**📘 Day 46 – SQL Challenge**

**Dataset Setup**

**Employees Table**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| EmpID | EmpName | Department | HireDate | Salary | ManagerID |
| 1 | Alice | HR | 2020-01-15 | 50000 | Null |
| 2 | Bob | Finance | 2019-03-01 | 65000 | 1 |
| 3 | Charlie | Finance | 2021-07-01 | 60000 | 2 |
| 4 | David | IT | 2022-01-20 | 55000 | 1 |
| 5 | Emma | IT | 2018-11-11 | 70000 | 4 |
| 6 | Frank | Sales | 2021-06-15 | 45000 | 2 |
| 7 | Grace | Sales | 2019-09-10 | 48000 | 6 |

**Projects Table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ProjectID | ProjectName | Department | StartDate | EndDate |
| 101 | Payroll System | Finance | 2023-01-01 | 2023-06-30 |
| 102 | Recruitment Portal | HR | 2023-02-01 | 2023-08-01 |
| 103 | CRM Development | Sales | 2023-03-15 | 2023-09-15 |
| 104 | Network Upgrade | IT | 2023-04-01 | 2023-10-01 |

**EmployeeProjects Table (Many-to-Many relationship)**

|  |  |  |
| --- | --- | --- |
| EmpID | ProjectID | HoursWorked |
| 2 | 101 | 120 |
| 3 | 101 | 80 |
| 1 | 102 | 150 |
| 4 | 104 | 100 |
| 5 | 104 | 200 |
| 6 | 103 | 180 |
| 7 | 103 | 160 |

**Questions**

1. **Department Salary Analysis**  
   Find the **average, minimum, and maximum salary** for each department.
2. **Manager-Employee Relationship**  
   List each employee along with their manager’s name.
3. **Longest Tenure Employees**  
   Find the top 3 employees with the **longest tenure** in the company.
4. **Project Allocation**  
   Show how many employees are working in each project.
5. **Employee Project Hours**  
   Find the employee who has contributed the **maximum hours** to projects.
6. **Cross Department Projects**  
   Identify employees working on projects **outside their own department**.
7. **Project Duration**  
   Calculate the total number of days each project ran.
8. **Salary Growth Potential**  
   Assume each employee’s salary grows by **10% yearly**.  
   Show projected salaries for 2025.
9. **Department Contribution to Projects**  
   Find which department contributed the **highest total hours** across all projects.
10. **Window Function – Salary Ranking**  
    Rank employees by salary within each department.

**Bonus Challenge**

1. **Recursive CTE – Management Hierarchy**  
   Build a **hierarchy tree** showing each employee and their reporting chain up to the top manager.