# 📘 SQL Learning Journey – Day 33 Reflection

## 🗂️ Dataset Context

Today's practice was built around an **HR Analytics system** with Departments, Employees, and Leaves tables. The exercises simulated **real-world HR problems** such as salary analysis, employee hierarchies, leave tracking, and department-level insights.

## 🔑 Key Learnings

### Table Design & Constraints

- Accidentally added a **more than 3-character length constraint** for Name in Employees table.
    - Couldn't insert values due to this.
    - Learnt how to **check existing constraints in a table** using sys.check_constraints.
    - Corrected it by altering the constraint to allow proper inserts.
      ✅ This was a new, practical debugging experience.
- Reinforced best practices in **table creation**:
    - Proper use of **ON UPDATE CASCADE** for maintaining referential integrity.
    - Ensured **valid values** with CHECK constraints (salary > 0, leave types restricted).

### Query-Specific Reflections

1. **4th Question** – Took longer to understand and implement logic for employees reporting directly to a manager (Alice).
2. **6th Question** – Successfully applied **RANK() window function** partitioned by department *without syntax errors*.
3. **9th Question** – Learnt and implemented **Recursive CTE** for the first time to display employee hierarchy.
    - This was a completely new concept and a great addition to my SQL toolkit.
4. **10th Question** – Very challenging; calculating percentage of employees above a salary threshold per department improved my aggregation skills.
5. **Bonus Challenge** – One of the toughest; involved combining **company average salary** with **leave counts in 2023**, forcing me to use **multiple CTEs**.

## 📌 Takeaways

- Each tough query is making recursive CTEs, advanced window functions, and complex joins feel more natural.
- Today's set felt **real-world and interview-like**, especially the bonus challenge.
- Debugging constraints was an unexpected but valuable part of today's learning.

## ✅ Day 33 Completed – Feeling more confident with advanced SQL concepts!