

## Day 36 – SQL Practice Reflection

### ◆ Overview

Day 36 of the SQL 100-Day Challenge focused on **advanced real-world banking system queries**. The tasks involved customer, account, transaction, and branch data, pushing me to use **window functions, CTEs, joins, aggregates, churn calculations, and optimization comparisons**.

This day was **very tough**, but it provided excellent practice with real interview-style questions.

### ◆ Key Learnings

#### 1. Schema & Constraints

- Defined strong constraints like CHECK, NOT NULL, ON UPDATE CASCADE, and indexing for optimized query performance.
- Ensured **data validity** (e.g., no negative balances, only valid account types).

#### 2. Query-Specific Learnings

- **Top balances per branch (Q2)**: Practiced using ROW\_NUMBER() with PARTITION BY and ordering, making ranking queries clearer.
- **Churn rate (Q10)**: Learnt how to combine multiple CTEs to calculate **percentage-based metrics**, a very real-world analytical use case.
- **Consecutive high-value debits (Q9)**: Used LAG() function to check previous row conditions – powerful for sequence/event detection.
- **NTILE (Q8)**: Divided balances into quartiles, which is very useful in **customer segmentation analysis**.
- **Fraud detection (Q5)**: Simulated balance drop tracking with a **running total balance** using SUM() OVER().

#### 3. Optimization (Bonus Question)

- Explored **COUNT(\*) vs COUNT(1)** differences and indexing impact, a key performance optimization concept.

### ◆ Challenges Faced

- Many queries required **multi-level CTEs** (like fraud detection and churn rate) which took longer to design and implement.
- **Date-based queries** and running balance logic (Q5 & Q9) were the hardest, reinforcing the need for more **practice on analytical queries**.
- Bonus query pushed me to think about **query optimization and indexing** beyond just correctness.

### ◆ Additional Reflections

1. Learnt the importance of **schema design + indexing** before jumping into queries.
2. Realized that even though syntax may be challenging, **breaking queries into smaller CTEs** makes debugging and solving much easier.
3. Overall, today's set felt like a **mock SQL interview**, preparing me for **real job scenarios**.

### ◆ Summary

Day 36 was tough but **extremely valuable**. I reinforced my knowledge of:

- **Window functions (ROW\_NUMBER, NTILE, LAG)**
- **Churn calculation & fraud detection queries**
- **Performance tuning with COUNT and indexing**

This kind of practice is exactly what will make me **job-ready by Day 100**. 🚀