Day 30 – SQL Practice Reflection

1. Overview

Day 30 marked a challenging yet rewarding practice session, focusing on a **real-world online marketplace case study**. The set involved a mix of aggregation, analytical functions, date manipulations, filtering, and advanced joins — making it feel like an actual job interview task.

2. Key Learnings & Observations

Database Design & Constraints

- Created Sellers, Products, Customers, and Orders tables with **primary keys, foreign keys, and appropriate CHECK constraints**.
- Applied **ON UPDATE CASCADE** for foreign keys to maintain referential integrity.
- Added **single-column, composite, and analytical indexes** to improve query performance.

SQL Concepts Practiced

- **Aggregations & Grouping:** SUM, COUNT, AVG with GROUP BY and HAVING.
- **Analytical Functions:** LAG() for revenue growth, SUM() OVER() for running totals.
- **Filtering Techniques:** Used NOT IN, LEFT JOIN with NULL checks, and correlated subqueries.
- **Date Functions:** YEAR(), MONTH(), MIN(), and date comparisons for time-based insights.

3. Specific Question Insights

1. **5th Question:**
    - **Challenge:** Calculating month-over-month revenue growth required multiple CTEs and the use of LAG().
    - **Learning:** Strengthened understanding of comparing current and previous period values.
2. **8th Question:**
    - **Challenge:** Retrieving each customer's **first purchase date and product** involved correlated subqueries for MIN date filtering.
    - **Learning:** Practiced tying subqueries to main queries for precise filtering.
3. **9th Question:**
    - **Challenge:** Calculating running total revenue for each seller was tough despite doing a similar query yesterday.
    - **Learning:** Reinforced understanding of ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW for cumulative calculations.

4. **Bonus Challenge:**
    - Required careful **percentage contribution** calculation using total revenue as a window function.
    - Practiced using NULLIF() to avoid division-by-zero errors.

4. Overall Takeaways

- This set required **critical thinking**, **attention to detail**, and **real-world scenario handling**.
- Each complex query was a mini case study, pushing analytical and SQL skills beyond straightforward syntax.
- The toughest questions highlighted the need for **more practice in date manipulations and analytical window functions**.