Advanced Real-World SQL Challenges Using CTEs, Recursion & Analytics

Project Title:

Advanced Real-World SQL Challenges Using CTEs, Recursion & Analytics

Overview:

This project showcases 24 advanced SQL challenges based on real-world business scenarios — covering employee productivity, HR analytics, project management, diversity metrics, performance scoring, and recursive reporting structures.

Every challenge is built around clean SQL logic using Common Table Expressions (CTEs), with a focus on modularity, performance, and clarity.

Skills Demonstrated:

- Modular Query Design using CTEs
- Recursive CTEs for employee hierarchy and department structure
- Composite KPI calculation using normalization
- Salary, bonus, and performance benchmarking
- Multi-level reporting chains (for employees and departments)
- Project allocation analysis and imbalance detection
- Gender diversity, stagnant employees, ghost employee tracking
- Outlier detection using statistical metrics (STDDEV, Deviation)
- Department ranking using DENSE_RANK
- Continuous trends and cumulative hiring metrics
- Managerial effectiveness evaluation
- NULL-safe calculations and ISNULL/COALESCE usage

Key Highlights:

1. Identify underutilized or overloaded employees.

2. Calculate manager effectiveness grades using team metrics.

3. Detect salary growth opportunities for high-performing but underpaid employees.

4. Build full multi-level reporting chains using recursion.

5. Analyze project involvement gaps over time.

6. Rank employees based on normalized composite KPIs.

7. Track gender diversity department-wise.

8. Build department and employee hierarchies dynamically.

Ideal For:

Clients looking for deep SQL solutions in HRTech, Analytics, Enterprise Dashboards, Workforce Management, ETL Development, or Business Intelligence.