# Project Summary: Data Modeler – Building a Normalized Star Schema Data Model

## Project Objective

The objective of this project was to design and implement a well-structured relational data model in Power BI using multiple normalized tables. The focus was on table relationships, schema design, and handling advanced data modeling features without using DAX or calculated columns.

## Schema Design

The model follows a Star Schema design with Sales\_Fact as the central fact table. Dimension tables include Customer\_Dim, Product\_Dim, Region\_Dim, and Date\_Dim. Additionally, Returns\_Fact is modeled as a secondary fact table connected to both Sales\_Fact and Date\_Dim. This structure creates a star schema with a snowflake-like extension.

## Relationships and Cardinality

The following relationships were defined manually in Model View:  
- Sales\_Fact[CustomerID] → Customer\_Dim[CustomerID] (Many-to-One, Single)  
- Sales\_Fact[ProductID] → Product\_Dim[ProductID] (Many-to-One, Single)  
- Sales\_Fact[RegionID] → Region\_Dim[RegionID] (Many-to-One, Single)  
- Sales\_Fact[DateKey] → Date\_Dim[DateKey] (Many-to-One, Single)  
- Returns\_Fact[SalesID] → Sales\_Fact[SalesID] (Many-to-One, Single)  
- Returns\_Fact[ReturnDateKey] → Date\_Dim[DateKey] (Many-to-One, Single, Inactive)

## Filter Flow

Cross-filter direction was set to Single for all relationships to avoid ambiguity and circular filtering. The only exception was the inactive relationship between Returns\_Fact and Date\_Dim, which was left inactive to prevent filter conflicts with Sales\_Fact’s active DateKey relationship.

## Issues and Resolutions

- Ambiguous filter paths appeared when connecting Returns\_Fact to both Sales\_Fact and Date\_Dim. This was resolved by keeping the ReturnDateKey → Date\_Dim relationship inactive.  
- Some fields had inconsistent data types (e.g., IDs stored as text). These were corrected in Power Query by setting appropriate data types before loading the tables into the model.

## Verification

A Matrix visual was used for verification:  
- Sales grouped by Product Category and Region.  
- Return Reasons by Fiscal Year.  
- Revenue by Customer Segment.  
These validations confirmed the correctness of the data model and relationships.