COMM051 Project D3: Individual Final Report

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Group: Group-13

1. Collaboration Approach

Our group started by connecting to discuss the project's timelines, objectives, approach, and prerequisites. We prioritized keeping the collaboration offline and in-person as much as possible, believing that this would enhance learning and growth for everyone involved. This coursework presented a valuable learning opportunity, and working closely together fostered a deeper understanding.

While we held most sessions in person, some brainstorming and debugging were conducted virtually for convenience. Tasks were distributed strategically to ensure no single member was overloaded while allowing everyone to maintain a clear understanding of the entire project.

2. Individuals' Roles in the Group

- ✓ **Amir** – Played a pivotal role throughout the project. He took responsibility for compiling the entire project (both deliverables) and contributed significantly to the normalization task. He also worked extensively on the BI SSAS analytics cube, brainstorming, and implementing calculations involving hierarchies, dimensions, measures, and calculated measures.
- ✓ **Shivasmi** – Contributed significantly to the normalization task by analyzing the given tables, and identifying primary keys, partial dependencies, and transitive dependencies. She also worked closely with me to develop stored procedures, indexing, manage transactions, and implement error handling and control.
- ✓ **Ishwari** – Actively collaborated with Shivasmi and me on the normalization task, helping to identify primary keys, partial dependencies, and transitive dependencies.
- ✓ **Prerana** – Provided valuable contributions by designing the necessary ER diagrams for the tables in 3NF form, ensuring the structural integrity of the database design.
- ✓ **Arpit** – Worked alongside Prerana on the ER diagrams and assisted me in preparing the presentation.

3. My Contribution

I have worked alongside my fellow group members in analyzing the given tables for normalization. I also contributed to creating views, indexes, and stored procedures, as well as

writing testing queries for them. Additionally, I worked on implementing transaction management and error control. Furthermore, I participated in brainstorming for the BI part and contributed to creating the presentation for the video explaining the proposed solutions we developed as part of the task.

4. Design Decisions

Database Design Decisions

I. Normalization to 3NF – Order Item, Product, and Customer tables were normalized to 3NF to eliminate redundancy and ensure data integrity. Primary, foreign, and a surrogate key was introduced to clearly define relationships and enforce data consistency. Eliminated partial dependencies and transitive dependencies.

II. Order Group View – We created an order group view to keep better track of orders. This captured orderStatusCode, OrderNumber, and BillingCurrency improving order processing and reporting.

III. We then have created stored procedures prCreateOrderGroup and prCreateOrderItem to handle orders with full transaction support. We implemented error handling when validation logic was violated using TRY/CATCH and transaction control via BEGIN TRAN, COMMIT, and ROLLBACK ensuring data consistency.

IV. We added non-clustered indexes on frequently queried columns to optimize query performance.

BI Design Decisions

I. Data Source – We have used the original 3 tables given to us namely product, order Item, and customerCity for the sake of simplicity in reporting and analysis, and better query performance. OrderItem Table is our fact table in this scenario.

II. We have added an extra time dimension alongside Order and Product. This helps us organize and analyze data over time which helps us infer trends and forecast and helps with decision-making.

III. Measures and dimensions helped us analyze data at a more granular level. The platform was designed to track key metrics such as cancelled orders, sales value, and order fulfilment.

IV. Customer and product data were set up in a hierarchy (Customer → City → Region → Country; Product → Product Group → Product Variant), which helped with easier aggregation and reporting. This setup made it simpler to analyze data at different levels.

V. For metrics like the percentage of cancelled orders, we calculated them against total orders to get useful insights. These calculations were done using calculated measures in the BI system, making it easier to analyze key business data.

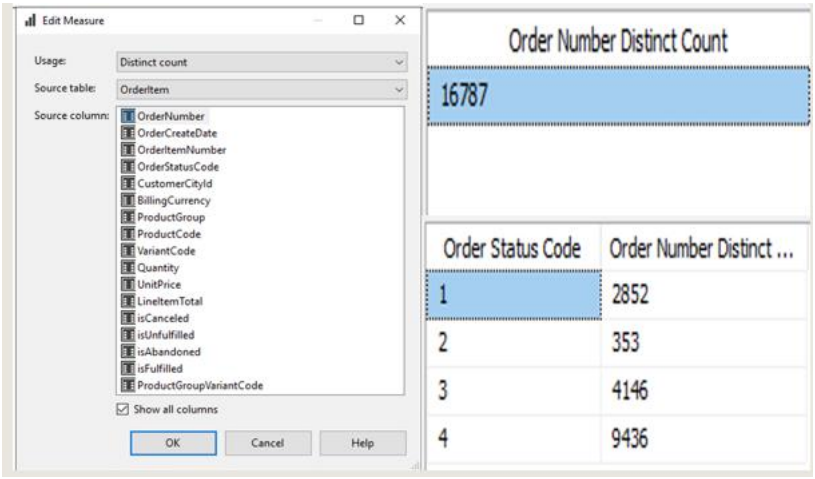


Fig 1 – Code snippet - Order Number Distinct Count measure which shows distinct count of various order statuses.

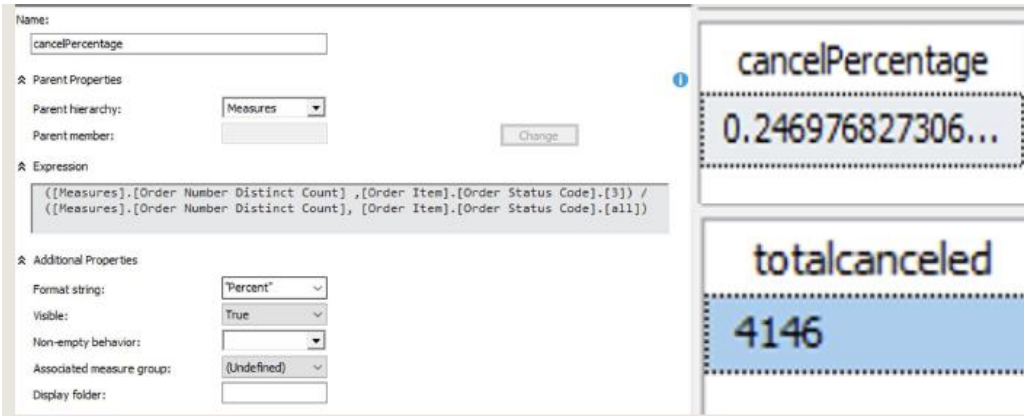


Fig 2 – Code snippet – cancelPercentage used as a calculated measure which depicts percentage of cancelled orders.

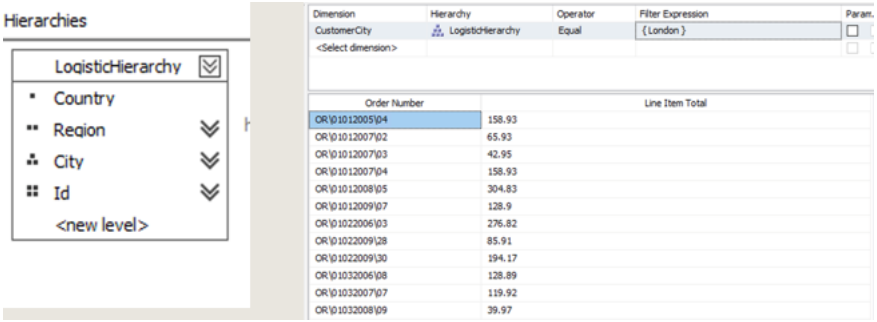


Fig 3 – Code snippet - Order Number analysed over different hierarchies

5. What I Learnt

During this project, I learned a lot of technical skills, especially with databases and business intelligence. I got better at normalizing databases, which helped organize data and reduce

repetition. I also worked on SQL queries and created stored procedures for managing transactions. Using SSAS to build a BI cube taught me more about reporting and data analysis. The team worked well together overall—we split tasks and had regular check-ins. However, finding a time that worked for everyone for meetings was tough and caused some delays.

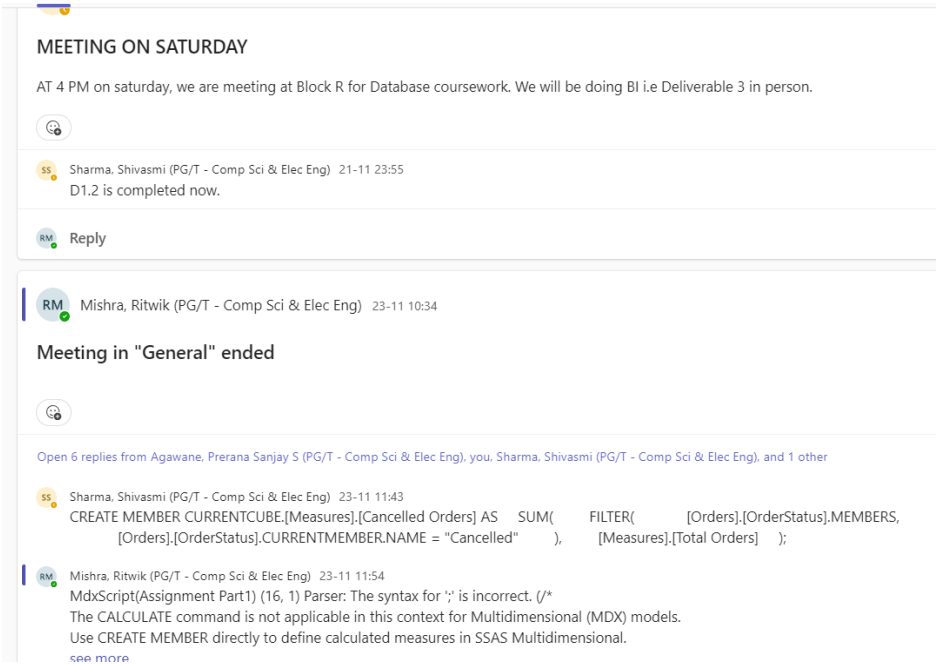
Looking back, I think I could have done more data pre-processing since some columns in the tables had null values. Fixing this earlier might have saved time. Also, I would consider using normalized tables for BI and wanted to discover how would it have helped with our analysis.

Given a chance to do this again, I would focus more on time management. Some tasks took longer than planned, which made others feel rushed. Setting better deadlines and checking in more often would have helped. Also, more documentation would have been good, especially for the BI cube.

Overall, I learned a lot about working with a team, managing time, and improving my technical skills. I feel more confident now and know what to improve next time.

Appendix: Evidence of Collaboration

Snippet 1 – Shows our initial brainstorming sessions in person.



Snippet 2 – Shows our normalization related discussion over the teams channel we created.

```
Select *
FROM CustomerCity
WHERE Id IS NULL OR Gender IS NULL OR FirstName IS NULL OR LastName IS NULL OR DateRegistered IS NULL OR City IS NULL OR County
IS NULL OR Region IS NULL OR Country IS NULL;

SELECT *
FROM Product
```
see more

Sharma, Shivasmi (PG/T - Comp Sci & Elec Eng) 15-11 17:41

3NF FOR PRODUCT:

```
USE AssignmentPart1
SELECT  ProductGroup,
            COUNT(DISTINCT ProductCode) AS UniqueProductCode,
```
see more

Reply

Ghasemi Veisi, Amirreza R (PG/T - Comp Sci & Elec Eng) 17-11 17:05

Tables after 3NF

Hi guys, I finished the final tables and attached the file. let me know if you find any issues

coursework-Final-tables.pdf

Reply