SQL 100 Days Challenge – Day 43 Reflection

Topic: Employee–Project Management Analysis (Advanced SQL)

Dataset: Employees, Projects, EmployeeProjects

Key Learnings & Practice Areas:

1. **Window Functions:** Ranking departments by average salary; identifying top-rated employees per project.
2. **Hierarchical Queries:** Recursive CTE to list employees reporting under a manager.
3. **Aggregations:** Departmental salary averages, project budgets, employee weighted ratings.
4. **Joins & Multi-table Queries:** Linking employees, projects, and hours worked.
5. **Advanced Filtering:** Employees earning above departmental averages.
6. **Recursive CTEs:** Understanding and visualizing reporting structures.
7. **Complex Metrics:** Weighted average ratings based on hours worked.

Insights:

- IT projects (Cloud Upgrade, AI Chatbot) had multiple employees with high ratings, showcasing teamwork.
- Recursive CTE helped clearly map hierarchy under Alice (EmpID=1).
- Weighted average ratings gave a **fairer measure** of performance compared to plain averages.
- Departmental budget rankings showed Finance handling the largest share.
- Bonus challenge highlighted top contributors in 2021 projects.

Skills Reinforced:

- Ranking techniques (RANK(), ROW_NUMBER())
- Recursive CTE for hierarchies
- Weighted average calculations
- Multi-level aggregations across projects and employees
- Combining business rules (years, budgets, departments) into SQL logic

Personal Note:
Today's practice was particularly rewarding — it felt like a **revision of complex SQL concepts** I've been building up over the last 40+ days. Recursive CTEs, weighted metrics, and hierarchical queries challenged me to think beyond basic joins, and I now feel more confident handling **real-world enterprise data scenarios**.

Next Steps:

- Explore employee churn/tenure analysis with JoinDate.
- Extend recursive hierarchies to deeper organizational levels.
- Analyze project overlaps and resource allocation efficiency.