MYSQL PROJECT PRESENTATION

PRESENTED BY

PRAVEEN S

# **Project Title**:

## Comprehensive Employee Management System

**Objective:**

Students will create and manage a complex SQL database designed to handle employee records, department information, salary details, project assignments, performance reviews, and more. This project will help students learn SQL commands, create tables, manage data, perform subqueries, joins, aggregate functions, and manage transactions, all with a substantial dataset.

**Database Design:**

- Database Name: `employee_management_system`

- Tables:

1. Departments
   - `dept_id` (Primary Key, INT)
   - `dept_name` (VARCHAR)
   - `location` (VARCHAR)
2. Employees
   - `emp_id` (Primary Key, INT, AUTO_INCREMENT)
   - `emp_name` (VARCHAR)
   - `dept_id` (INT)

- `position` (VARCHAR)
- `salary` (INT)
- `hire_date` (DATE)
- `email` (VARCHAR)
- `phone` (VARCHAR)

3. Salaries
- `salary_id` (Primary Key, INT, AUTO_INCREMENT)
- `emp_id` (INT)
- `base_salary` (INT)
- `bonus` (INT)
- `total_salary` (Computed)
- `pay_date` (DATE)

4. Projects
- `project_id` (Primary Key, INT, AUTO_INCREMENT)
- `project_name` (VARCHAR)
- `start_date` (DATE)
- `end_date` (DATE)
- `budget` (INT)

5. EmployeeProjects
- `emp_id` (INT)
- `project_id` (INT)
- `role` (VARCHAR)

6. PerformanceReviews
- `review_id` (Primary Key, INT, AUTO_INCREMENT)
- `emp_id` (INT)
- `review_date` (DATE)

- `review_score` (INT)

- `comments` (TEXT)

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# Step-by-Step Implementation with Large Sample Data

# # Step 1: Create the Database

```
CREATE DATABASE employee_management_system;

USE employee_management_system;
```

- Explanation:

  - The `CREATE DATABASE` command creates a new database.

  - The `USE` command switches to the `employee_management_system` database.

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# # Step 2: Create the Tables

**1. Departments Table:**

```
CREATE TABLE Departments (
    dept_id INT PRIMARY KEY,
    dept_name VARCHAR(50),
    location VARCHAR(50)
```

);

- Explanation:

  - The `Departments` table includes a unique `dept_id`, the department's name, and its location.

**2. Employees Table:**

```
CREATE TABLE Employees (
    emp_id INT PRIMARY KEY AUTO_INCREMENT,
    emp_name VARCHAR(50) NOT NULL,
    dept_id INT,
    position VARCHAR(50),
    salary INT,
    hire_date DATE,
    email VARCHAR(100),
    phone VARCHAR(15)
);
```

- Explanation:

  - The `Employees` table now includes additional columns for `email` and `phone` to store contact details.

**3. Salaries Table:**

```
CREATE TABLE Salaries (
    salary_id INT PRIMARY KEY AUTO_INCREMENT,
    emp_id INT,
    base_salary INT,
```

```
    bonus INT,
    total_salary AS (base_salary + bonus),
    pay_date DATE
);
```

- Explanation:
  - The `Salaries` table now includes a `pay_date` column to track when salaries were paid.

**4. Projects Table:**

```
CREATE TABLE Projects (
    project_id INT PRIMARY KEY AUTO_INCREMENT,
    project_name VARCHAR(100),
    start_date DATE,
    end_date DATE,
    budget INT
);
```

- Explanation:
  - The `Projects` table tracks projects with their names, start and end dates, and budget.

**5. EmployeeProjects Table:**

```
CREATE TABLE EmployeeProjects (
    emp_id INT,
    project_id INT,
    role VARCHAR(50)
);
```

- Explanation:

  - The `EmployeeProjects` table links employees to projects and assigns them roles.

**6. PerformanceReviews Table:**

```
CREATE TABLE PerformanceReviews (
    review_id INT PRIMARY KEY AUTO_INCREMENT,
    emp_id INT,
    review_date DATE,
    review_score INT,
    comments TEXT
);
```

- Explanation:

  - The `PerformanceReviews` table stores reviews for each employee, with a score and comments.

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# # Step 3: Insert Extensive Sample Data

**1. Insert Data into Departments Table:**

```
-- Inserting 20  random values into the table
INSERT INTO Departments (dept_id, dept_name, location) VALUES
(101,"IT",'UK'),
 (102,"HR",'INDIA'),
 (103,"SALES",'NEW YORK'),
```

**(104,"IT",'SINGAPORE'),**

**(105,"HR",'NEW YORK'),**

**(106,"SALES",'USA'),**

**(107,"IT",'INDIA'),**

**(108,"FINANCE",'JAPAN'),**

**(109,"HR",'AFRICA'),**

**(110,"TESTER",'MEXICO'),**

**(111,"TESTER",'UK'),**

**(112,"IT",'AFRICA'),**

**(113,"MARKETING",'USA'),**

**(114,"CUSTOMER SUPPORT",'UAE'),**

**(115,"TESTER",'USA'),**

**(116,"FINANCE",'NWE YORK'),**

**(117,"SALES",'UAE'),**

**(118,"HR",'INDIA'),**

**(119,"COUSTOMER SUPPORT",'UK'),**

**(120,"LEGAL",'SINGAPORE');**

**OUTPUT;**

```
Database changed
mysql> select * from department;
+---------+-------------------+-----------+
| dept_id | dept_name         | location  |
+---------+-------------------+-----------+
|     101 | IT                | UK        |
|     102 | HR                | INDIA     |
|     103 | SALES             | NEW YORK  |
|     104 | IT                | SINGAPORE |
|     105 | HR                | NEW YORK  |
|     106 | SALES             | USA       |
|     107 | IT                | INDIA     |
|     108 | FINANCE           | JAPAN     |
|     109 | HR                | AFRICA    |
|     110 | TESTER            | MEXICO    |
|     111 | TESTER            | UK        |
|     112 | IT                | AFRICA    |
|     113 | MARKETING         | USA       |
|     114 | CUSTOMER SUPPORT  | UAE       |
|     115 | TESTER            | USA       |
|     116 | FINANCE           | NWE YORK  |
|     117 | SALES             | UAE       |
|     118 | HR                | INDIA     |
|     119 | COUSTOMER SUPPORT | UK        |
|     120 | LEGAL             | SINGAPORE |
+---------+-------------------+-----------+
20 rows in set (0.18 sec)
```

**2. Insert Data into Employees Table:**

-- Inserting 20 random values into the table

INSERT INTO Employees (emp_Name, dept_ID, position, salary, hire_date, email, phone)

VALUES

('Christopher Lee',101, 'Legal Advisor', 100000, '2019-07-18',

'christo@example.com', '123-555-7898'),

('Ashley Hernandez', 102, 'PR Specialist', 65000, '2022-03-29',

'ashley@example.com', '123-555-7899'),

('George Lee', 103, 'IT', 55000, '2022-07-20', 'georgele@example.com', '555-345-1131'),

('Hannah Adams', 104, 'IT', 83000, '2024-04-05', 'hannaha@example.com', '555-456-1417'),

('Isaac Newton', 105, 'IT', 67000, '2023-11-12', 'newton@example.com', '555-567-1519'),

('Julia Roberts', 106, 'Sales', 72000, '2022-09-25', 'roberts@example.com', '555-678-2420'),

('Kevin Hart', 107, 'Sales', 80000, '2023-05-14', 'kevin@example.com', '555-789-5991'),

('Laura Croft', 108, 'HR', 69000, '2022-10-30', 'laura@example.com', '555-890-8581'),

('Mike Wazowski', 109, 'HR', 64000, '2023-03-19', 'wazowski@example.com','555-901-2212'),

('Paula Abdul', 110, 'Finance', 67000, '2023-07-29', 'abdul@example.com', '555-345-3337'),

('Quincy Jones', 111, 'Sales', 79000, '2023-04-10', 'jones@example.com', '555-456-4448'),

('Steve Rogers', 112, 'Testing', 62000, '2024-01-18', 'rogers@example.com','555-678-1912'),

('Tina Fey', 113, 'Finance', 88000, '2023-09-09', 'fey@example.com', '555-789-8282'),

('Grace Mitchell', 113, 'SEO Specialist', 61000, '2021-03-06', 'gracemitc@example.com','123-555-7911'),

('Ethan Perez', 115, 'Sales Executive', 76000, '2018-07-09', 'ethanperez@example.com','123-555-7912'),

('Victoria Allen', 116, 'IT Manager', 90000, '2020-10-11', 'aallen@example.com','123-555-7913'),

('Tyler Ramirez', 117, 'Investment Analyst', 87000, '2022-05-21','tyler@example.com', '123-555-7914'),

('Brianna Thomas', 118, 'Research Scientist', 97000, '2023-04-14','thomas@example.com', '123-555-7915'),

('Mason Moore', 119, 'Customer Service Manager', 55000, '2019-03-30','masonmoore@example.com', '123-555-7916'),

('Rachel Green', 120, 'Testing', 76000, '2022-06-25', 'rachel@example.com','555-567-2231');

**OUTPUT;**

```
mysql> select * from employee;
+--------+------------------+---------+-------------------------+--------+------------+-----------------------+--------------+
| emp_id | emp_name         | dept_id | position                | salary | hire_date  | email                 | phone        |
+--------+------------------+---------+-------------------------+--------+------------+-----------------------+--------------+
|      1 | Christopher Lee  |     101 | Legal Advisor           | 100000 | 2019-07-18 | christo@example.com   | 123-555-7898 |
|      2 | Ashley Hernandez |     102 | PR Specialist           |  65000 | 2022-03-29 | ashley@example.com    | 123-555-7899 |
|      3 | George Lee       |     103 | IT                      |  55000 | 2022-07-20 | georgele@example.com  | 555-345-1131 |
|      4 | Hannah Adams     |     104 | IT                      |  83000 | 2024-04-05 | hannaha@example.com   | 555-456-1417 |
|      5 | Isaac Newton     |     105 | IT                      |  67000 | 2023-11-12 | newton@example.com    | 555-567-1519 |
|      6 | Julia Roberts    |     106 | Sales                   |  72000 | 2022-09-25 | roberts@example.com   | 555-678-2420 |
|      7 | Kevin Hart       |     107 | Sales                   |  80000 | 2023-05-14 | kevin@example.com     | 555-789-5991 |
|      8 | Laura Croft      |     108 | HR                      |  69000 | 2022-10-30 | laura@example.com     | 555-890-8581 |
|      9 | Mike Wazowski    |     109 | HR                      |  64000 | 2023-03-19 | wazowski@example.com  | 555-901-2212 |
|     10 | Paula Abdul      |     110 | Finance                 |  67000 | 2023-07-29 | abdul@example.com     | 555-345-3337 |
|     11 | Quincy Jones     |     111 | Sales                   |  79000 | 2023-04-10 | jones@example.com     | 555-456-4448 |
|     12 | Steve Rogers     |     112 | Testing                 |  62000 | 2024-01-18 | rogers@example.com    | 555-678-1912 |
|     13 | Tina Fey         |     113 | Finance                 |  88000 | 2023-09-09 | fey@example.com       | 555-789-8282 |
|     14 | Grace Mitchell   |     113 | SEO Specialist          |  61000 | 2021-03-06 | gracemitc@example.com | 123-555-7911 |
|     15 | Ethan Perez      |     115 | Sales Executive         |  76000 | 2018-07-09 | ethanperez@example.com| 123-555-7912 |
|     16 | Victoria Allen   |     116 | IT Manager              |  90000 | 2020-10-11 | aallen@example.com    | 123-555-7913 |
|     17 | Tyler Ramirez    |     117 | Investment Analyst      |  87000 | 2022-05-21 | tyler@example.com     | 123-555-7914 |
|     18 | Brianna Thomas   |     118 | Research Scientist      |  97000 | 2023-04-14 | thomas@example.com    | 123-555-7915 |
|     19 | Mason Moore      |     119 | Customer Service Manager|  55000 | 2019-03-30 | masonmoore@example.com| 123-555-7916 |
|     20 | Rachel Green     |     120 | Testing                 |  76000 | 2022-06-25 | rachel@example.com    | 555-567-2231 |
+--------+------------------+---------+-------------------------+--------+------------+-----------------------+--------------+
20 rows in set (0.10 sec)
```

**3.Inser Data into Salaries table;**

INSERT INTO Salaries (emp_id, base_salary, bonus, pay_date) values

-- Inserting 20  random values into the table

(1,  5000, 90000, '2023-12-31'),

(2, 3000, 63000, '2023-12-31'),

(3,  2000, 57000, '2023-12-31'),

(4,  4000, 74000, '2023-12-31'),

(5,  3500, 78500, '2023-12-31'),

(6,  6000, 101000, '2023-12-31'),

(7,  1500, 46500, '2023-12-31'),

(8,  3500, 78500, '2023-12-31'),

(9,  7000, 117000, '2023-12-31'),

(10,  3000, 70000, '2021-12-31'),

(11,  2500, 64500, '2023-12-31'),

(12,  2000, 63000, '2023-12-31'),

(13,  4000, 80000, '2023-12-31'),

(14,  5000, 95000, '2022-12-31'),

(15,  4000, 91000, '2022-12-31'),

(16,  6000, 103000, '2022-12-31'),

(17,  2000, 57000, '2021-12-31'),

(18,  7000, 112000, '2021-12-31'),

(19,  8000, 123000, '2024-12-31'),

(20,  3000, 72000, '2024-12-31');

**OUTPUT;**

```
mysql> SELECT * FROM sALARIES;
+-----------+--------+-------------+--------+--------------+------------+
| salary_id | emp_id | base_salary | bonus  | total_salary | pay_date   |
+-----------+--------+-------------+--------+--------------+------------+
|         1 |      1 |        5500 |  90000 |        95500 | 2023-12-31 |
|         2 |      2 |        3000 |  63000 |        66000 | 2023-12-31 |
|         3 |      3 |        2000 |  57000 |        59000 | 2023-12-31 |
|         4 |      4 |        4000 |  74000 |        78000 | 2023-12-31 |
|         5 |      5 |        3500 |  78500 |        82000 | 2023-12-31 |
|         6 |      6 |        6000 | 101000 |       107000 | 2023-12-31 |
|         7 |      7 |        1500 |  46500 |        48000 | 2023-12-31 |
|         8 |      8 |        3500 |  78500 |        82000 | 2023-12-31 |
|         9 |      9 |        7000 | 117000 |       124000 | 2023-12-31 |
|        10 |     10 |        3000 |  70000 |        73000 | 2021-12-31 |
|        11 |     11 |        2500 |  64500 |        67000 | 2023-12-31 |
|        12 |     12 |        2000 |  63000 |        65000 | 2023-12-31 |
|        13 |     13 |        4000 |  80000 |        84000 | 2023-12-31 |
|        14 |     14 |        5000 |  95000 |       100000 | 2022-12-31 |
|        15 |     15 |        4000 |  91000 |        95000 | 2022-12-31 |
|        16 |     16 |        6000 | 103000 |       109000 | 2022-12-31 |
|        17 |     17 |        2000 |  57000 |        59000 | 2021-12-31 |
|        18 |     18 |        7000 | 112000 |       119000 | 2021-12-31 |
|        19 |     19 |        8000 | 123000 |       131000 | 2024-12-31 |
|        20 |     20 |        3000 |  72000 |        75000 | 2024-12-31 |
+-----------+--------+-------------+--------+--------------+------------+
20 rows in set (0.00 sec)
```

**4.Insert into Projects table;**

```
-- Inserting 20  random values into the table
INSERT INTO Projects (project_name, start_date, end_date, budget) values
('Customer Relationship Management (CRM) System', '2024-01-15', '2024-07-15',
90000),
('Mobile App Development', '2024-05-01', '2024-11-01', 130000),
('Cybersecurity Upgrade', '2024-06-01', '2024-10-01', 60000),
('Data Migration', '2024-03-15', '2024-09-15', 45000),
('Sales Training Program', '2024-07-01', '2024-10-31', 25000),
('IT Infrastructure Overhaul', '2024-02-01', '2024-12-31', 200000),
('Employee Wellness Program', '2024-04-15', '2024-12-15', 40000),
('Cloud Migration', '2024-05-15', '2024-11-15', 85000),
('New Headquarters Construction', '2024-03-01', '2025-03-01', 300000),
('AI Integration', '2024-06-15', '2024-12-15', 110000),
('Client Portal Development', '2024-01-20', '2024-07-20', 70000),
('Quality Assurance Revamp', '2024-04-10', '2024-09-10', 55000),
('Supply Chain Optimization', '2024-02-20', '2024-08-20', 95000),
('Customer Relationship Management (CRM) System', '2024-01-15', '2024-07-15',
90000),
('Mobile App Development', '2024-05-01', '2024-11-01', 130000),
('Cybersecurity Upgrade', '2024-06-01', '2024-10-01', 60000),
('Data Migration', '2024-03-15', '2024-09-15', 45000),
('Sales Training Program', '2024-07-01', '2024-10-31', 25000),
('IT Infrastructure Overhaul', '2024-02-01', '2024-12-31', 200000),
('Employee Wellness Program', '2024-04-15', '2024-12-15', 40000);
```

**OUTPUT;**

```
mysql> select * from projects;
+------------+-----------------------------------------------+------------+------------+--------+
| project_id | project_name                                  | start_date | end_date   | budget |
+------------+-----------------------------------------------+------------+------------+--------+
|          1 | Customer Relationship Management (CRM) System | 2024-01-15 | 2024-07-15 |  90000 |
|          2 | Mobile App Development                        | 2024-05-01 | 2024-11-01 | 130000 |
|          3 | Cybersecurity Upgrade                         | 2024-06-01 | 2024-10-01 |  60000 |
|          4 | Data Migration                                | 2024-03-15 | 2024-09-15 |  45000 |
|          5 | Sales Training Program                        | 2024-07-01 | 2024-10-31 |  25000 |
|          6 | IT Infrastructure Overhaul                    | 2024-02-01 | 2024-12-31 | 200000 |
|          7 | Employee Wellness Program                     | 2024-04-15 | 2024-12-15 |  40000 |
|          8 | Cloud Migration                               | 2024-05-15 | 2024-11-15 |  85000 |
|          9 | New Headquarters Construction                 | 2024-03-01 | 2025-03-01 | 300000 |
|         10 | AI Integration                                | 2024-06-15 | 2024-12-15 | 110000 |
|         11 | Client Portal Development                     | 2024-01-20 | 2024-07-20 |  70000 |
|         12 | Quality Assurance Revamp                      | 2024-04-10 | 2024-09-10 |  55000 |
|         13 | Supply Chain Optimization                     | 2024-02-20 | 2024-08-20 |  95000 |
|         14 | Customer Relationship Management (CRM) System | 2024-01-15 | 2024-07-15 |  90000 |
|         15 | Mobile App Development                        | 2024-05-01 | 2024-11-01 | 130000 |
|         16 | Cybersecurity Upgrade                         | 2024-06-01 | 2024-10-01 |  60000 |
|         17 | Data Migration                                | 2024-03-15 | 2024-09-15 |  45000 |
|         18 | Sales Training Program                        | 2024-07-01 | 2024-10-31 |  25000 |
|         19 | IT Infrastructure Overhaul                    | 2024-02-01 | 2024-12-31 | 200000 |
|         20 | Employee Wellness Program                     | 2024-04-15 | 2024-12-15 |  40000 |
+------------+-----------------------------------------------+------------+------------+--------+
20 rows in set (0.00 sec)
```

**5.Insert into Employeeprojects;**

-- Inserting 20  random values into the table

INSERT INTO EmployeeProjects (emp_id, project_id,ROLE) VALUES

(1, 1, 'Project Manager'),

(2, 2, 'Lead Developer'),

(3, 3, 'Marketing Specialist'),

(4, 4, 'Cloud Engineer'),

(5, 5, 'Automation Specialist'),

(6, 6, 'Data Analyst'),

(7, 7, 'Cybersecurity Lead'),

(8, 8, 'Product Manager'),

(9, 9, 'Supply Chain Coordinator'),

(10, 10, 'R&D Lead'),

(11, 11, 'Training Coordinator'),

(12, 12, 'Expansion Analyst'),

(13, 13, 'Social Media Strategist'),

(14, 14, 'Infrastructure Engineer'),

(15, 15, 'Lead Developer'),

(16, 22, 'Marketing Manager'),

(17,17, 'HR'),

(18,18,'Sales'),

(19, 19,'data analyst'),

(20,20,'Data Analyst');

**OUTPUT;**

```
mysql> select * from employeeprojects;
+--------+------------+--------------------------+
| emp_id | project_id | role                     |
+--------+------------+--------------------------+
|      1 |          1 | Project Manager          |
|      2 |          2 | Lead Developer           |
|      3 |          3 | Marketing Specialist     |
|      4 |          4 | Cloud Engineer           |
|      5 |          5 | Automation Specialist    |
|      6 |          6 | Data Analyst             |
|      7 |          7 | Cybersecurity Lead       |
|      8 |          8 | Product Manager          |
|      9 |          9 | Supply Chain Coordinator |
|     10 |         10 | R&D Lead                 |
|     11 |         11 | Training Coordinator     |
|     12 |         12 | Expansion Analyst        |
|     13 |         13 | Social Media Strategist  |
|     14 |         14 | Infrastructure Engineer  |
|     15 |         15 | Lead Developer           |
|     16 |         22 | Marketing Manager        |
|     17 |         17 | HR                       |
|     18 |         18 | Sales                    |
|     19 |         19 | data analyst             |
|     20 |         20 | Data Analyst             |
+--------+------------+--------------------------+
```

**6.Insert into Projectreviews table;**

-- Inserting 20 random values into the table

INSERT INTO PerformanceReviews (emp_id, review_date, review_score, comments)

values

(1, '2024-01-31', 88, 'Excellent performance throughout the year. Demonstrates strong leadership skills.'),

(2, '2024-02-28', 76, 'Good performance, but there is room for improvement in project management.'),

(3, '2024-03-31', 92, 'Outstanding contributions to data analysis and reporting. A true asset to the team.'),

(4, '2024-04-30', 85, 'Shows great potential in HR management. Needs to improve on team coordination.'),

(5, '2024-05-31', 78, 'Solid performance in sales. Should focus on enhancing client relationship skills.'),

(6, '2024-06-30', 90, 'Great job on product management. Effective in leading the development team.'),

(7, '2024-07-31', 72, 'Decent performance in customer support. Needs to work on responsiveness.'),

(8, '2024-04-22', 86, 'Excellent in product management with strategic foresight.'),

(9, '2024-05-15', 74, 'Effective in supply chain management but needs better organizational skills.'),

(10, '2024-06-10', 93, 'Exceptional leadership and contributions to R&D.'),

(11, '2024-07-25', 73, 'Needs significant improvement in adapting to new training programs.'),

(12, '2024-08-15', 82, 'Effective in expansion efforts, good communication with stakeholders.'),

(13, '2024-09-05', 80, 'Good social media execution, should work on analytical skills.'),

(14, '2024-10-12', 85, 'Strong in managing infrastructure projects with good stakeholder communication.'),

(15, '2024-11-10', 83, 'Effective in e-commerce project execution and strategic planning.'),

(16, '2024-12-05', 90, 'Outstanding skills in AI development and implementation.'),

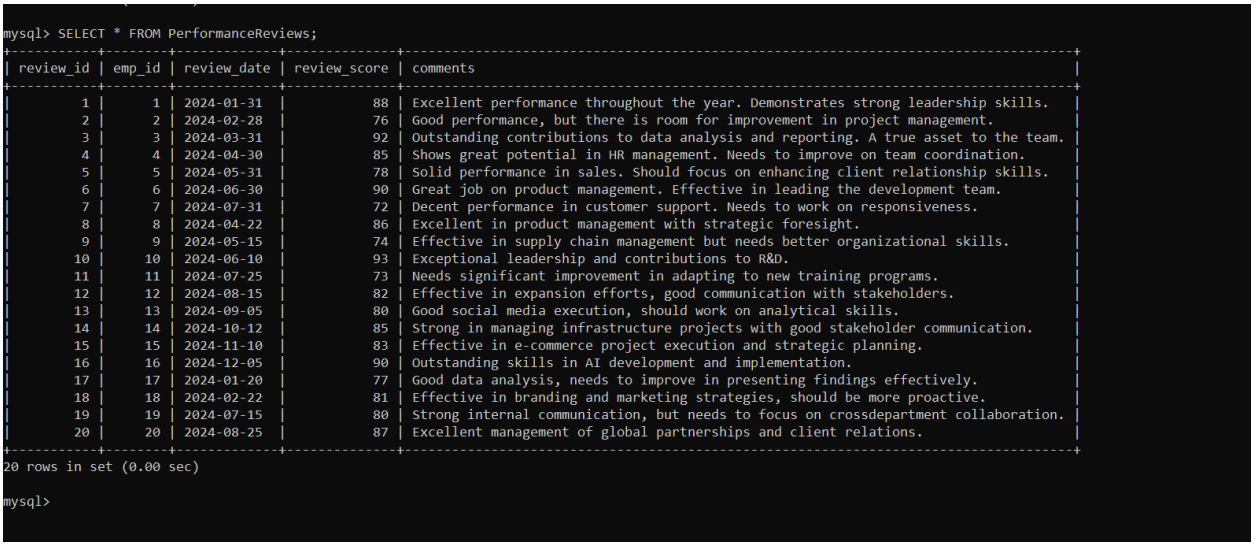
(17, '2024-01-20', 77, 'Good data analysis, needs to improve in presenting findings effectively.'),

(18, '2024-02-22', 81, 'Effective in branding and marketing strategies, should be more proactive.'),

(19, '2024-07-15', 80, 'Strong internal communication, but needs to focus on crossdepartment collaboration.'),

(20, '2024-08-25', 87, 'Excellent management of global partnerships and client relations.');

**OUTPUT;**



```
mysql> SELECT * FROM PerformanceReviews;
+-----------+--------+-------------+--------------+-----------------------------------------------------------------------------------------+
| review_id | emp_id | review_date | review_score | comments                                                                                |
+-----------+--------+-------------+--------------+-----------------------------------------------------------------------------------------+
|         1 |      1 | 2024-01-31  |           88 | Excellent performance throughout the year. Demonstrates strong leadership skills.       |
|         2 |      2 | 2024-02-28  |           76 | Good performance, but there is room for improvement in project management.              |
|         3 |      3 | 2024-03-31  |           92 | Outstanding contributions to data analysis and reporting. A true asset to the team.     |
|         4 |      4 | 2024-04-30  |           85 | Shows great potential in HR management. Needs to improve on team coordination.         |
|         5 |      5 | 2024-05-31  |           78 | Solid performance in sales. Should focus on enhancing client relationship skills.       |
|         6 |      6 | 2024-06-30  |           90 | Great job on product management. Effective in leading the development team.             |
|         7 |      7 | 2024-07-31  |           72 | Decent performance in customer support. Needs to work on responsiveness.                |
|         8 |      8 | 2024-04-22  |           86 | Excellent in product management with strategic foresight.                               |
|         9 |      9 | 2024-05-15  |           74 | Effective in supply chain management but needs better organizational skills.            |
|        10 |     10 | 2024-06-10  |           93 | Exceptional leadership and contributions to R&D.                                        |
|        11 |     11 | 2024-07-25  |           73 | Needs significant improvement in adapting to new training programs.                     |
|        12 |     12 | 2024-08-15  |           82 | Effective in expansion efforts, good communication with stakeholders.                   |
|        13 |     13 | 2024-09-05  |           80 | Good social media execution, should work on analytical skills.                          |
|        14 |     14 | 2024-10-12  |           85 | Strong in managing infrastructure projects with good stakeholder communication.         |
|        15 |     15 | 2024-11-10  |           83 | Effective in e-commerce project execution and strategic planning.                       |
|        16 |     16 | 2024-12-05  |           90 | Outstanding skills in AI development and implementation.                                |
|        17 |     17 | 2024-01-20  |           77 | Good data analysis, needs to improve in presenting findings effectively.                |
|        18 |     18 | 2024-02-22  |           81 | Effective in branding and marketing strategies, should be more proactive.               |
|        19 |     19 | 2024-07-15  |           80 | Strong internal communication, but needs to focus on crossdepartment collaboration.     |
|        20 |     20 | 2024-08-25  |           87 | Excellent management of global partnerships and client relations.                       |
+-----------+--------+-------------+--------------+-----------------------------------------------------------------------------------------+
20 rows in set (0.00 sec)

mysql>
```

# Step 4: Complex Queries and Operations

After setting up and populating the tables with large datasets, students can perform the following complex operations:

**# 1. Complex JOINs to Retrieve Data**

sql

-- Retrieve all employees along with their department names and project roles

SELECT

Employees.emp_name,

Departments.dept_name,

EmployeeProjects.role,

Projects.project_name

FROM

```
    Employees
JOIN
    Departments ON Employees.dept_id = Departments.dept_id
JOIN
    EmployeeProjects ON Employees.emp_id = EmployeeProjects.emp_id
JOIN
    Projects ON EmployeeProjects.project_id = Projects.project_id;
```

**OUTPUT;**

```
mysql> SELECT
    ->     Employees.emp_name,
    ->     Departments.dept_name,
    ->     EmployeeProjects.role,
    ->     Projects.project_name
    -> FROM
    ->     Employees
    -> JOIN
    ->     Departments ON Employees.dept_id = Departments.dept_id
    -> JOIN
    ->     EmployeeProjects ON Employees.emp_id = EmployeeProjects.emp_id
    -> JOIN
    ->     Projects ON EmployeeProjects.project_id = Projects.project_id;
+------------------+------------------+--------------------------+-----------------------------------------------+
| emp_name         | dept_name        | role                     | project_name                                  |
+------------------+------------------+--------------------------+-----------------------------------------------+
| Christopher Lee  | HR               | Project Manager          | Customer Relationship Management (CRM) System |
| Ashley Hernandez | IT               | Lead Developer           | Mobile App Development                        |
| George Lee       | Finance          | Marketing Specialist     | Cybersecurity Upgrade                         |
| Hannah Adams     | Marketing        | Cloud Engineer           | Data Migration                                |
| Isaac Newton     | Sales            | Automation Specialist    | Sales Training Program                        |
| Julia Roberts    | IT               | Data Analyst             | IT Infrastructure Overhaul                    |
| Kevin Hart       | IT               | Cybersecurity Lead       | Employee Wellness Program                     |
| Laura Croft      | IT               | Product Manager          | Cloud Migration                               |
| Mike Wazowski    | Sales            | Supply Chain Coordinator | New Headquarters Construction                 |
| Paula Abdul      | Sales            | R&D Lead                 | AI Integration                                |
| Quincy Jones     | Customer Service | Training Coordinator     | Client Portal Development                     |
| Steve Rogers     | Operations       | Expansion Analyst        | Quality Assurance Revamp                      |
| Tina Fey         | Legal            | Social Media Strategist  | Supply Chain Optimization                     |
| Grace Mitchell   | Legal            | Infrastructure Engineer  | Customer Relationship Management (CRM) System |
| Ethan Perez      | Procurement      | Lead Developer           | Mobile App Development                        |
| Tyler Ramirez    | Quality Assurance | HR                       | Data Migration                                |
| Brianna Thomas   | HR               | Sales                    | Sales Training Program                        |
| Mason Moore      | HR               | data analyst             | IT Infrastructure Overhaul                    |
| Rachel Green     | Marketing        | Data Analyst             | Employee Wellness Program                     |
+------------------+------------------+--------------------------+-----------------------------------------------+
19 rows in set (0.00 sec)
```

- Explanation:

- This query joins multiple tables to retrieve comprehensive employee information, including their department and project details.

# 2. Subquery Example to Find the Highest Salary in Each Department

```
-- Find the highest salary in each department
SELECT
    dept_name,
    MAX(salary) AS highest_salary
FROM
    Employees
JOIN
    Departments ON Employees.dept_id = Departments.dept_id
GROUP BY
    dept_name;
```

**OUTPUT;**

```
mysql> SELECT
    ->     dept_name,
    ->     MAX(salary) AS highest_salary
    -> FROM
    ->     Employees
    -> JOIN
    ->     Departments ON Employees.dept_id = Departments.dept_id
    -> GROUP BY
    ->     dept_name;
+------------------+----------------+
| dept_name        | highest_salary |
+------------------+----------------+
| HR               |         100000 |
| IT               |          80000 |
| Finance          |          55000 |
| Marketing        |          83000 |
| Sales            |          67000 |
| Customer Service |          79000 |
| Operations       |          62000 |
| Legal            |          88000 |
| Procurement      |          76000 |
| Engineering      |          90000 |
| Quality Assurance |          87000 |
+------------------+----------------+
11 rows in set (0.00 sec)

mysql>
```

- Explanation:

  - This query uses `GROUP BY` and `MAX` to find the highest salary for each department.

# 3. Transaction Example - Salary Update with Rollback

START TRANSACTION;

UPDATE Salaries

SET base_salary = base_salary * 1.1

WHERE emp_id = 1;

ROLLBACK;

**OUTPUT;**

```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql> UPDATE Salaries
    -> SET base_salary = base_salary * 1.1
    -> WHERE emp_id = 1;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> ROLLBACK;
Query OK, 0 rows affected (0.02 sec)

mysql>
```

---

- Explanation:

- This demonstrates a transaction where a salary update is performed and then rolled back, undoing the changes.