

# SETUP

```
DROP DATABASE project_db;
```

```
CREATE DATABASE project_db;  
USE project_db;
```

## SCHEMA CREATION

```
-- Create Department table
```

```
CREATE TABLE Department (  
    DeptID INT PRIMARY KEY AUTO_INCREMENT,  
    DeptName VARCHAR(255),  
    ManagerID INT  
);
```

```
-- Create Employee table
```

```
CREATE TABLE Employee (  
    EmplID INT PRIMARY KEY,  
    Name VARCHAR(255),  
    DeptID INT,  
    Salary INT,  
    Experience VARCHAR(255),  
    FOREIGN KEY (DeptID) REFERENCES Department(DeptID)  
);
```

```
-- Create Project table
```

```
CREATE TABLE Project (  
    ProjectID INT PRIMARY KEY,  
    ProjectName VARCHAR(255),  
    DeptID INT,  
    Budget INT,  
    FOREIGN KEY (DeptID) REFERENCES Department(DeptID)  
);
```

```
-- Create Works_On table
```

```
CREATE TABLE Works_On (  
    EmplID INT,  
    ProjectID INT,  
    HoursWorked INT,  
    PRIMARY KEY (EmplID, ProjectID),  
    FOREIGN KEY (EmplID) REFERENCES Employee(EmplID),  
    FOREIGN KEY (ProjectID) REFERENCES Project(ProjectID)  
);
```

```
mysql> SHOW TABLES;
+-----+
| Tables_in_project_db |
+-----+
| Department            |
| Employee              |
| Project               |
| Works_On              |
+-----+
4 rows in set (0.00 sec)
```

```
mysql> DESC Department;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| DeptID     | int           | NO   | PRI | NULL    | auto_increment |
| DeptName   | varchar(255)  | YES  |     | NULL    |                |
| ManagerID  | int           | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

```
mysql> DESC Employee;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| EmpID      | int           | NO   | PRI | NULL    |                |
| Name       | varchar(255)  | YES  |     | NULL    |                |
| DeptID     | int           | YES  | MUL | NULL    |                |
| Salary     | int           | YES  |     | NULL    |                |
| Experience | varchar(255)  | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql> DESC Project;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| ProjectID  | int           | NO   | PRI | NULL    |                |
| ProjectName | varchar(255)  | YES  |     | NULL    |                |
| DeptID     | int           | YES  | MUL | NULL    |                |
| Budget     | int           | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)
```

```
mysql> DESC Works_On;
+-----+-----+-----+-----+-----+-----+
| Field      | Type | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| EmpID      | int  | NO   | PRI | NULL    |                |
| ProjectID  | int  | NO   | PRI | NULL    |                |
| HoursWorked | int  | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

# DATA INSERTION

-- Inserting data into the Department table

```
INSERT INTO Department (DeptName, ManagerID) VALUES  
( 'HR', 201),  
( 'IT', 202),  
( 'Finance', 203);
```

```
mysql> SELECT * FROM Department;  
+-----+-----+-----+  
| DeptID | DeptName | ManagerID |  
+-----+-----+-----+  
|      1 | HR      |      201 |  
|      2 | IT      |      202 |  
|      3 | Finance |      203 |  
+-----+-----+-----+  
3 rows in set (0.00 sec)
```

-- Inserting data into the Employee table

```
INSERT INTO Employee (EmplID, Name, DeptID, Salary, Experience) VALUES  
(101, 'Alice', 1, 50000, '5 years'),  
(102, 'Bob', 2, 70000, '7 years'),  
(103, 'Carol', 1, 65000, '6 years'),  
(104, 'David', 3, 72000, '8 years'),  
(105, 'Eve', 2, 52000, '64 years');
```

```
mysql> SELECT * FROM Employee;  
+-----+-----+-----+-----+-----+  
| EmplID | Name  | DeptID | Salary | Experience |  
+-----+-----+-----+-----+-----+  
|    101 | Alice |      1 | 50000 | 5 years   |  
|    102 | Bob   |      2 | 70000 | 7 years   |  
|    103 | Carol |      1 | 65000 | 6 years   |  
|    104 | David |      3 | 72000 | 8 years   |  
|    105 | Eve   |      2 | 52000 | 64 years  |  
+-----+-----+-----+-----+-----+  
5 rows in set (0.00 sec)
```

-- Inserting data into the Project table

```
INSERT INTO Project (ProjectID, ProjectName, DeptID, Budget) VALUES  
(501, 'Alpha', 1, 500000),  
(502, 'Beta', 2, 700000),  
(503, 'Gamma', 1, 650000),  
(504, 'Delta', 3, 720000);
```

```
mysql> SELECT * FROM Project;  
+-----+-----+-----+-----+  
| ProjectID | ProjectName | DeptID | Budget |  
+-----+-----+-----+-----+  
|      501 | Alpha      |      1 | 500000 |  
|      502 | Beta       |      2 | 700000 |  
|      503 | Gamma      |      1 | 650000 |  
|      504 | Delta      |      3 | 720000 |  
+-----+-----+-----+-----+  
4 rows in set (0.00 sec)
```

-- Inserting data into the Works\_On table

```
INSERT INTO Works_On (EmplID, ProjectID, HoursWorked) VALUES  
(101, 501, 30),  
(102, 502, 25),  
(103, 503, 20),  
(104, 504, 35),  
(105, 502, 28);
```

```
mysql> SELECT * FROM Works_On;  
+-----+-----+-----+  
| EmplID | ProjectID | HoursWorked |  
+-----+-----+-----+  
|    101 |      501 |          30 |  
|    102 |      502 |          25 |  
|    103 |      503 |          20 |  
|    104 |      504 |          35 |  
|    105 |      502 |          28 |  
+-----+-----+-----+  
5 rows in set (0.00 sec)
```

# NESTED QUERIES

Q1)

```
SELECT DISTINCT DeptName
FROM Department
WHERE DeptID IN (
    SELECT DeptID FROM Employee
    WHERE Salary > 60000
);
```

```
+-----+
| DeptName |
+-----+
| HR       |
| IT       |
| Finance  |
+-----+
3 rows in set (0.01 sec)
```

Q2)

```
SELECT emp.Name
FROM Employee emp
WHERE EXISTS (
    SELECT * FROM Project proj
    JOIN Works_On worksOn ON proj.ProjectID = worksOn.ProjectID
    WHERE worksOn.EmplD = emp.EmplD AND proj.DeptID = emp.DeptID
);
```

```
+-----+
| Name |
+-----+
| Alice |
| Bob   |
| Carol |
| David |
| Eve   |
+-----+
5 rows in set (0.00 sec)
```

Q3)

```
SELECT DeptName
FROM Department dept
WHERE NOT EXISTS (
    SELECT * FROM Employee emp
    WHERE emp.DeptID = dept.DeptID AND emp.Salary <= (
        SELECT AVG(Salary)
        FROM Employee
    )
);
```

```
+-----+
| DeptName |
+-----+
| Finance |
+-----+
1 row in set (0.00 sec)
```

Q4)

```
SELECT emp.Name
FROM Employee emp
WHERE NOT EXISTS (
    SELECT proj.ProjectID
    FROM Project proj
    JOIN Department dept ON proj.DeptID = dept.DeptID
    WHERE dept.DeptName = 'HR'
    AND NOT EXISTS (
        SELECT * FROM Works_On worksOn
        WHERE worksOn.EmplID = emp.EmplID AND worksOn.ProjectID = proj.ProjectID
    )
);
```

```
Empty set (0.00 sec)
```

Q5)

```
SELECT DISTINCT emp.Name
FROM Employee emp
JOIN Works_On worksOn ON emp.EmplID = worksOn.EmplID
JOIN Project proj ON worksOn.ProjectID = proj.ProjectID
WHERE proj.Budget > 600000;
```

```
+-----+
| Name |
+-----+
| Bob |
| Eve |
| Carol |
| David |
+-----+
4 rows in set (0.01 sec)
```

## Aggregates, Group By, Having

Q6)

```
SELECT dept.DeptName, SUM(emp.Salary) AS TotalSalary
FROM Department dept
JOIN Employee emp ON dept.DeptID = emp.DeptID
GROUP BY dept.DeptName;
```

DeptName	TotalSalary
HR	115000
IT	122000
Finance	72000

3 rows in set (0.00 sec)

Q7)

```
SELECT dept.DeptName, SUM(emp.Salary) AS TotalSalary
FROM Department dept
JOIN Employee emp ON dept.DeptID = emp.DeptID
GROUP BY dept.DeptName
HAVING SUM(emp.Salary) > 100000;
```

DeptName	TotalSalary
HR	115000
IT	122000

2 rows in set (0.00 sec)

Q8)

```
SELECT proj.ProjectName, SUM(worksOn.HoursWorked) AS TotalHoursWorked
FROM Project proj
JOIN Works_On worksOn ON proj.ProjectID = worksOn.ProjectID
GROUP BY proj.ProjectName
HAVING SUM(worksOn.HoursWorked) > (
    SELECT AVG(HoursWorked) FROM Works_On
);
```

ProjectName	TotalHoursWorked
Alpha	30
Beta	53
Delta	35

3 rows in set (0.00 sec)

Q9)

```
SELECT dept.DeptName, AVG(emp.Salary) AS AvgSalary
FROM Department dept
JOIN Employee emp ON dept.DeptID = emp.DeptID
GROUP BY dept.DeptName
HAVING AVG(emp.Salary) > 60000;
```

```
+-----+-----+
| DeptName | AvgSalary |
+-----+-----+
| IT       | 61000.0000 |
| Finance  | 72000.0000 |
+-----+-----+
2 rows in set (0.00 sec)
```

Q10)

```
SELECT dept.DeptName, AVG(emp.Salary) AS AvgSalary
FROM Department dept
JOIN Employee emp ON dept.DeptID = emp.DeptID
GROUP BY dept.DeptName
HAVING AVG(emp.Salary) > (
    SELECT AVG(Salary) FROM Employee
);
```

```
+-----+-----+
| DeptName | AvgSalary |
+-----+-----+
| Finance  | 72000.0000 |
+-----+-----+
1 row in set (0.00 sec)
```



Q11)

```
SELECT emp.EmplID AS EmplID, emp.Name, proj.ProjectID, proj.Budget
FROM Employee emp
JOIN Works_On worksOn ON emp.EmplID = worksOn.EmplID
JOIN Project proj ON worksOn.ProjectID = proj.ProjectID
WHERE proj.Budget >= 700000 AND emp.Salary >= 70000;
```

```
+-----+-----+-----+-----+
| EmplID | Name  | ProjectID | Budget |
+-----+-----+-----+-----+
|      102 | Bob   |      502 | 700000 |
|      104 | David |      504 | 720000 |
+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

Q12)

```
SELECT emp.EmplID AS EmplID, emp.Name, worksOn.ProjectID, worksOn.HoursWorked
FROM Employee emp
JOIN Works_On worksOn ON emp.EmplID = worksOn.EmplID
WHERE worksOn.HoursWorked BETWEEN 28 AND 30;
```

```
+-----+-----+-----+-----+
| EmplID | Name  | ProjectID | HoursWorked |
+-----+-----+-----+-----+
|      101 | Alice |      501 |      30 |
|      105 | Eve   |      502 |      28 |
+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```