Marketing |
+-----+-----+
5 rows in set (0.01 sec)
```

5. Write a SQL query to perform a **NATURAL JOIN** between Emp and Dept.

SELECT * FROM Employee NATURAL JOIN Department;

```
mysql> SELECT * FROM Employee NATURAL JOIN Department;
```

DeptID	EmpID	EmpName	Salary	Designation	DeptName	Location
1	1	Amit	55000.00	HR Executive	HR	Mumbai
3	2	Priya	75000.00	Developer	IT	Bangalore
2	4	Sneha	80000.00	Accountant	Finance	Delhi
4	5	Vikas	65000.00	Sales Executive	Sales	Mumbai

4 rows in set (0.00 sec)

6. Write a SQL query to perform a **CROSS JOIN** between Emp and Project table.

SELECT E.EmpName,P.ProjectName FROM Employee E CROSS JOIN Project P;

```
mysql> SELECT E.EmpName,P.ProjectName FROM Employee E CROSS JOIN Project P;
```

EmpName	ProjectName
Vikas	HR System Upgrade
Sneha	HR System Upgrade
Raj	HR System Upgrade
Priya	HR System Upgrade
Amit	HR System Upgrade
Vikas	ERP Implementation
Sneha	ERP Implementation
Raj	ERP Implementation
Priya	ERP Implementation
Amit	ERP Implementation
Vikas	Website Revamp
Sneha	Website Revamp
Raj	Website Revamp
Priya	Website Revamp
Amit	Website Revamp
Vikas	Market Analysis
Sneha	Market Analysis
Raj	Market Analysis
Priya	Market Analysis
Amit	Market Analysis
Vikas	Sales Automation
Sneha	Sales Automation
Raj	Sales Automation
Priya	Sales Automation
Amit	Sales Automation

25 rows in set (0.01 sec)

7. Write a SQL query to create a new table **EmpBackup** with the same structure as Emp but no data.

CREATE TABLE EmpBackup AS SELECT * FROM Employee WHERE 1=0;

8. Write a SQL query to copy all data from Emp into EmpBackup table.

INSERT INTO EmpBackup SELECT * FROM Employee;

```
mysql> select * from EmpBackup;
```

EmpID	EmpName	Salary	DeptID	Designation
1	Amit	55000.00	1	HR Executive
2	Priya	75000.00	3	Developer
3	Raj	45000.00	NULL	Intern
4	Sneha	80000.00	2	Accountant
5	Vikas	65000.00	4	Sales Executive

5 rows in set (0.00 sec)

9. Write a SQL query to create a new table **ProjectArchive** with the same structure and data as **Project**.

CREATE TABLE ProjectArchive AS SELECT * FROM Project;

```
mysql> select * from ProjectArchive;
```

ProjectID	ProjectName	DeptID	Budget
101	HR System Upgrade	1	200000.00
102	ERP Implementation	2	500000.00
103	Website Revamp	3	150000.00
104	Market Analysis	5	120000.00
105	Sales Automation	4	300000.00

5 rows in set (0.00 sec)

10. Write a SQL query to create an **AUTO_INCREMENT** sequence for **EmpID** in the **Emp** table during table creation.

Already defined

11. Write a SQL query using a **subquery** to find all employees whose salary is greater than the **average salary of all employees**.

SELECT EmpName,Salary FROM Employee WHERE Salary > (SELECT AVG(Salary) FROM Employee);

```
mysql> SELECT EmpName,Salary FROM Employee WHERE Salary > (SELECT AVG(Salary) FROM Employee);
```

EmpName	Salary
Priya	75000.00
Sneha	80000.00
Vikas	65000.00

3 rows in set (0.00 sec)

12. Write a SQL query using a **subquery in WHERE clause** to find employees working in departments located in 'Mumbai'.

SELECT EmpName FROM Employee WHERE DeptID IN (SELECT DeptID FROM Department WHERE Location='Mumbai');

```
mysql> SELECT EmpName FROM Employee WHERE DeptID IN (SELECT DeptID FROM Department WHERE Location='Mumbai');
```

EmpName
Amit
Vikas

2 rows in set (0.00 sec)

13. Write a SQL query to display all departments where the number of employees is greater than **5**, using a subquery.

SELECT DeptName FROM Department WHERE DeptID IN (SELECT DeptID FROM Employee GROUP BY DeptID HAVING COUNT(EmpID)>5);

```
mysql> SELECT DeptName FROM Department WHERE DeptID IN (SELECT DeptID FROM Employee GROUP BY DeptID HAVING COUNT(EmpID)>5);
```

Empty set (0.00 sec)

14. Write a subqueries for find out Max salary of employee.

SELECT EmpName,Salary FROM Employee WHERE Salary=(SELECT MAX(Salary) FROM Employee);

```
mysql> SELECT EmpName,Salary FROM Employee WHERE Salary=(SELECT MAX(Salary) FROM Employee);
+-----+-----+
| EmpName | Salary |
+-----+-----+
| Sneha   | 80000.00 |
+-----+-----+
1 row in set (0.00 sec)
```

15. Write a self join query for each table.

Self join on Employee:

SELECT E1.EmpName AS Emp1,E2.EmpName AS Emp2,E1.DeptID FROM Employee E1 JOIN Employee E2 ON E1.DeptID=E2.DeptID WHERE E1.EmpID<>E2.EmpID;

```
mysql> SELECT E1.EmpName AS Emp1,E2.EmpName AS Emp2,E1.DeptID FROM Employee E1 JOIN Employee E2 ON E1.DeptID=E2.DeptID WHERE E1.EmpID<>E2.EmpID;
Empty set (0.01 sec)
```

Self Join on Department:

SELECT D1.DeptName AS Dept1,D2.DeptName AS Dept2,D1.Location FROM Department D1 JOIN Department D2 ON D1.Location=D2.Location WHERE D1.DeptID<>D2.DeptID;

```
mysql> SELECT D1.DeptName AS Dept1,D2.DeptName AS Dept2,D1.Location FROM Department D1 JOIN Department D2 ON D1.Location=D2.Location WHERE D1.DeptID<>D2.DeptID;
+-----+-----+-----+
| Dept1 | Dept2 | Location |
+-----+-----+-----+
| Sales | HR    | Mumbai  |
| HR    | Sales | Mumbai  |
+-----+-----+-----+
2 rows in set (0.01 sec)
```

Self Join on Project:

SELECT P1.ProjectName AS Proj1,P2.ProjectName AS Proj2,P1.DeptID FROM Project P1 JOIN Project P2 ON P1.DeptID=P2.DeptID WHERE P1.ProjectID<>P2.ProjectID;

```
mysql> SELECT P1.ProjectName AS Proj1,P2.ProjectName AS Proj2,P1.DeptID FROM Project P1 JOIN Project P2 ON P1.DeptID=P2.DeptID WHERE P1.ProjectID<>P2.ProjectID;
Empty set (0.00 sec)
```