**👩‍💼 Day 71 – SQL Challenge: HR Analytics & Workforce Insights**

**Dataset Overview**  
Employees, Departments, Salaries, and Performance.

**1️⃣ Employees**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **EmpID** | **Name** | **Gender** | **Age** | **DepartmentID** | **HireDate** | **City** |
| 1 | Priya Nair | F | 29 | 101 | 2019-05-10 | Bengaluru |
| 2 | Arjun Sharma | M | 35 | 102 | 2018-03-15 | Delhi |
| 3 | David Lee | M | 41 | 103 | 2020-08-20 | New York |
| 4 | Fatima Noor | F | 32 | 101 | 2021-06-11 | Bengaluru |
| 5 | Maria Garcia | F | 28 | 104 | 2022-01-05 | Madrid |
| 6 | Rohan Mehta | M | 37 | 102 | 2019-11-25 | Delhi |
| 7 | Ahmed Khan | M | 45 | 103 | 2017-07-30 | Dubai |
| 8 | Sneha Iyer | F | 30 | 104 | 2020-03-18 | Mumbai |

2️⃣ **Departments**

|  |  |  |  |
| --- | --- | --- | --- |
| **DepartmentID** | **DepartmentName** | **Manager** | **Location** |
| 101 | HR | Dr. Sharma | India |
| 102 | IT | Anil Kapoor | India |
| 103 | Sales | David Watson | USA |
| 104 | Marketing | Maria Lopez | Spain |

3️⃣ **Salaries**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SalaryID** | **EmpID** | **Month** | **Year** | **BaseSalary** | **Bonus** | **Deductions** |
| 201 | 1 | Jul | 2022 | 60000 | 5000 | 2000 |
| 202 | 2 | Jul | 2022 | 85000 | 8000 | 3000 |
| 203 | 3 | Jul | 2022 | 95000 | 7000 | 4000 |
| 204 | 4 | Jul | 2022 | 55000 | 4000 | 1500 |
| 205 | 5 | Jul | 2022 | 50000 | 6000 | 2000 |
| 206 | 6 | Jul | 2022 | 78000 | 5000 | 3500 |
| 207 | 7 | Jul | 2022 | 88000 | 10000 | 5000 |
| 208 | 8 | Jul | 2022 | 58000 | 4500 | 1000 |

4️⃣ **Performance**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **PerfID** | **EmpID** | **Month** | **Year** | **ProjectsCompleted** | **Rating** | **Remarks** |
| 301 | 1 | Jul | 2022 | 5 | 4.3 | Excellent |
| 302 | 2 | Jul | 2022 | 3 | 3.7 | Satisfactory |
| 303 | 3 | Jul | 2022 | 6 | 4.6 | Very Good |
| 304 | 4 | Jul | 2022 | 4 | 4.0 | Good |
| 305 | 5 | Jul | 2022 | 5 | 4.4 | Excellent |
| 306 | 6 | Jul | 2022 | 2 | 3.5 | Average |
| 307 | 7 | Jul | 2022 | 7 | 4.8 | Outstanding |
| 308 | 8 | Jul | 2022 | 3 | 3.8 | Good |

**💡 Day 71 – Advanced SQL Questions (HR Analytics & Workforce Insights)**

1. **JOIN Practice**  
   Display employee name, department name, base salary, and performance rating.
2. **CTE + Salary Analysis**  
   Using a CTE, calculate each employee’s *net salary* = BaseSalary + Bonus - Deductions and rank them within their department.
3. **Subquery + Filtering**  
   Find employees whose rating is above their department’s average rating.
4. **CASE + Conditional Aggregation**  
   Classify employees as:
   * “Top Performer” → Rating ≥ 4.5
   * “Good Performer” → 4.0–4.49
   * “Needs Improvement” → < 4.0
5. **Window Function (RANK)**  
   Rank departments by their average performance rating.
6. **Analytical Query (LAG)**  
   Calculate how an employee’s performance rating changed compared to the previous month (if July 2022 is current, assume June 2022 data for reference).
7. **Nested CTE + Aggregation**  
   Using nested CTEs, calculate the total payroll cost (net salary) for each department and find the top-earning department.
8. **Correlated Subquery**  
   Find employees earning above the average net salary of their department.
9. **Employee Retention Query (Advanced)**  
   Identify employees with tenure greater than 3 years and performance rating consistently above 4.0.
10. **Real-World HR KPI Query (Advanced)**  
    Compute **department efficiency** as:  
    (Avg Rating \* Avg ProjectsCompleted) / Avg Salary \* 1000  
    Rank all departments based on this metric.
11. **🚀 Bonus Challenge (Complex Analytical Logic)**  
    Find the **most cost-effective top performer** — the employee with rating ≥ 4.5 and the lowest cost per project (NetSalary / ProjectsCompleted).