SQL 100 Days Challenge – Day 46 Reflection

Topic: Employee–Project Management Analytics

Dataset: Employees, Projects, EmployeeProjects

Practice Experience:

- Questions **1–10** were smooth and felt easy to solve independently. They focused on important analytics concepts like salary summaries, project allocations, tenure calculations, employee–manager relationships, project duration, and salary projections.

- The **Bonus Challenge** (Recursive CTE for hierarchy building) was the toughest part. It required multiple iterations to get right, and building a reporting chain up to the top manager felt complex but rewarding.

Key Learnings:

1. **Department Analysis:** Avg/Min/Max salaries gave quick workforce insights.

2. **Employee–Manager Mapping:** Self-joins clarified reporting structures.

3. **Tenure Analysis:** Ranking longest-serving employees reinforced date calculations with DATEDIFF().

4. **Project Insights:** Employee allocation, total project hours, and duration metrics improved my join + aggregation handling.

5. **Cross-Department Analysis:** Easily spotted employees contributing outside their own department.

6. **Window Functions:** Departmental salary ranking with RANK() improved my partitioning practice.

7. **Recursive CTEs:** Constructing a hierarchy tree showcased how to build **multi-level reporting chains** directly in SQL.

Insights:

- **IT Department projects** received the highest individual contributions in hours.

- Cross-department allocations highlighted collaboration across Finance, IT, and Sales.

- Recursive CTEs mapped managers to employees effectively, creating a **clear reporting path** from top to bottom.

- Salary projections for 2025 highlighted the financial growth potential of employees across departments.

Skills Reinforced:

- Joins (Self & Multi-table)

- Aggregations with GROUP BY

- Window functions (RANK())

- Recursive CTE for hierarchies

- Date handling (DATEDIFF(), tenure, project durations)

Personal Note:
Today's session boosted my confidence since I could solve all 10 main questions without much struggle. The **Bonus Challenge was tough and tedious**, but I pushed through and learned how to handle recursive queries effectively. It was a great reminder that SQL is not just about solving quick queries but also about **designing logic for complex business hierarchies**.

Next Steps:

- Extend hierarchy analysis to include project-level reporting.

- Compare tenure and salary growth by department.

- Explore advanced recursive CTE use cases like org charts and bill of materials.