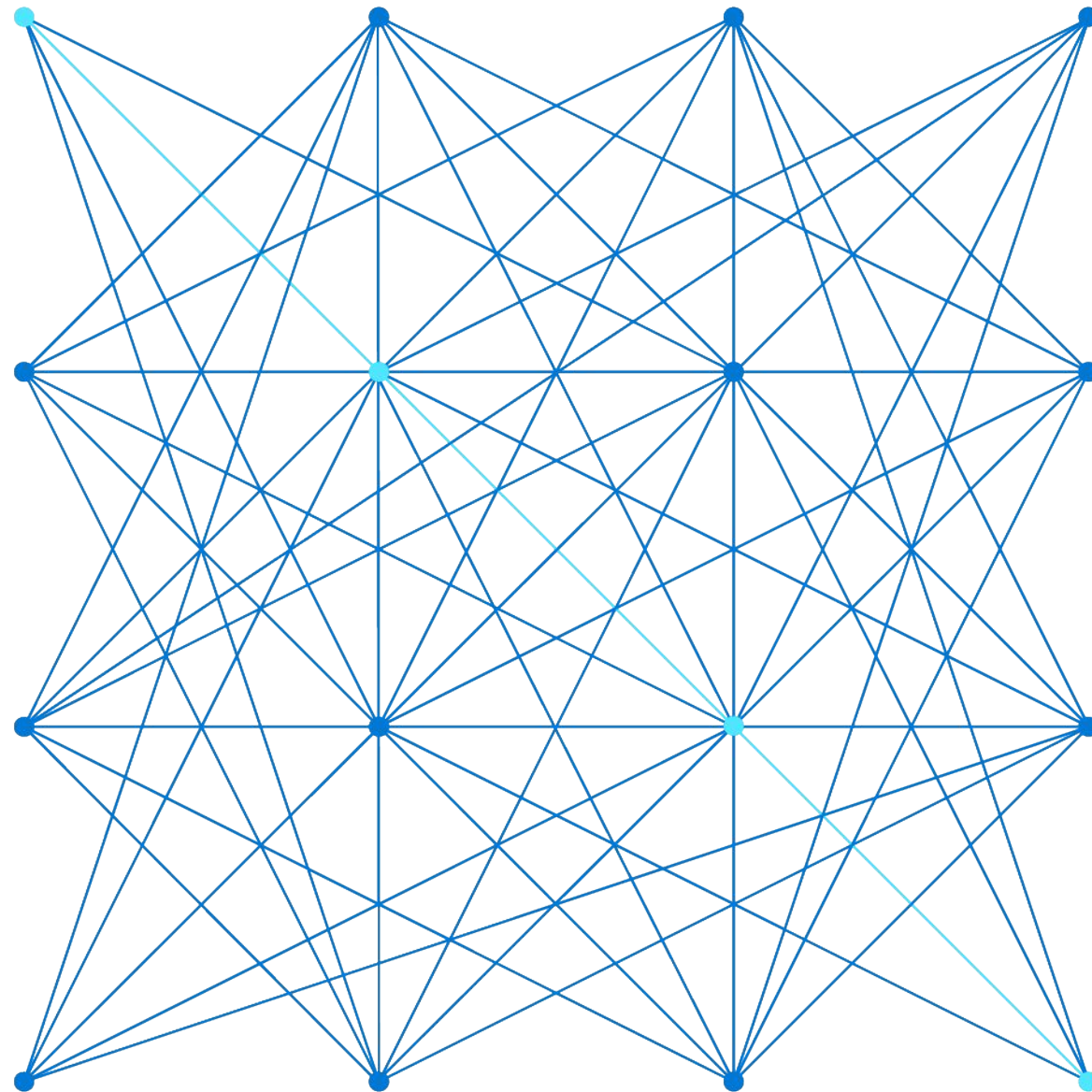


DA-100 Analyzing Data with Power BI - 4

Prof. Ernesto Lee



Module 4: Design a Data Model In Power BI

Learning Objectives

You will learn the following concepts:

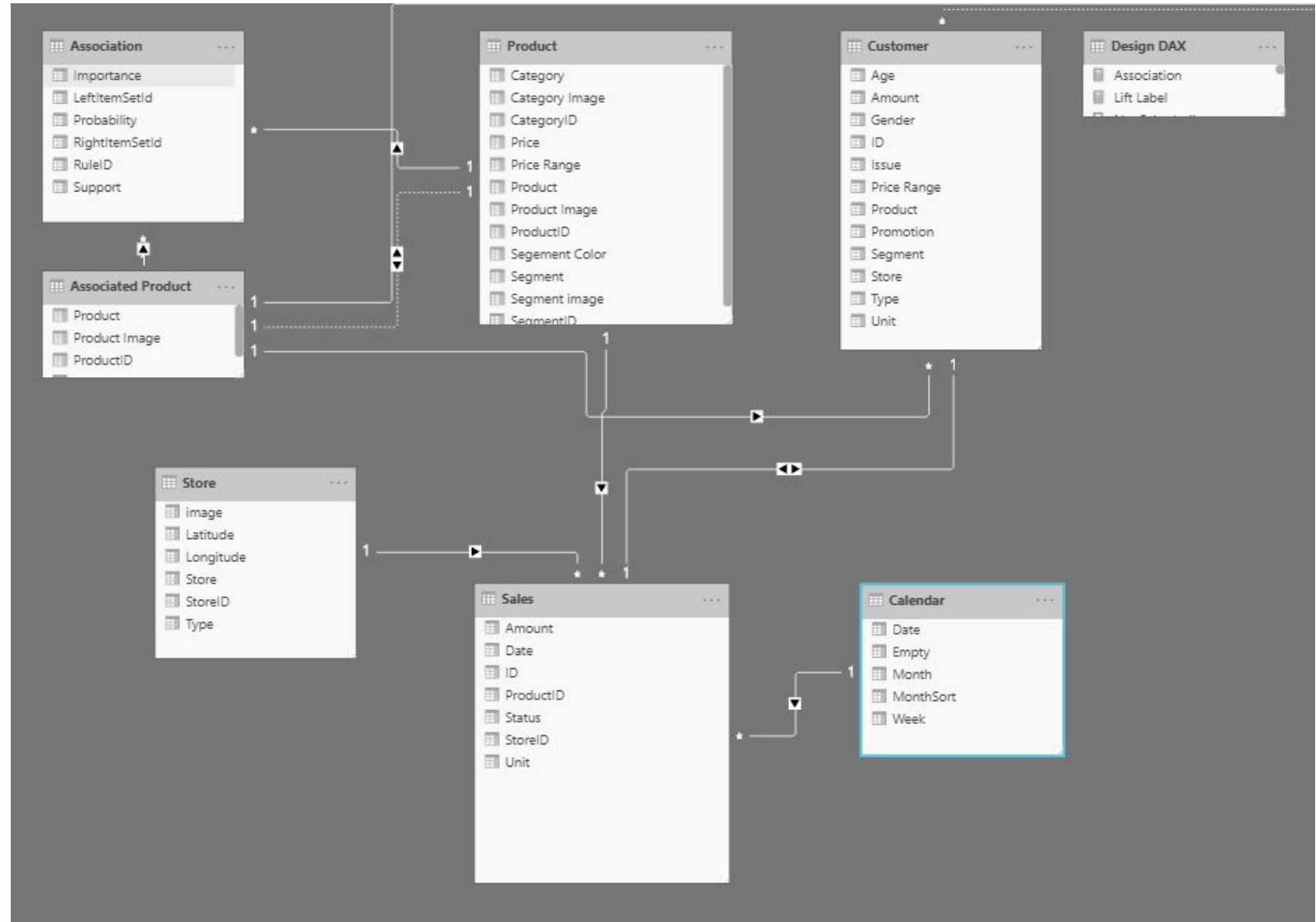
- Data Modeling
- Working with Tables
- Dimensions and Hierarchies



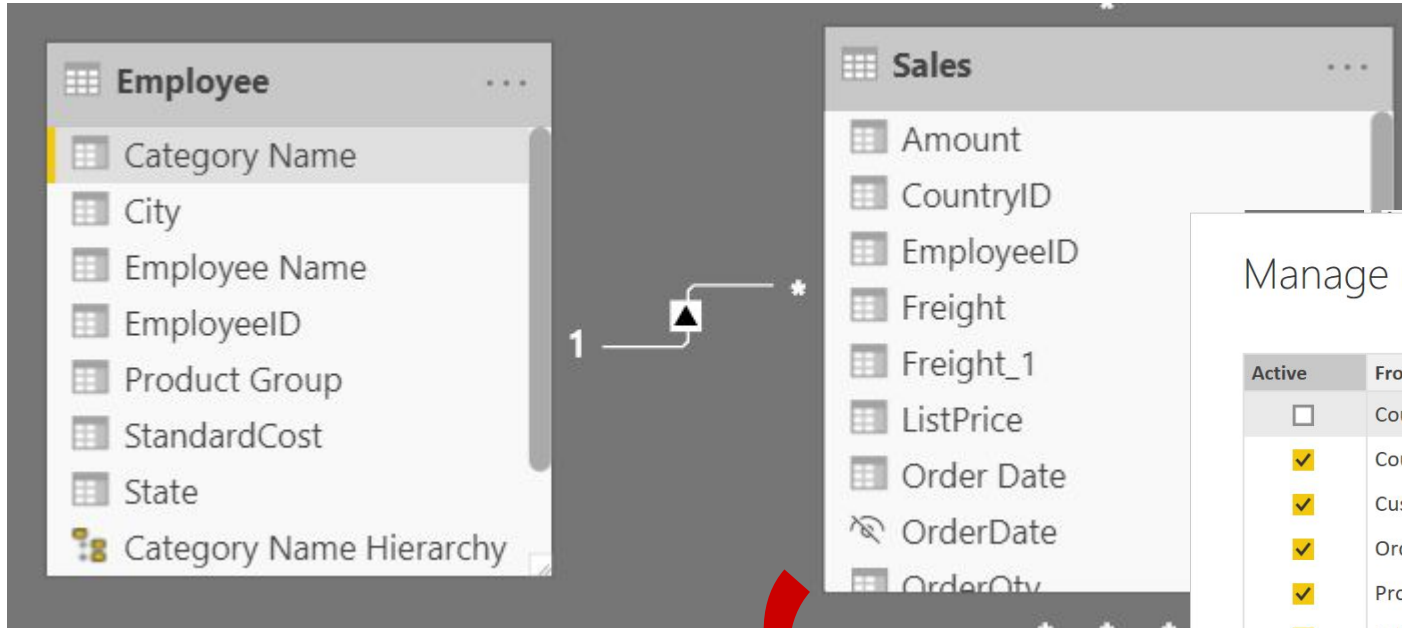
Lesson 1: Introduction to Data Modeling

Introduction to Data Modeling

- Benefits of a good data model:
 - Accurate reports.
 - Faster data exploration.
 - Simpler aggregations.
 - Easier to maintain.



Joins and Relationships

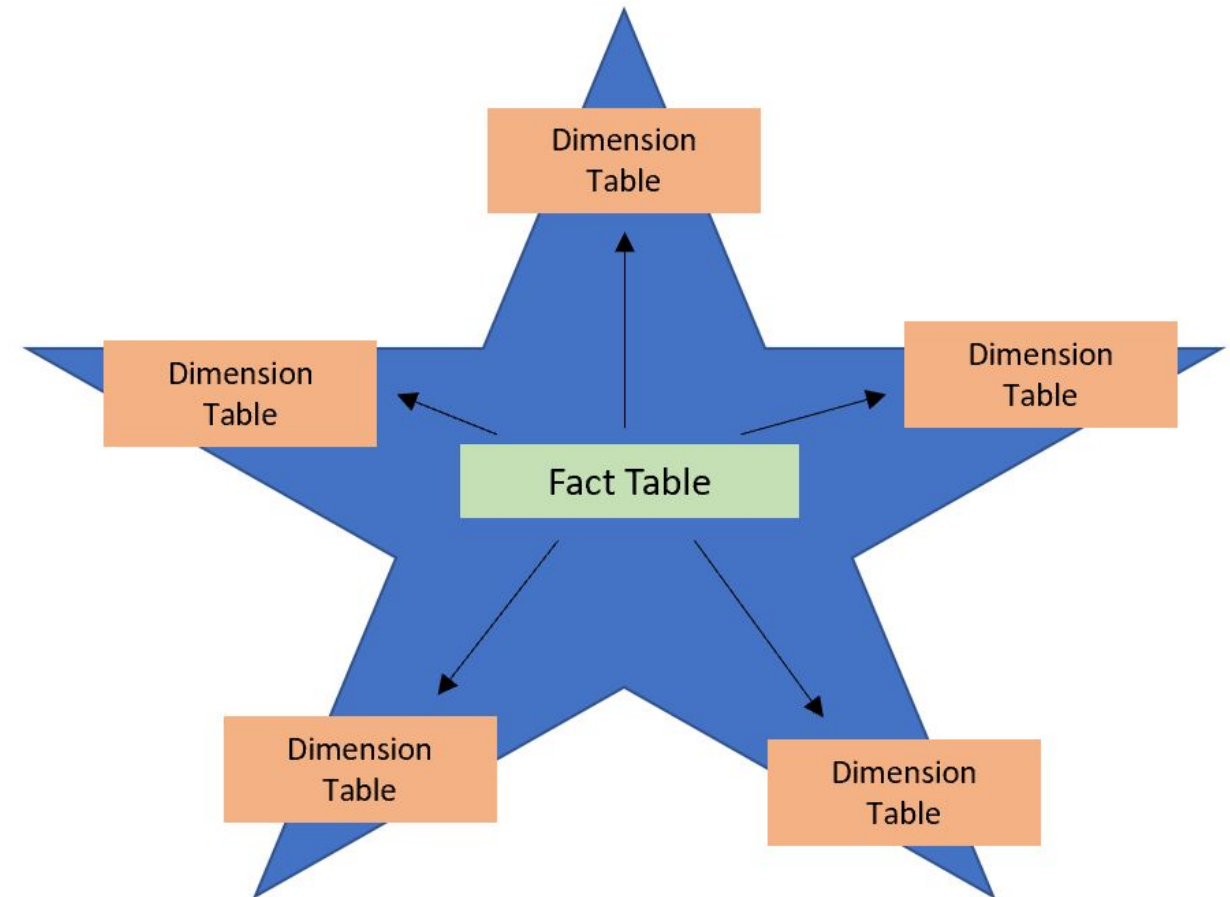


Manage relationships

Active	From: Table (Column)	To: Table (Column)
<input type="checkbox"/>	Country (Country)	CountryName (Country)
<input checked="" type="checkbox"/>	Country (Country)	Territory (Country)
<input checked="" type="checkbox"/>	Customers (ID)	SalesVals (ID)
<input checked="" type="checkbox"/>	Order (OrderDate)	Sales (OrderDate)
<input checked="" type="checkbox"/>	Product ID (ProductID)	Product (ProductID)
<input checked="" type="checkbox"/>	Sales (CountryID)	CountryName (CountryID)
<input checked="" type="checkbox"/>	Sales (Order Date)	Budget (Date)
<input checked="" type="checkbox"/>	Sales (Order Date)	Calendar (Date)
<input checked="" type="checkbox"/>	Sales (ProductID)	Product (ProductID)
<input checked="" type="checkbox"/>	Territory (Country)	CountryName (Country)

Star Schemas

- Tables are classified as dimension or fact tables.
 - Dimension: Describes business entities.
 - Fact: Store observations or events.



Review Questions

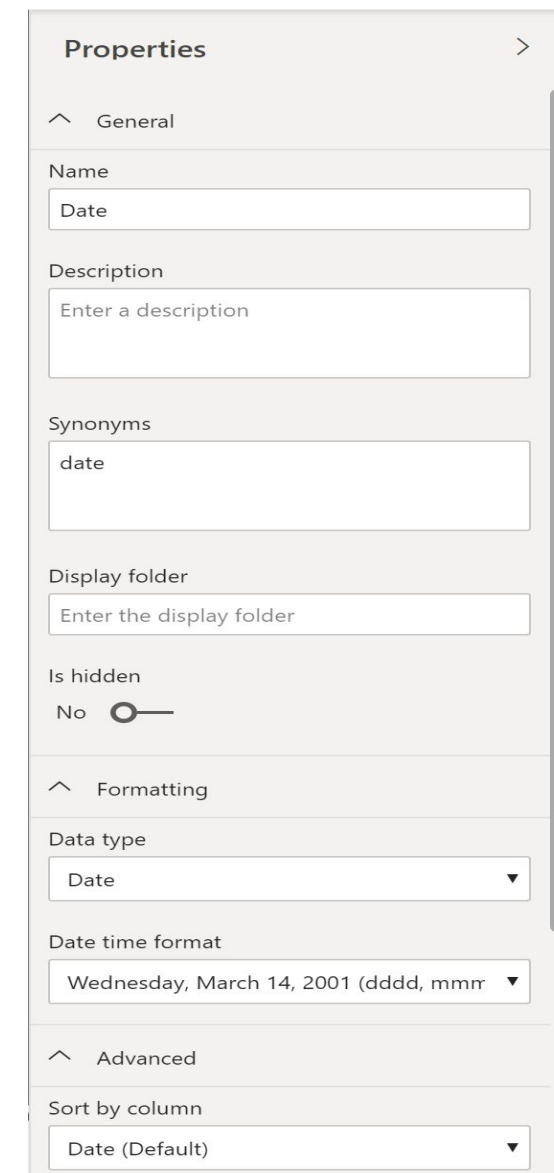
- Q01 – The two types of tables in a star schema are what?
- A01 – Dimension and Fact tables.
- Q02 – What is the difference between a fact table and a dimension table?
- A02 – Fact tables store observations or events while dimension tables contain information about specific entities within the data.



Lesson 2: Working with Tables

Configure Table and Column Properties

- Before working on reports, ensure your model and table structure are simplified.
- A simple table structure will be easy to navigate.



The screenshot shows the 'Properties' pane in the Microsoft Power Platform interface, specifically for configuring a table column. The pane is divided into three sections: General, Formatting, and Advanced.

General

- Name:** A text input field containing 'Date'.
- Description:** A text input field with the placeholder text 'Enter a description'.
- Synonyms:** A text input field containing 'date'.
- Display folder:** A text input field with the placeholder text 'Enter the display folder'.
- Is hidden:** A toggle switch labeled 'No' which is currently turned off.

Formatting






- Data type:** A dropdown menu showing 'Date'.
- Date time format:** A dropdown menu showing 'Wednesday, March 14, 2001 (dddd, mmmr)'.

Advanced

- Sort by column:** A dropdown menu showing 'Date (Default)'.

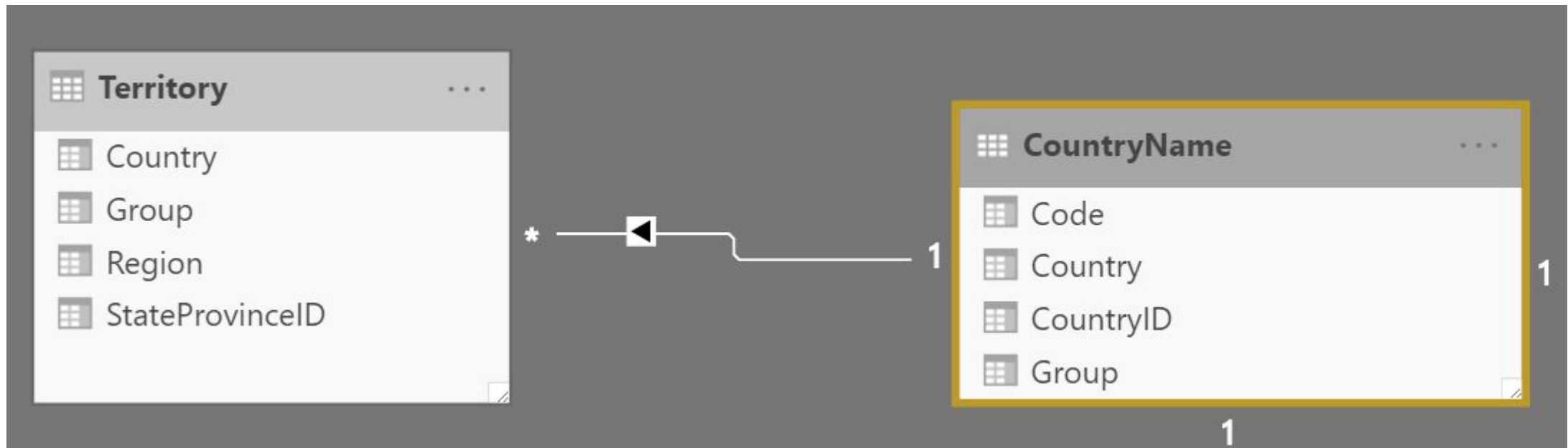
Create a Dates Table

Standardize on date formats and ranges that meet company requirements.

Date 	Year 	MonthNum 	WeekNum 	DayoftheWeek 
Tuesday, May 31, 2011	2011	5	23	Tuesday
Wednesday, June 1, 2011	2011	6	23	Sunday
Thursday, June 2, 2011	2011	6	23	Monday
Friday, June 3, 2011	2011	6	23	Tuesday

Relationships and Cardinality

- Relationship: Formed by correlating rows belonging to different tables.
- Cardinality: Uniqueness of data values in a column.



Create Many-to-many Relationships

CustID	CustName
1022	Roy M
1023	Bob K
1024	Ellen L
1025	Mitch W
1026	Regan Q
1027	Lulu S
1028	Aliya R

CustomerTable

CustomerID	AccountID	AccountName
1022	12	BHP
1023	12	BHP
1024	13	RogerInc
1024	14	MyShip
1026	15	Holdings Unl.
1025	16	Key Biz Insiders
1028	17	Ty Inc
1022	17	Ty Inc

AccountTable

×

Create relationship

Select tables and columns that are related.

AccountTable

CustomerID	AccountID	AccountName
1022	12	BHP
1023	12	BHP
1024	13	RogerInc

CustomerTable

CustID	CustName
1022	Roy M
1023	Bob K
1024	Ellen L

Cardinality

Many to Many (*:*)

Cross filter direction

Both

☒ Make this relationship active
 ☐ Assume referential integrity
 ☐ Apply security filter in both directions

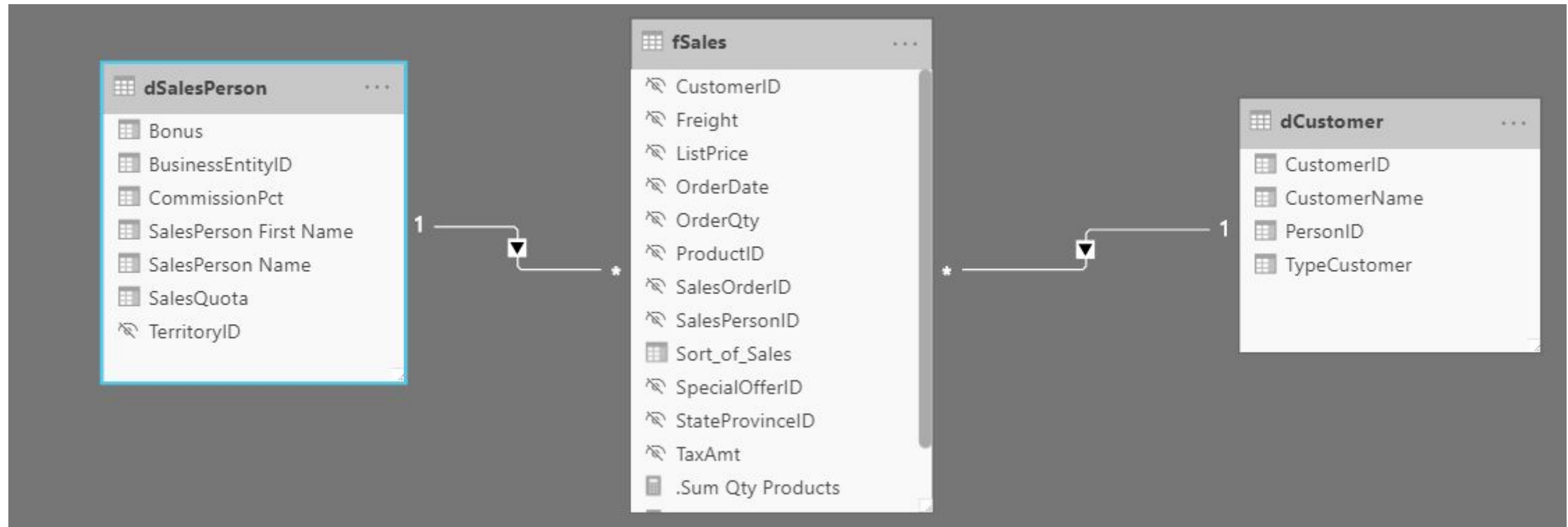
This relationship has cardinality Many-Many. This should only be used if it is expected that neither column (CustomerID and CustID) contains unique values, and that the significantly different behavior of Many-many relationships is understood. [Learn more](#)

OK

Cancel

Modeling Challenges

Circular relationships and relational dependencies.



Combine Queries

- Two methods for combining queries:
 - Append
 - Merge

Append

Concatenate rows from three or more tables into a single table.

☐ Two tables
 ☒ Three or more tables

Available tables

Production Suppliers
Sales Customers
HR Employees

Tables to append

Production Suppliers
Sales Customers
HR Employees

Add >>

OK

Cancel

Merge

Select a table and matching columns to create a merged table.

Sales Orders

orderid	custid	empid	orderdate	requireddate	shippeddate	shipperid	freight	shipname
10248	85	5	7/4/2014	8/1/2014	7/16/2014	3	32.38	Ship to 85-B
10249	79	6	7/5/2014	8/16/2014	7/10/2014	1	11.61	Ship to 79-C
10250	34	4	7/8/2014	8/5/2014	7/12/2014	2	65.83	Destination SCC
10251	84	3	7/8/2014	8/5/2014	7/15/2014	1	41.34	Ship to 84-A

Sales OrderDetails

orderid	productid	unitprice	qty	discount
10248	11	14.00	12	0
10248	42	9.80	10	0
10248	72	34.80	5	0
10249	14	18.60	9	0
10249	51	42.40	40	0

Join Kind

Left Outer (all from first, matching from second)

☐ Use fuzzy matching to perform the merge

Fuzzy matching options

The selection matches 830 of 830 rows from the first table.

OK

Cancel

Review Questions

- Q01 – What is Cardinality?
- A01 – The direction that the data flows in a relationship between two tables.
- Q02 – What is it called when multiple records in one table are associated with multiple records in another table?
- A02 – many-to-many relationship.

Lab: Data Modeling in Power BI Desktop

Lesson 3: Dimensions and Hierarchies



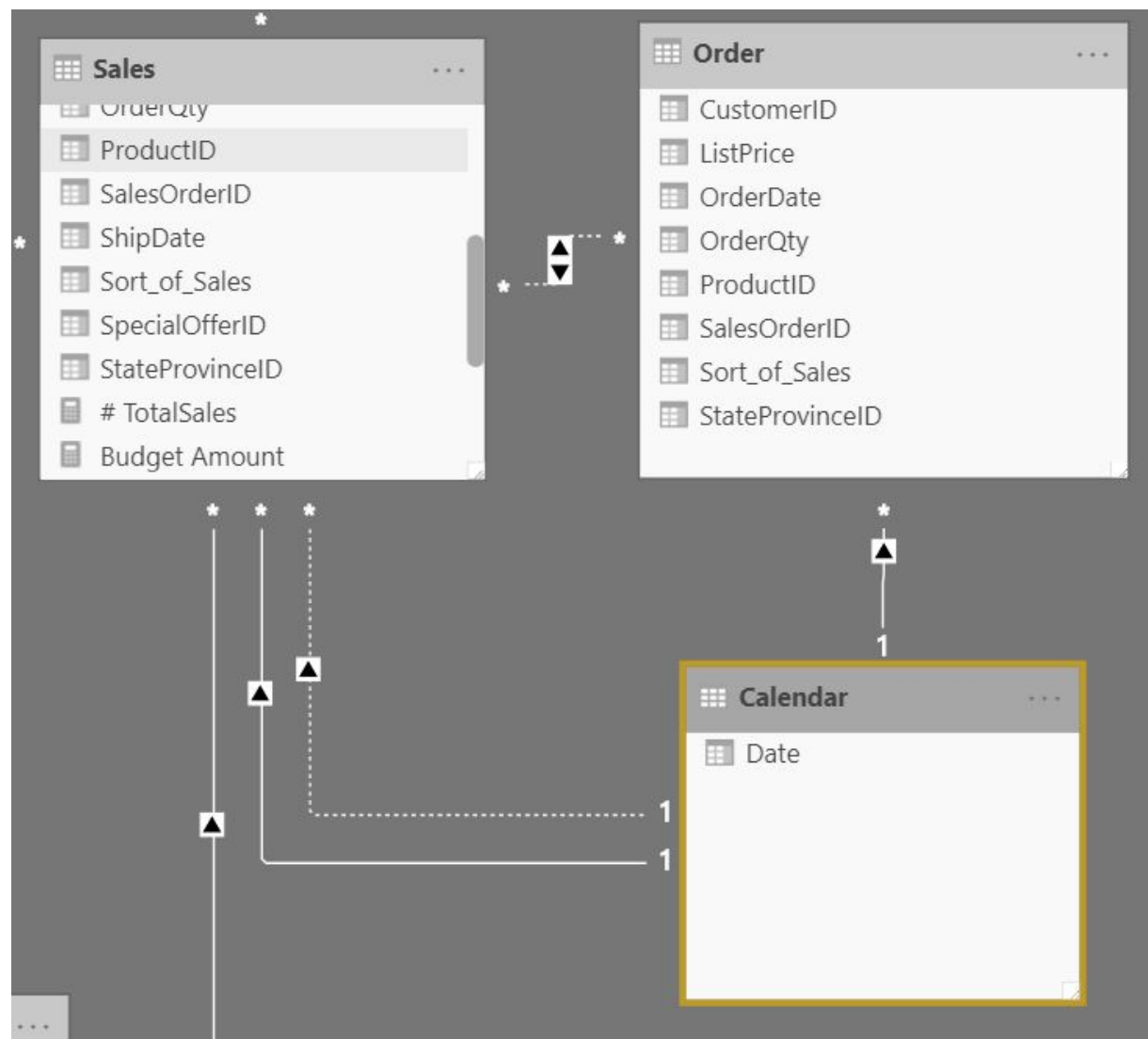
Introduction to Dimensions and Hierarchies

- Dimension: Store details about business entities.
- Hierarchy: Organize data such that one element is ranged over other data.

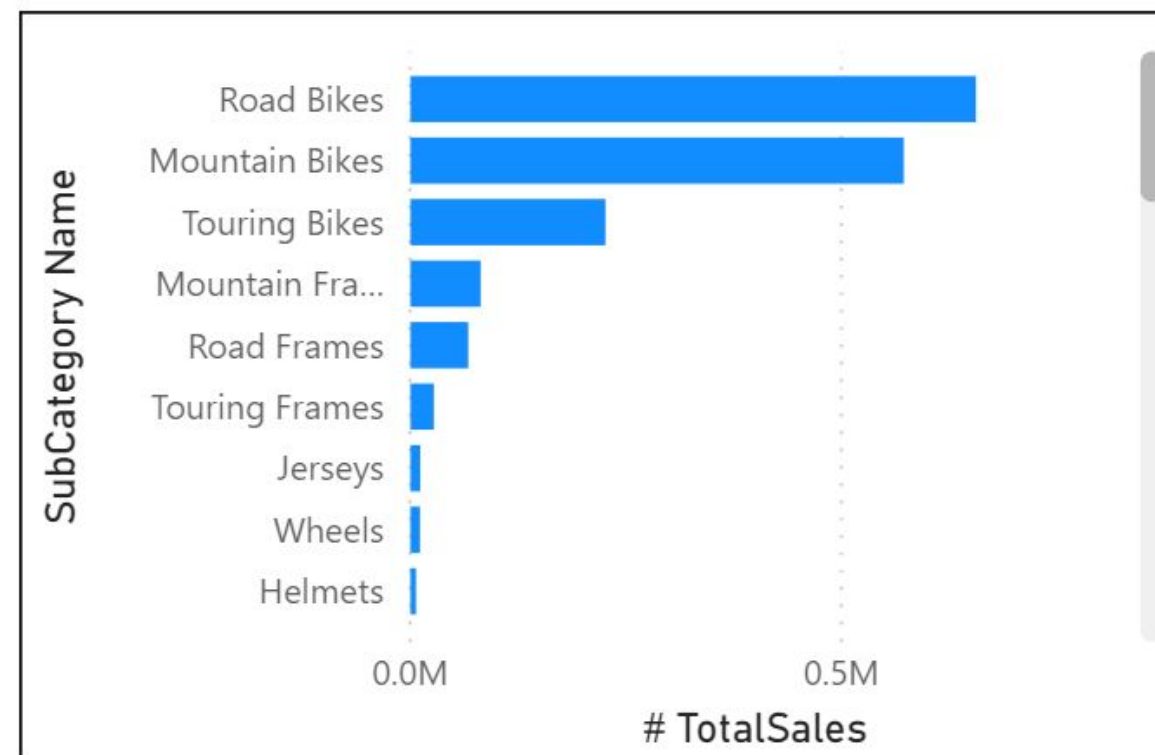
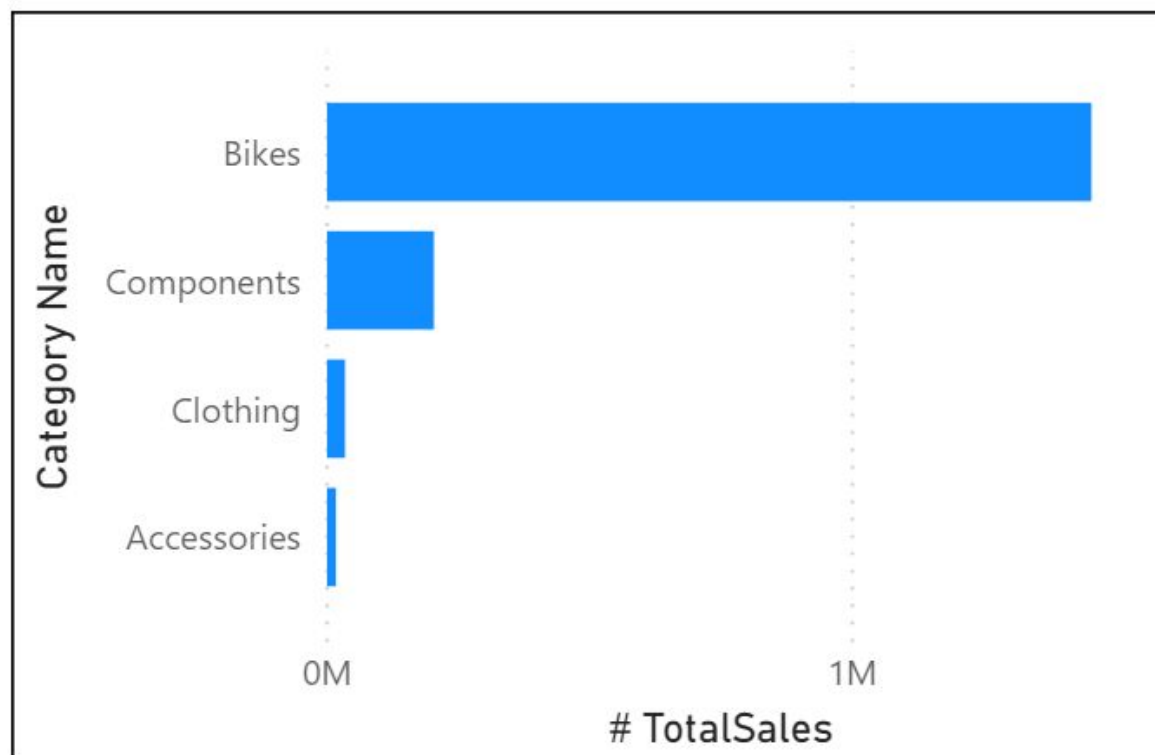
	1 ² ₃ Employee ID	A ^B _C Employee	1 ² ₃ Manager ID	A ^B _C Manager
1	1010	Roy F	null	
2	1011	Pam H	1010	Roy F
3	1012	Guy L	1010	Roy F
4	1013	Roger M	1011	Pam H
5	1014	Kaylie S	1011	Pam H
6	1015	Mike O	1012	Guy L
7	1016	Rudy Q	1012	Guy L

Role-playing Dimensions

A dimension that can filter related facts differently.



Creating new Hierarchies



Flatten out a Parent-child Hierarchy

Employee ID	Manager ID	Employee	Manager	Path
1010		Roy F		1010
1011	1010	Pam H	Roy F	1010 1011
1012	1010	Guy L	Roy F	1010 1012
1013	1011	Roger M	Pam H	1010 1011 1013
1014	1011	Kaylie S	Pam H	1010 1011 1014
1015	1012	Mike O	Guy L	1010 1012 1015

Employee ID	Name	Manager	Manager ID	Path	Level 1	Level 2	Level 3	Level 4
1000	Quincy Howard			1000	1000			
1001	Mallory Yang	Quincy Howard	1000	1000 1001	1000	1001		
1002	Donovan Maynard	Quincy Howard	1000	1000 1002	1000	1002		
1003	Giselle McClain	Mallory Yang	1001	1000 1001 1003	1000	1001	1003	
1004	Melvin Marsh	Mallory Yang	1001	1000 1001 1004	1000	1001	1004	
1005	Ria Snow	Giselle McClain	1003	1000 1001 1003 1005	1000	1001	1003	1005
1006	Callie Savage	Giselle McClain	1003	1000 1001 1003 1006	1000	1001	1003	1006

Review Questions

- Q01 – A dimension that can filter related facts differently is called what?
- A01 – A role-playing dimension.
- Q02 – What type of table stores details about business entities?
- A02 – Dimension table.

Lab: Advanced Data Modeling in Power BI Desktop

Module Overview

We covered the following concepts:

- Data Modeling
- Working with Tables
- Dimensions and Hierarchies

References

- DA-100 Design a data model in Power BI

<https://docs.microsoft.com/en-us/learn/modules/design-model-power-bi/>

