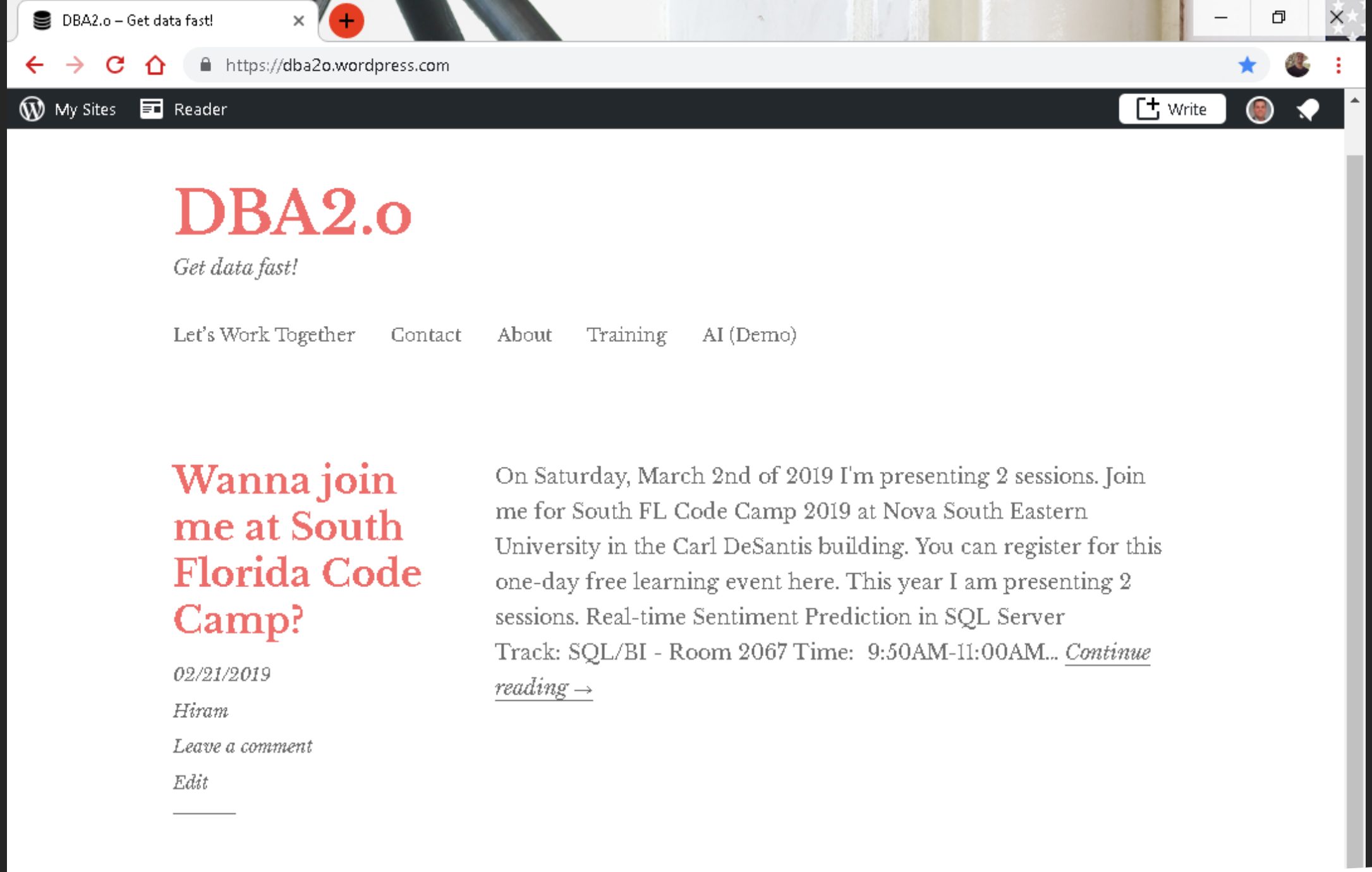
Power BI

Sealand Maersk
Power BI – Advanced Data Modeling

Hiram Fleitas

Please silence cell phones


DBA2.o – Get data fast!
https://dba2o.wordpress.com
My Sites
Reader
Write
DBA2.o
Get data fast!
Let's Work Together
Contact
About
Training
AI (Demo)
Wanna join me at South Florida Code Camp?
02/21/2019
Hiram
Leave a comment
Edit
On Saturday, March 2nd of 2019 I'm presenting 2 sessions. Join me for South FL Code Camp 2019 at Nova South Eastern University in the Carl DeSantis building. You can register for this one-day free learning event here. This year I am presenting 2 sessions. Real-time Sentiment Prediction in SQL Server Track: SQL/BI - Room 2067 Time: 9:50AM-11:00AM... Continue reading →

Session evaluations

Your feedback is very important.

This is the link:

bit.ly/pbi18

Submit your feedback by the end of this presentation.

Hiram Fleitas

Instructor

/HiramFleitas

/hfleitas

@HiramFleitas

hiram@fleitasarts.com

HiramFleitas

fleitasarts.com

BIO

Father
Principal DB Architect
Power BI since 2016
SQL Server since 1999
Developer since 1995
USCG Auxiliary Staff Officer
Microsoft Certified Professional
Power BI Certified

FUN

Construction & Family

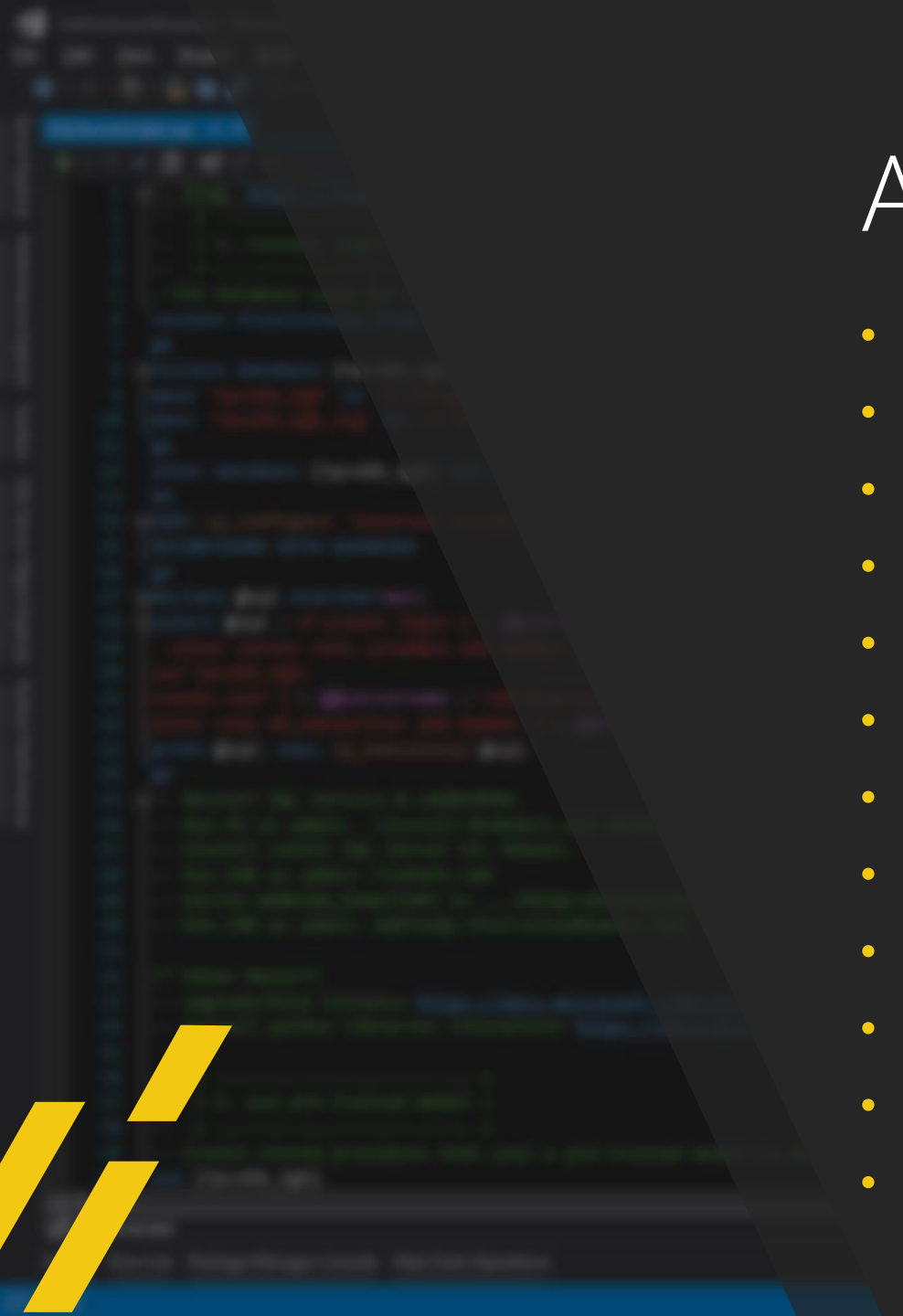
Schedule *(times are approximate and will be fluid with the class)*

Morning

09:00 AM – 11:45 AM – Advanced Data Modeling

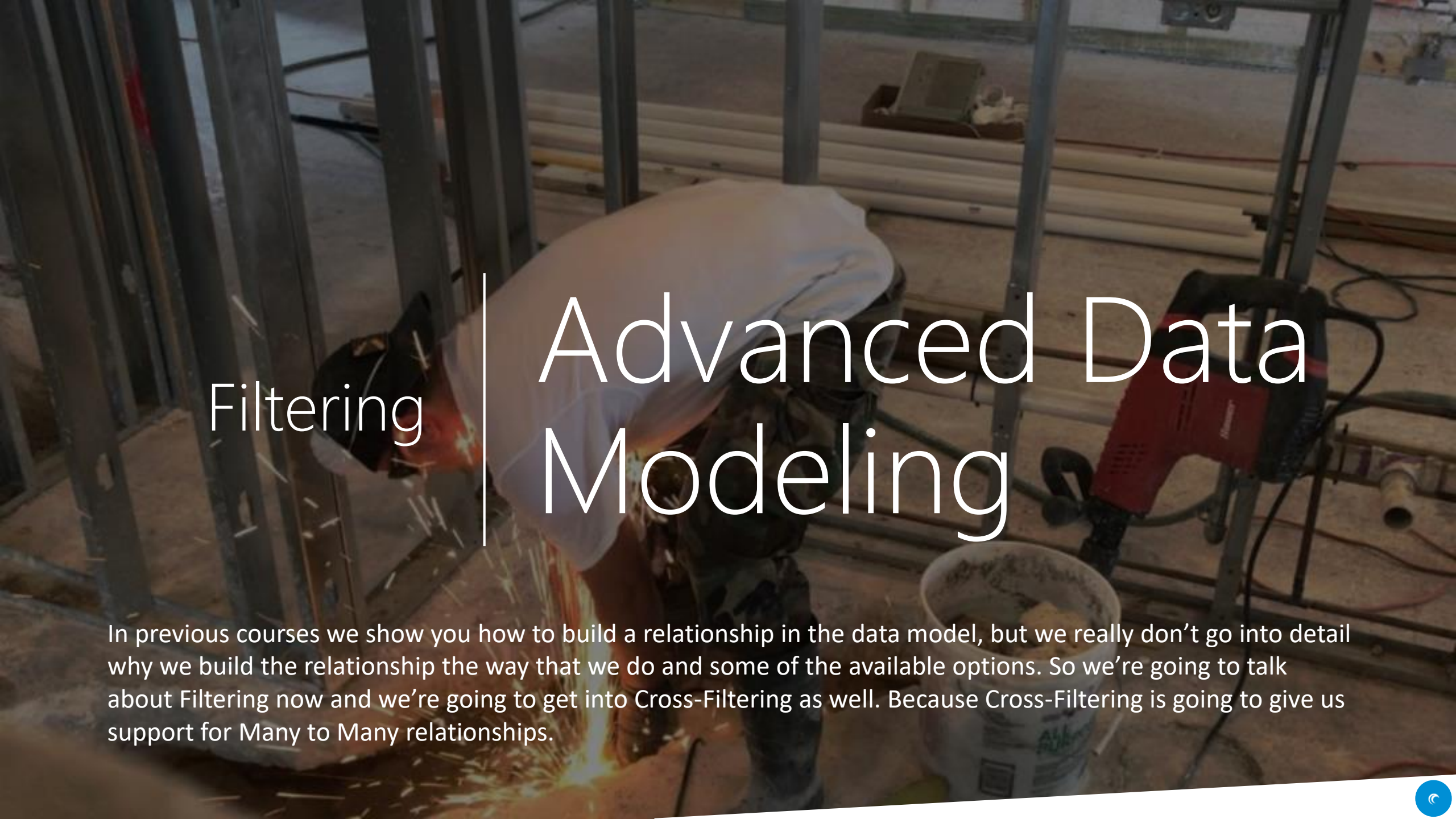
Afternoon

11:45 AM – 1:00 PM – Power BI Administration



Agenda

- Filtering (20min)
- Cross-Filtering and Time Intelligence (20min)
- Many to Many with DAX (15min)
- Creating a Bridge Table (20min)
- Role Playing Tables with DAX (20min)
- Role Playing Tables without DAX (20min)
- Mismatched Granularities (30min)
- Weighted Allocation (20min)
- Data Refresh Overview (20min)
- Scheduling Data Refresh (20min)
- Implementing Row Level Security (20min)
- Implementing Dynamic Security (15min)



Filtering | Advanced Data Modeling

In previous courses we show you how to build a relationship in the data model, but we really don't go into detail why we build the relationship the way that we do and some of the available options. So we're going to talk about Filtering now and we're going to get into Cross-Filtering as well. Because Cross-Filtering is going to give us support for Many to Many relationships.

Single Filtering

Products

ProdID	Name	Price
101	Bike	250
102	Socks	10
103	Shoes	120
104	Helmet	150
105	Gloves	45

Sales

CustID	ProdID	Amt	QTY
3	101	250	1
3	102	20	2
1	105	45	1
2	105	45	1
2	104	150	1
3	104	150	1
4	101	250	1

Customers

CustID	Name
1	Christina
2	Ocean
3	Skylar
4	Brent
5	Regis

Filtering

Automatically occurs from the single side of the relationship.

Many to Many relationships

Customers

Customer 1 – Buys Milk & Bread
Customer 2 – Buys Milk & Coffee
Customer 3 – Buys Sugar

Products

Milk – Customers 1, 2, 4, 5
Bread – Customers 1, 4, 6, 7

Question
How many customers have purchased each product?

Cross Filtering

Products

ProdID	Name	Price
101	Bike	250
102	Socks	10
103	Shoes	120
104	Helmet	150
105	Gloves	45

Sales

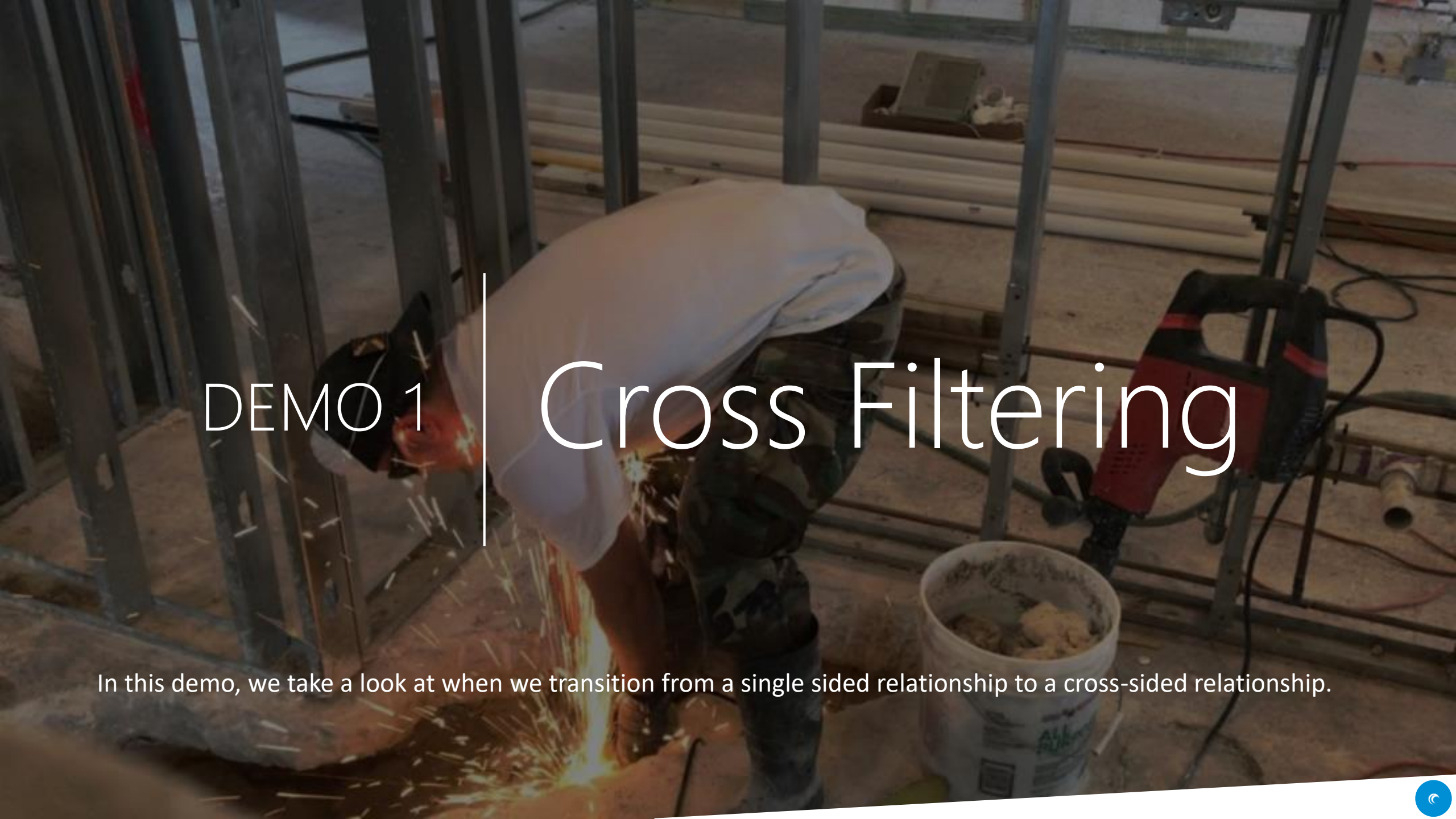
CustID	ProdID	Amt	QTY
3	101	250	1
3	102	20	2
1	105	45	1
2	105	45	1
2	104	150	1
3	104	150	1
4	101	250	1

Customers

CustID	Name
1	Christina
2	Ocean
3	Skylar
4	Brent
5	Regis

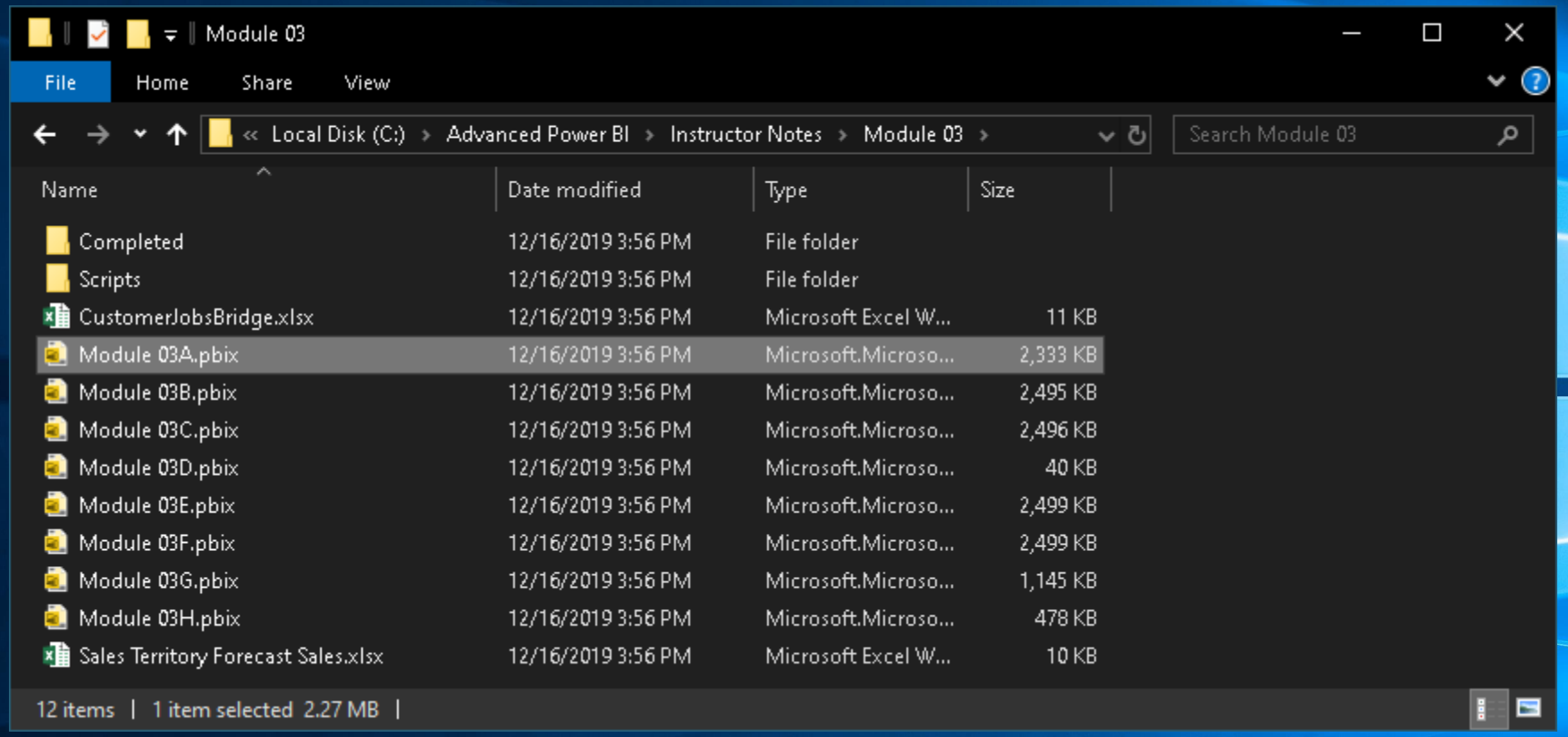
Filtering

Automatically occurs from the single side of the relationship.



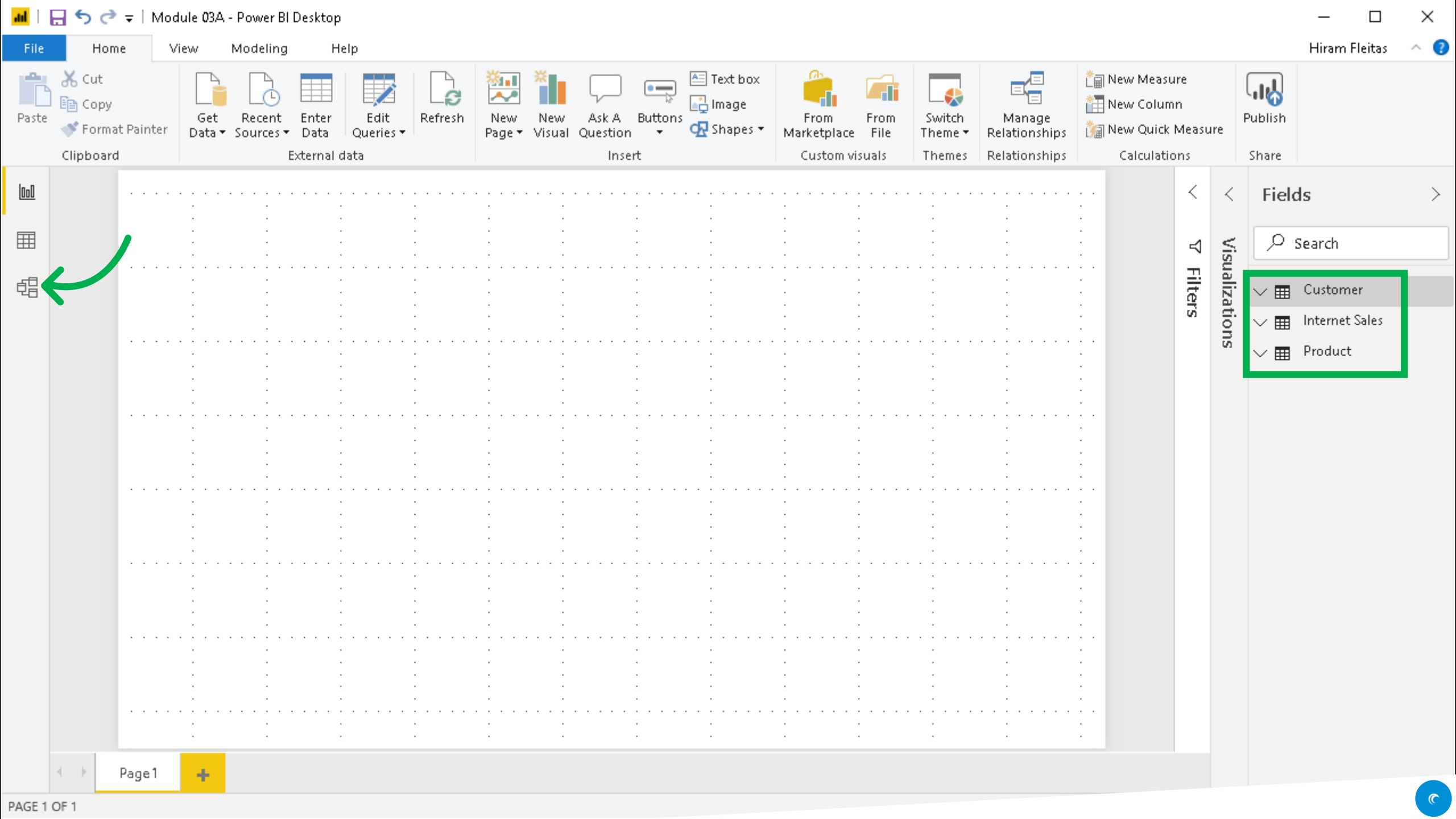
DEMO 1 | Cross Filtering

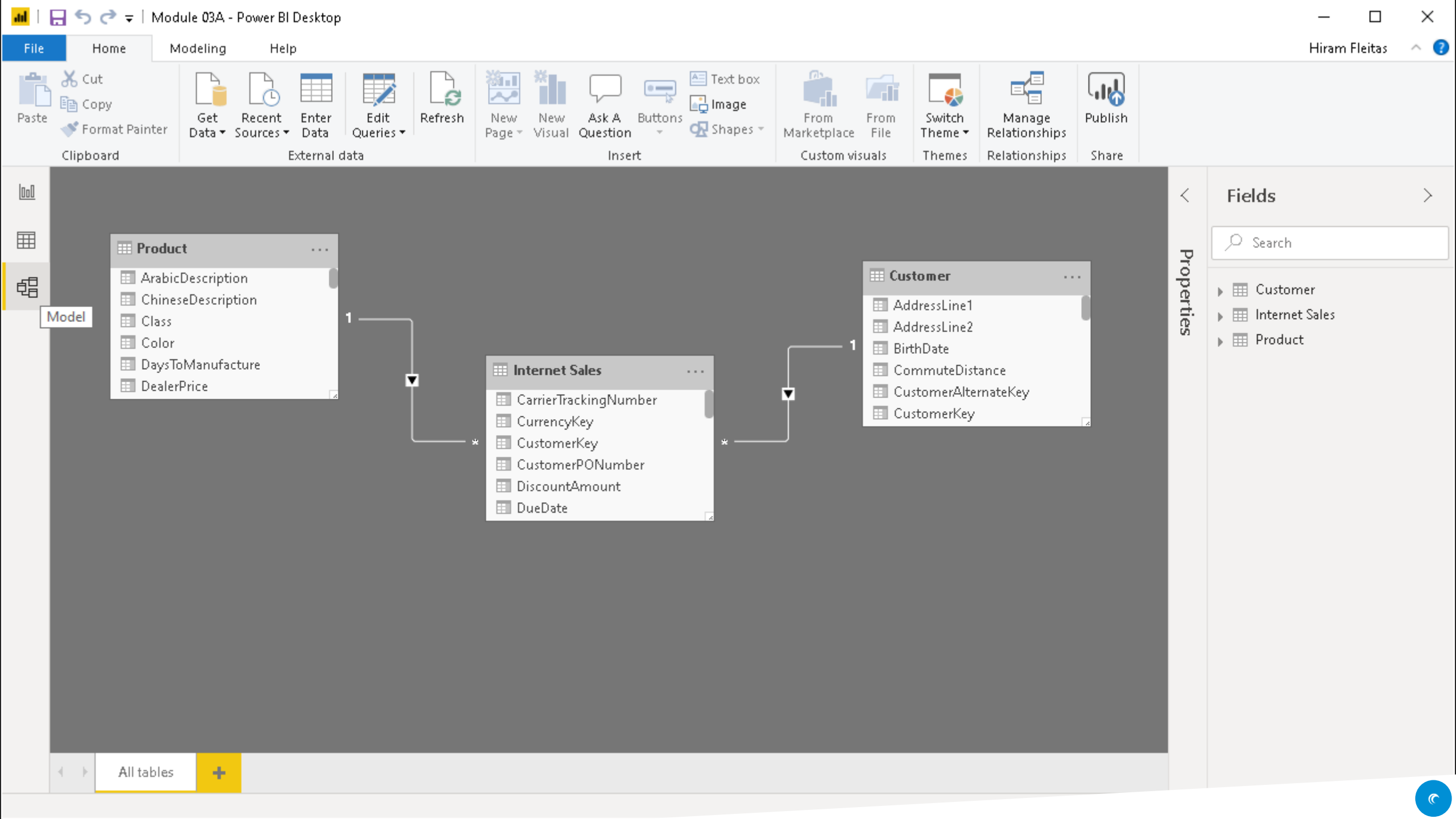
In this demo, we take a look at when we transition from a single sided relationship to a cross-sided relationship.

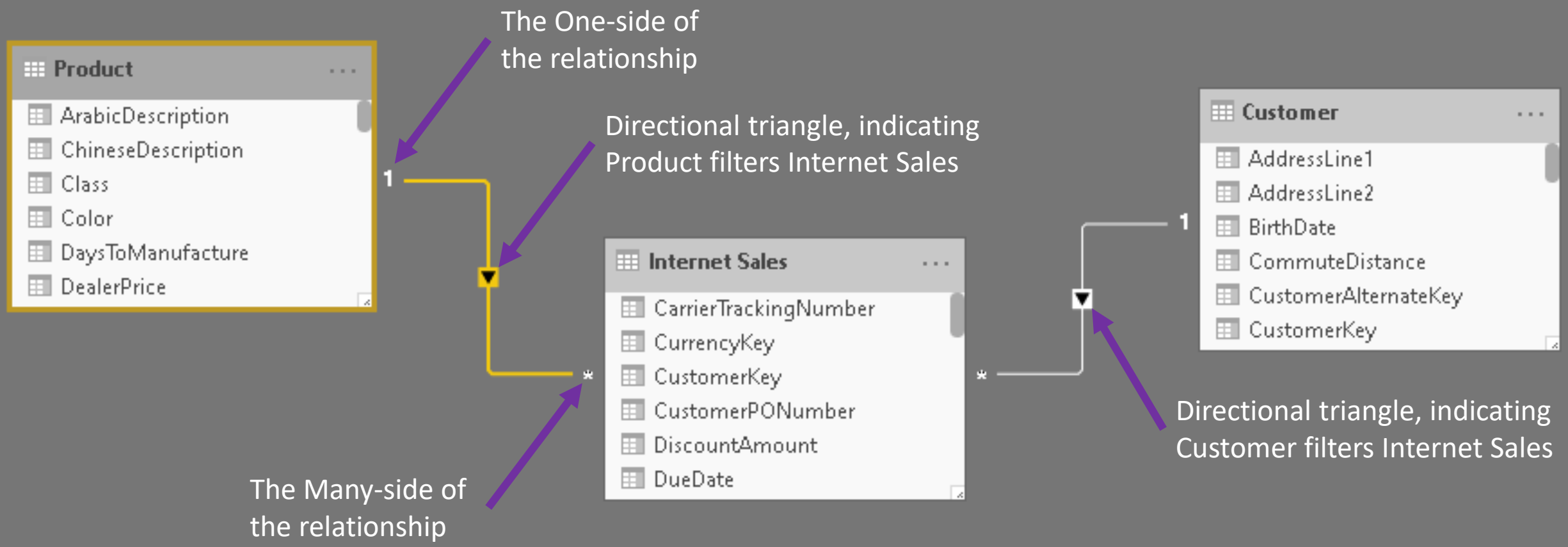


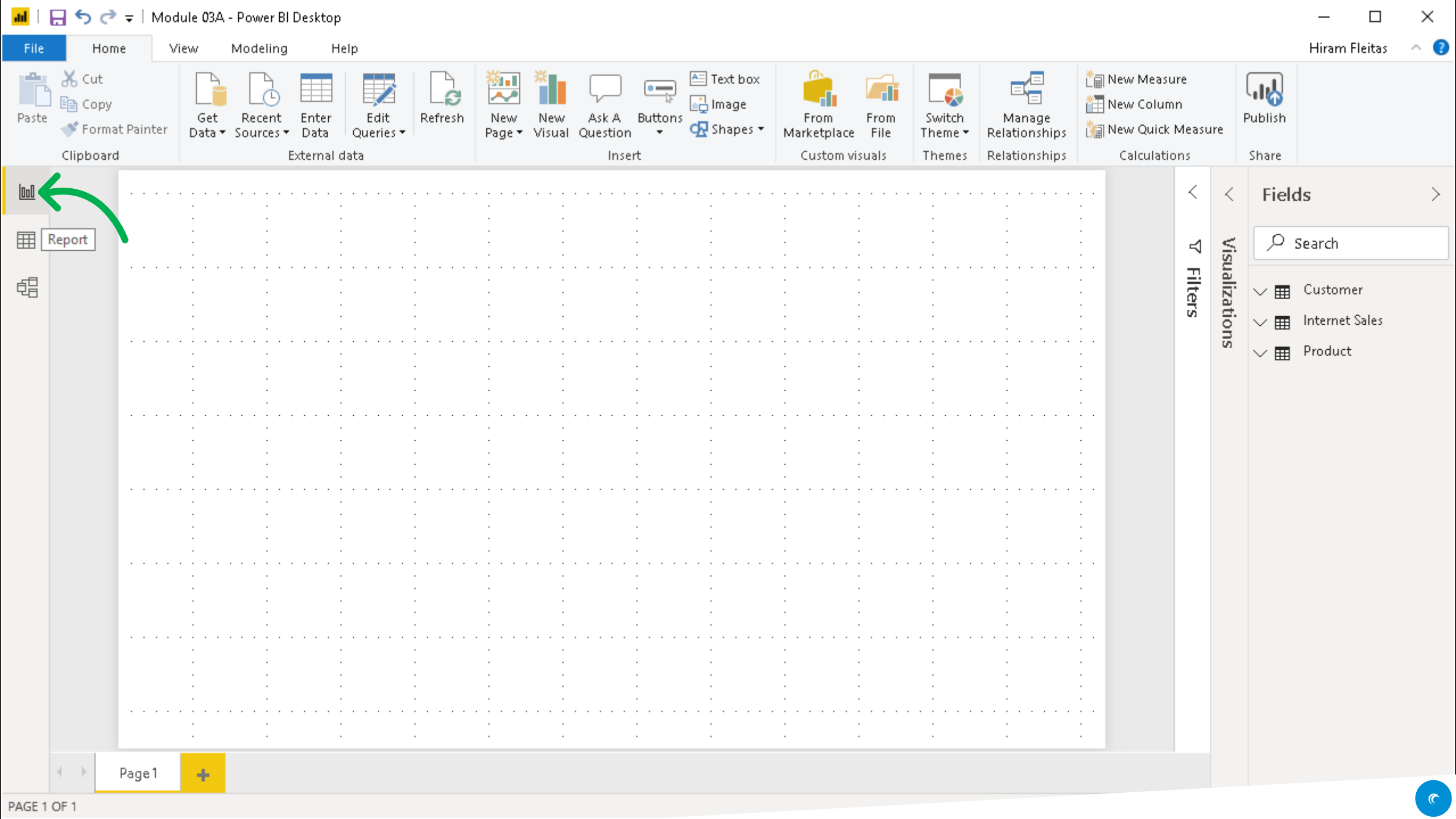
Module 03

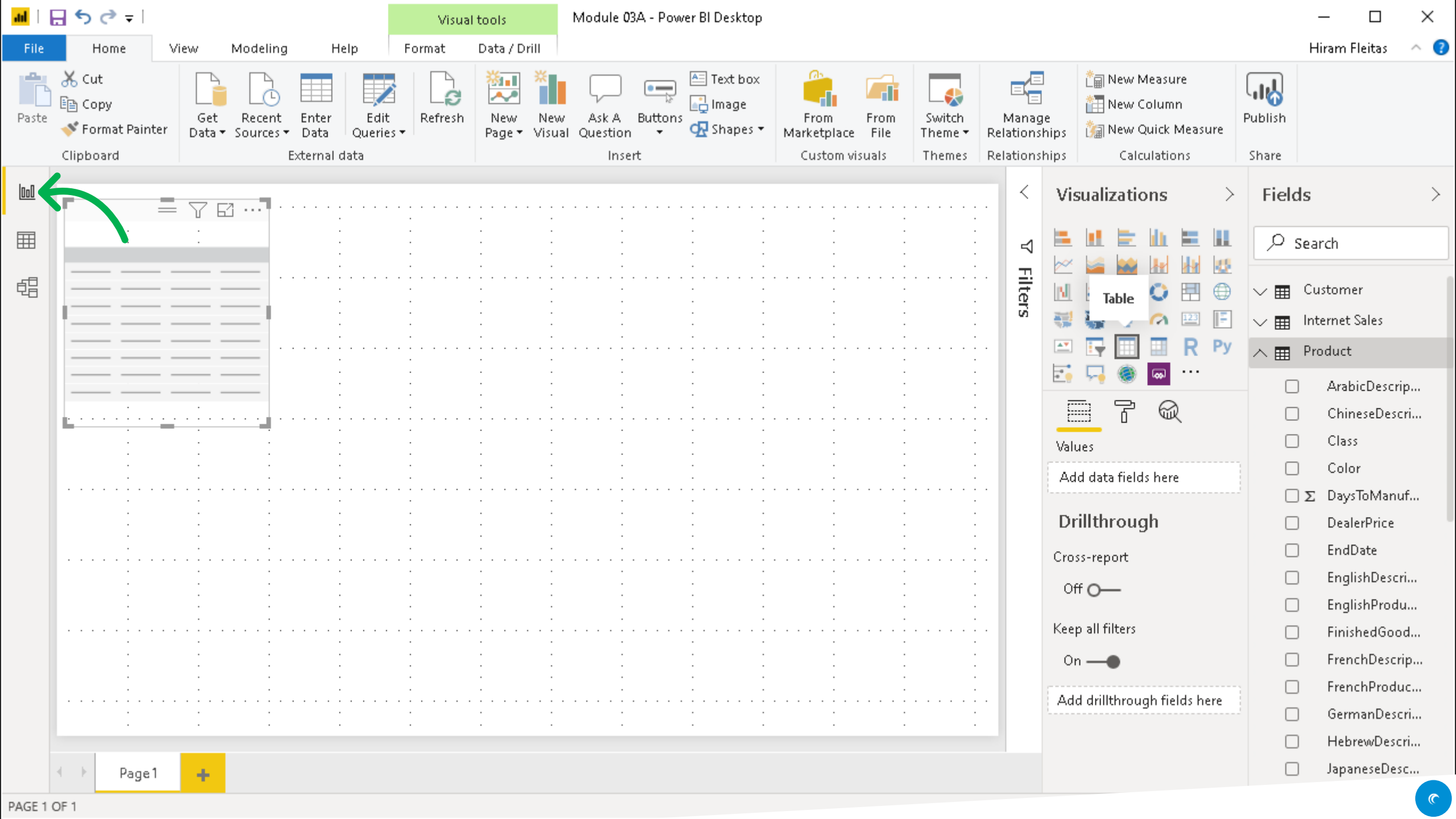
C:\Advanced Power BI\Instructor Notes\Module 03\Module 03A.pbix

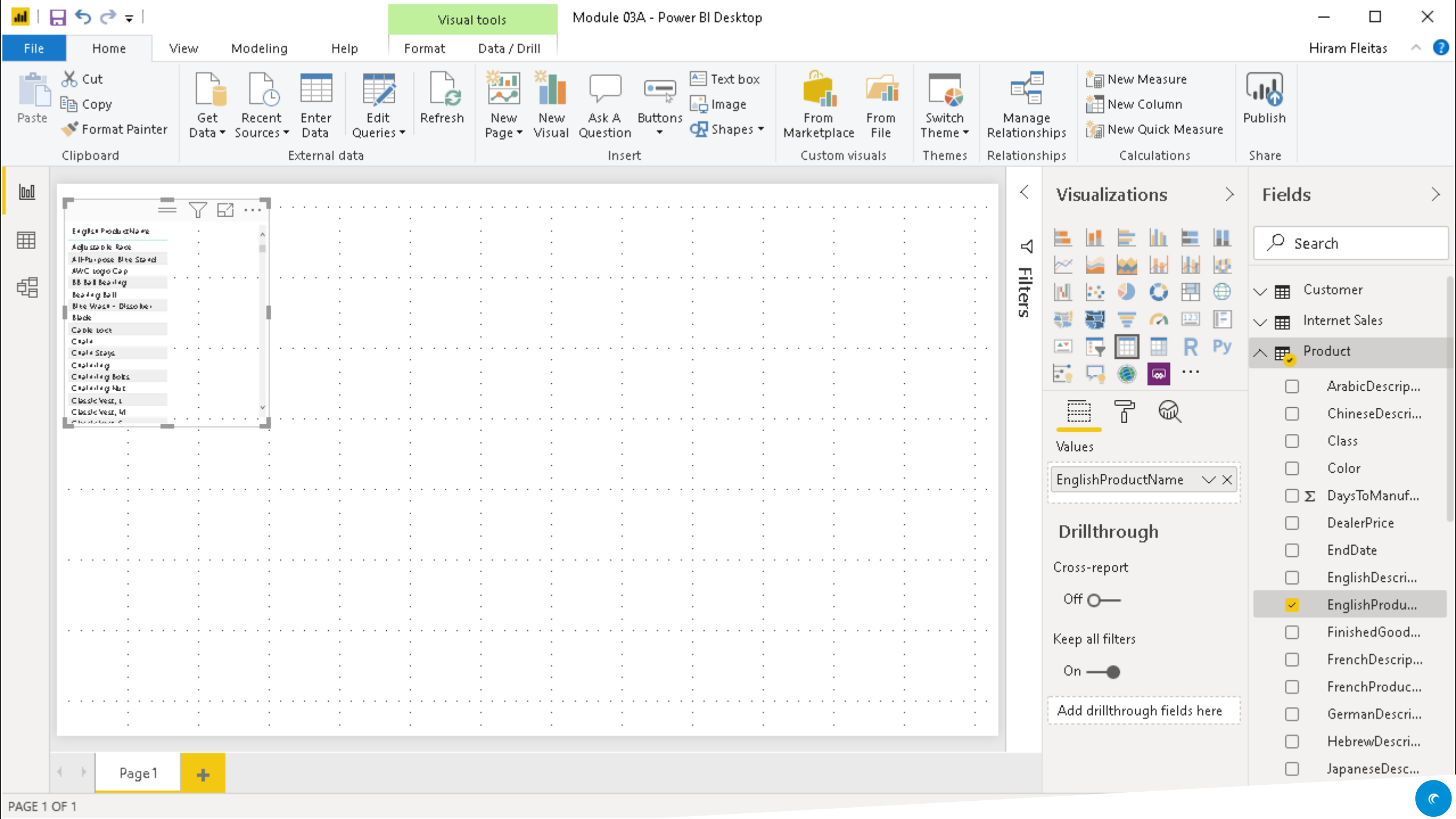

Module 03A - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Filters
Visualizations
Fields
Search
Customer
Internet Sales
Product
Page 1
PAGE 1 OF 1


Module 03A - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Model
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
1
*
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
*
1
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Properties
Fields
Search
Customer
Internet Sales
Product
All tables


The One-side of the relationship
Directional triangle, indicating Product filters Internet Sales
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
1
*
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
1
*
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Directional triangle, indicating Customer filters Internet Sales
The Many-side of the relationship


Module 03A - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Report
Filters
Visualizations
Fields
Search
Customer
Internet Sales
Product
Page 1
PAGE 1 OF 1


Visual tools
Module 03A - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Filters
Visualizations
Table
Values
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
Customer
Internet Sales
Product
ArabicDescrip...
ChineseDescri...
Class
Color
DaysToManuf...
DealerPrice
EndDate
EnglishDescri...
EnglishProdu...
FinishedGood...
FrenchDescrip...
FrenchProduc...
GermanDescri...
HebrewDescri...
JapaneseDesc...
Page 1
PAGE 1 OF 1


Visual tools
Module 03A - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Filters
Visualizations
Values
EnglishProductName
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
Customer
Internet Sales
Product
ArabicDescrip...
ChineseDescri...
Class
Color
DaysToManuf...
DealerPrice
EndDate
EnglishDescri...
EnglishProdu...
FinishedGood...
FrenchDescrip...
FrenchProduc...
GermanDescri...
HebrewDescri...
JapaneseDesc...
Page 1
PAGE 1 OF 1

Module 03A - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Cut | Copy | Format Painter | Paste — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

Filters

Visualizations

Values

EnglishProductName

Count of CustomerKey

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

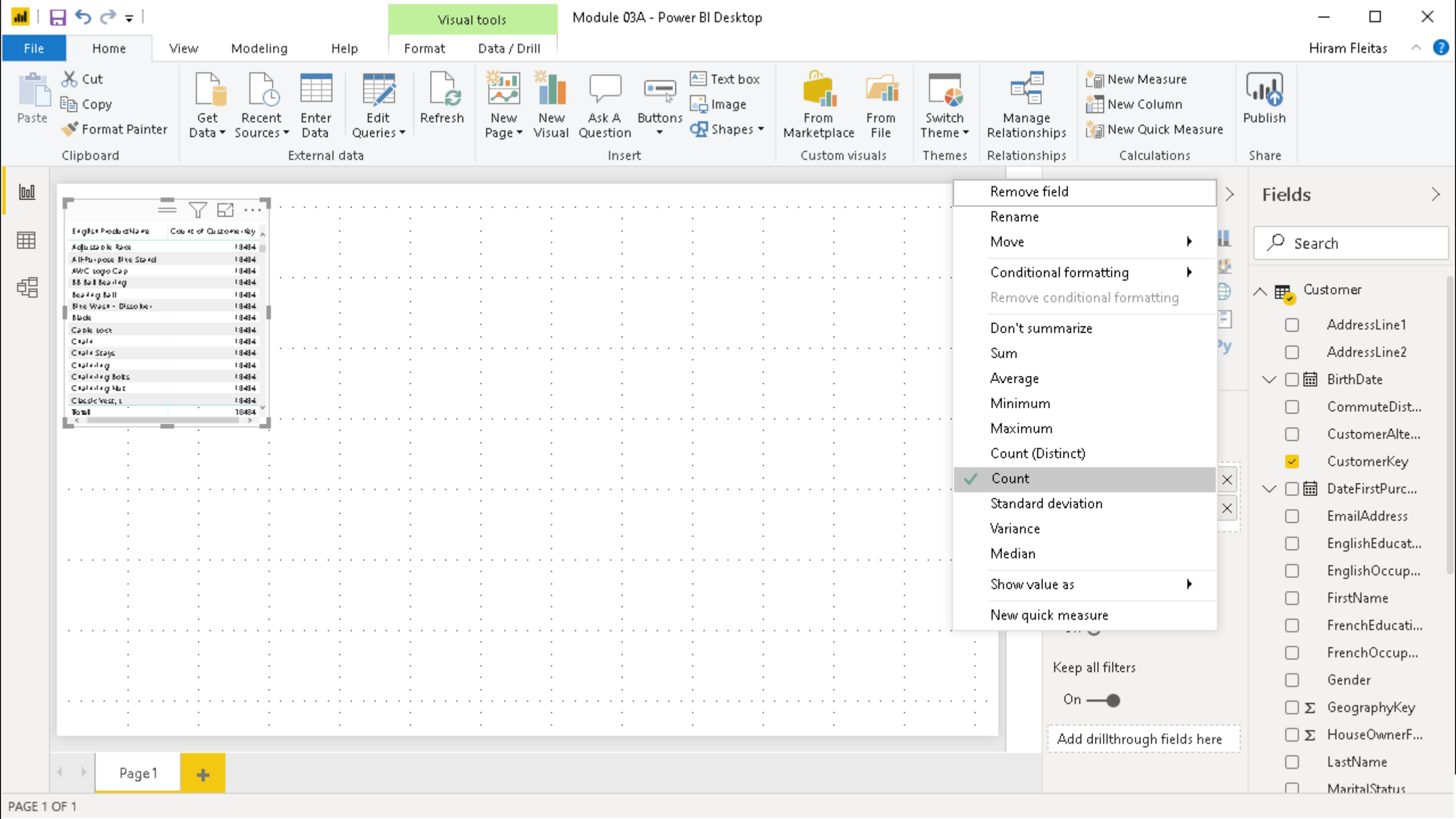
Search

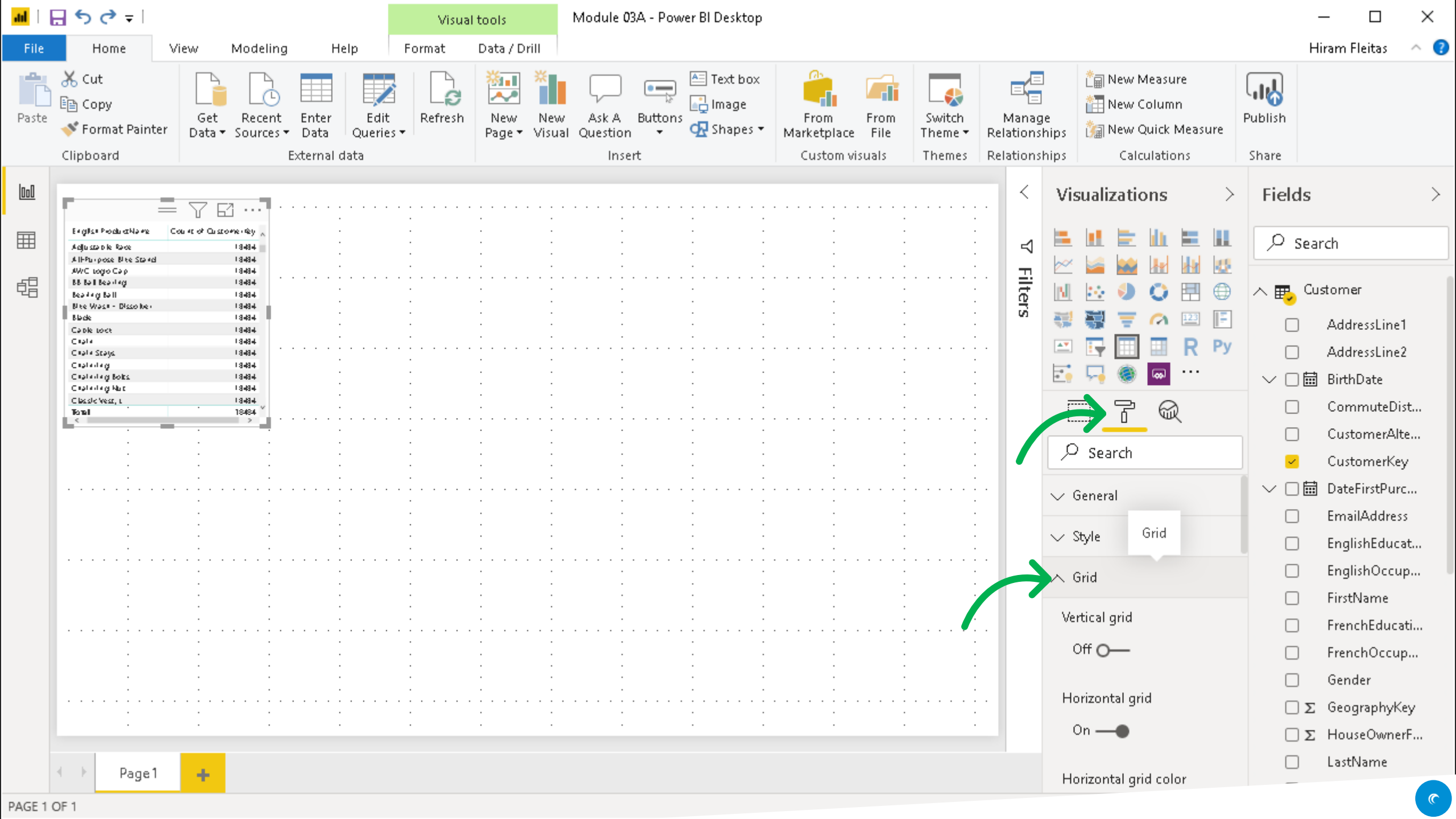
Customer

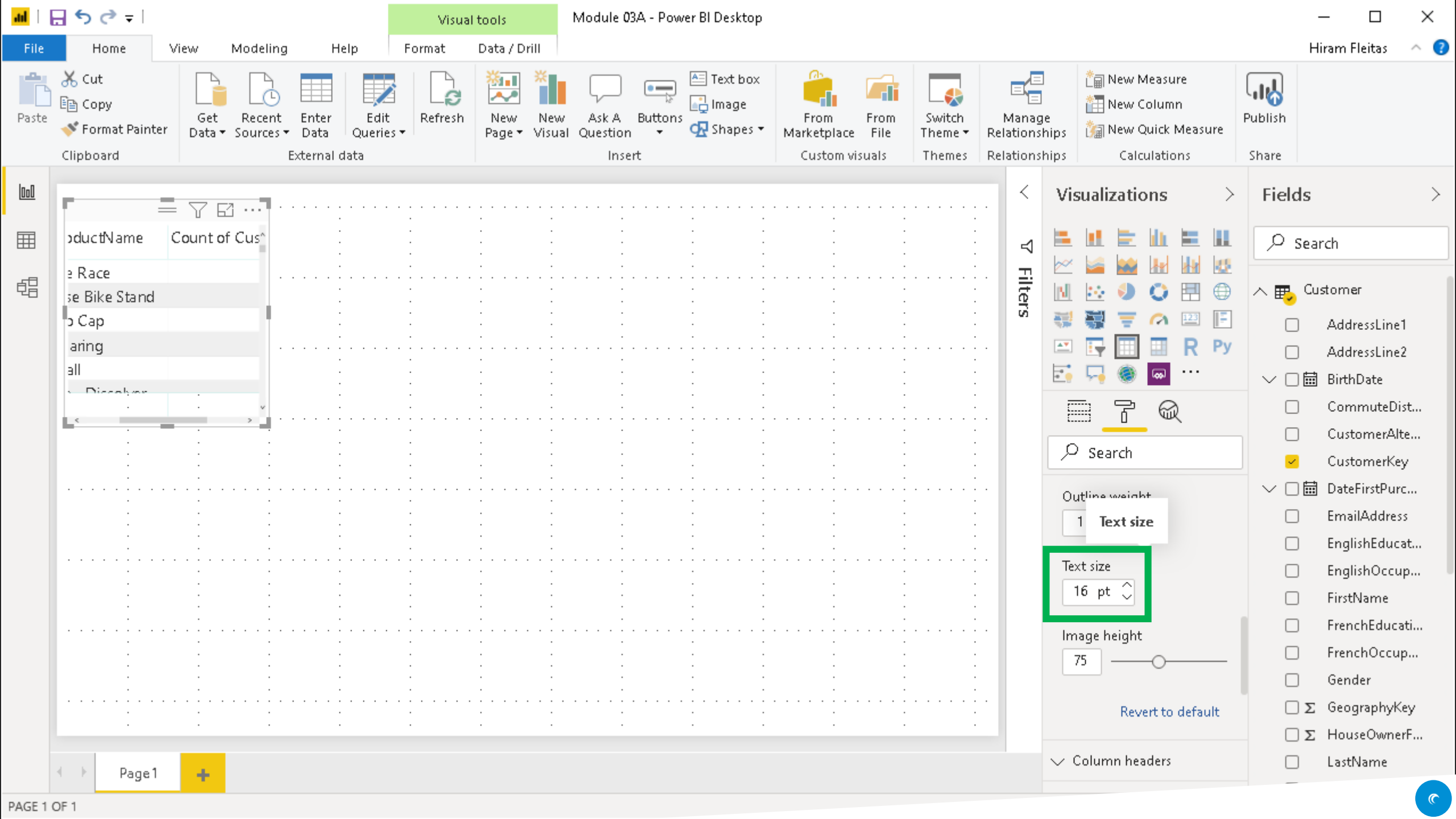
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName

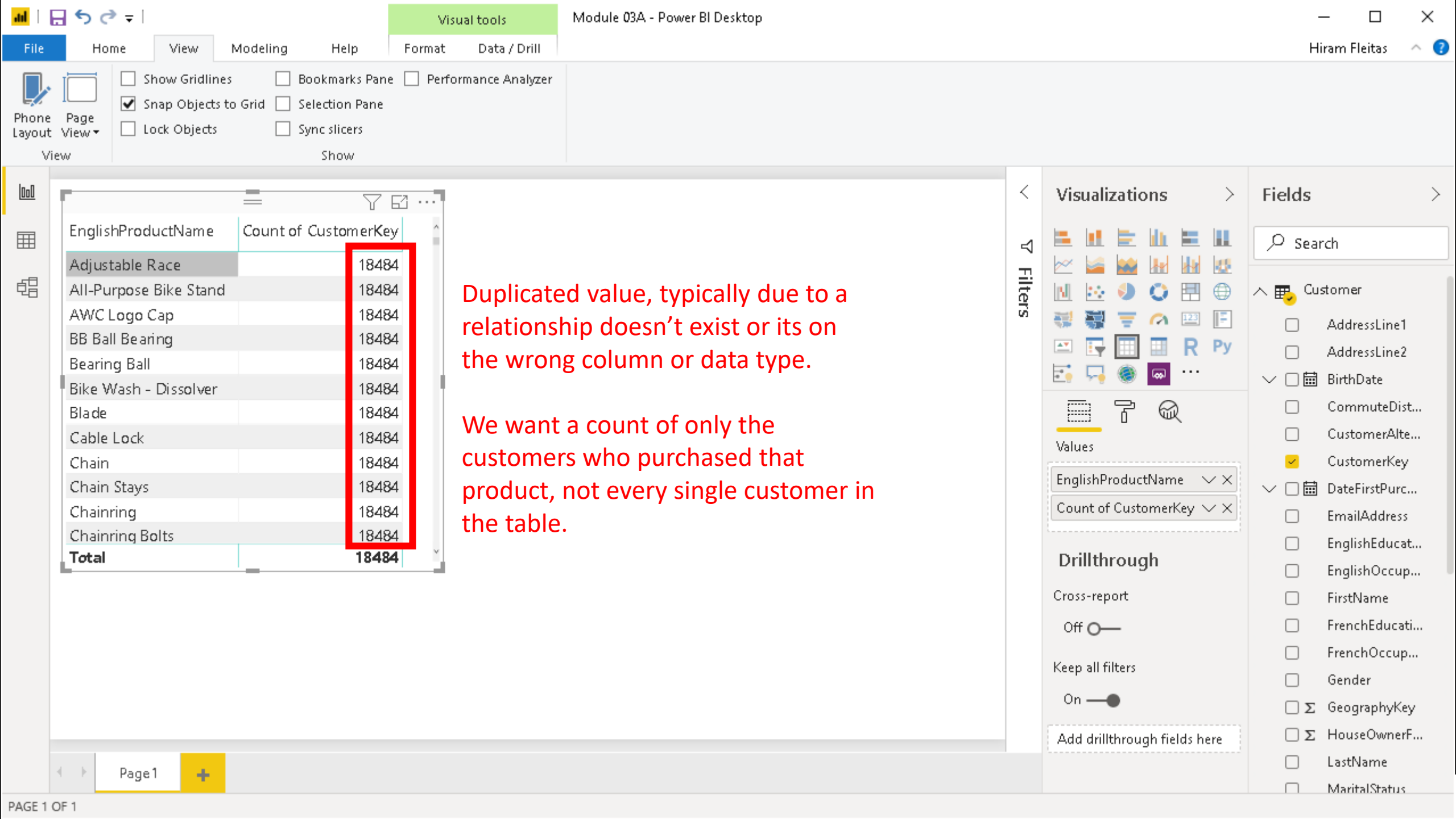
Page 1

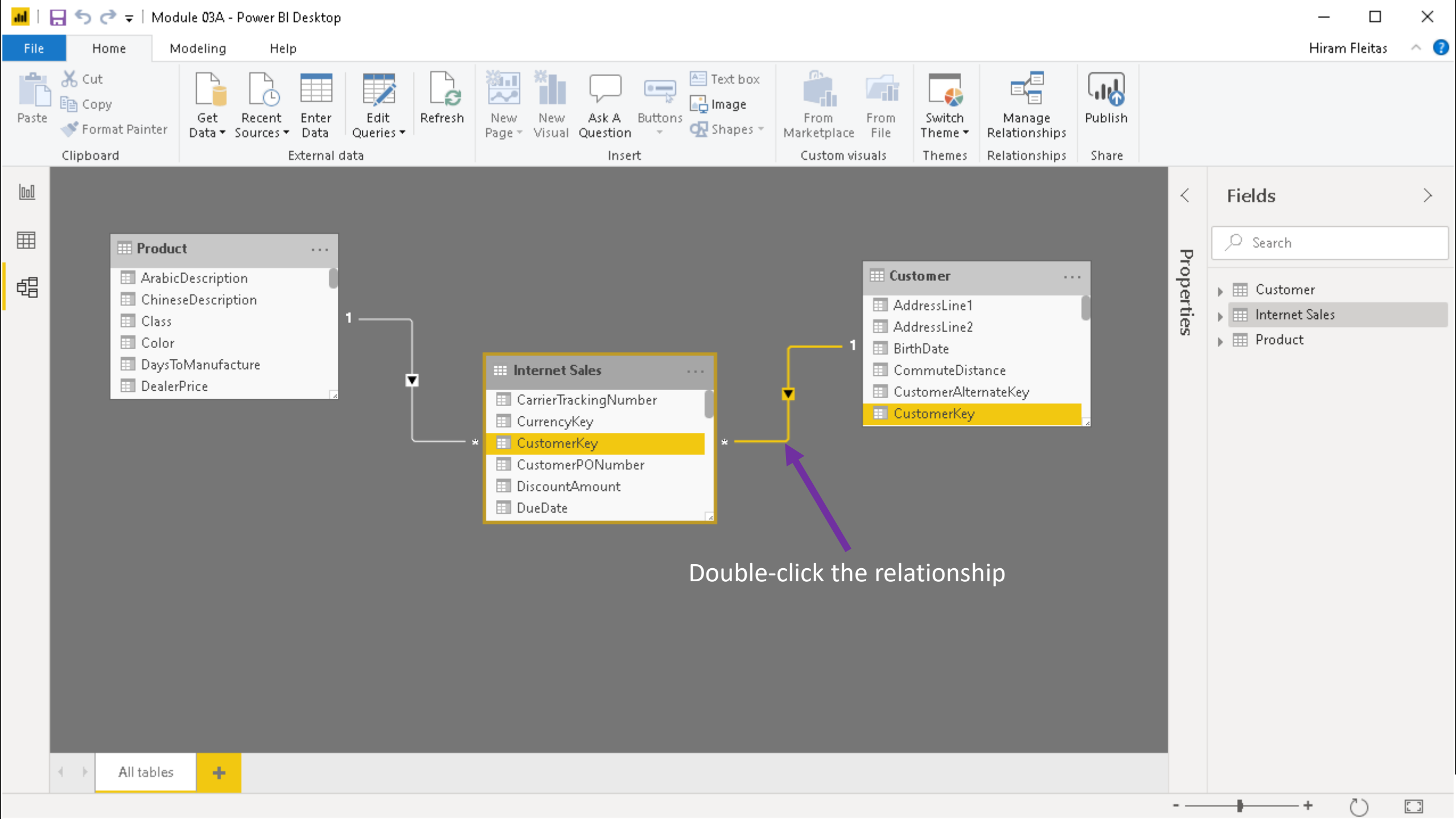
PAGE 1 OF 1


Module 03A - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Cut
Copy
Format Painter
Paste
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Remove field
Rename
Move
Conditional formatting
Remove conditional formatting
Don't summarize
Sum
Average
Minimum
Maximum
Count (Distinct)
Count
Standard deviation
Variance
Median
Show value as
New quick measure
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
MaritalStatus
Keep all filters
On
Add drillthrough fields here
Page 1
PAGE 1 OF 1

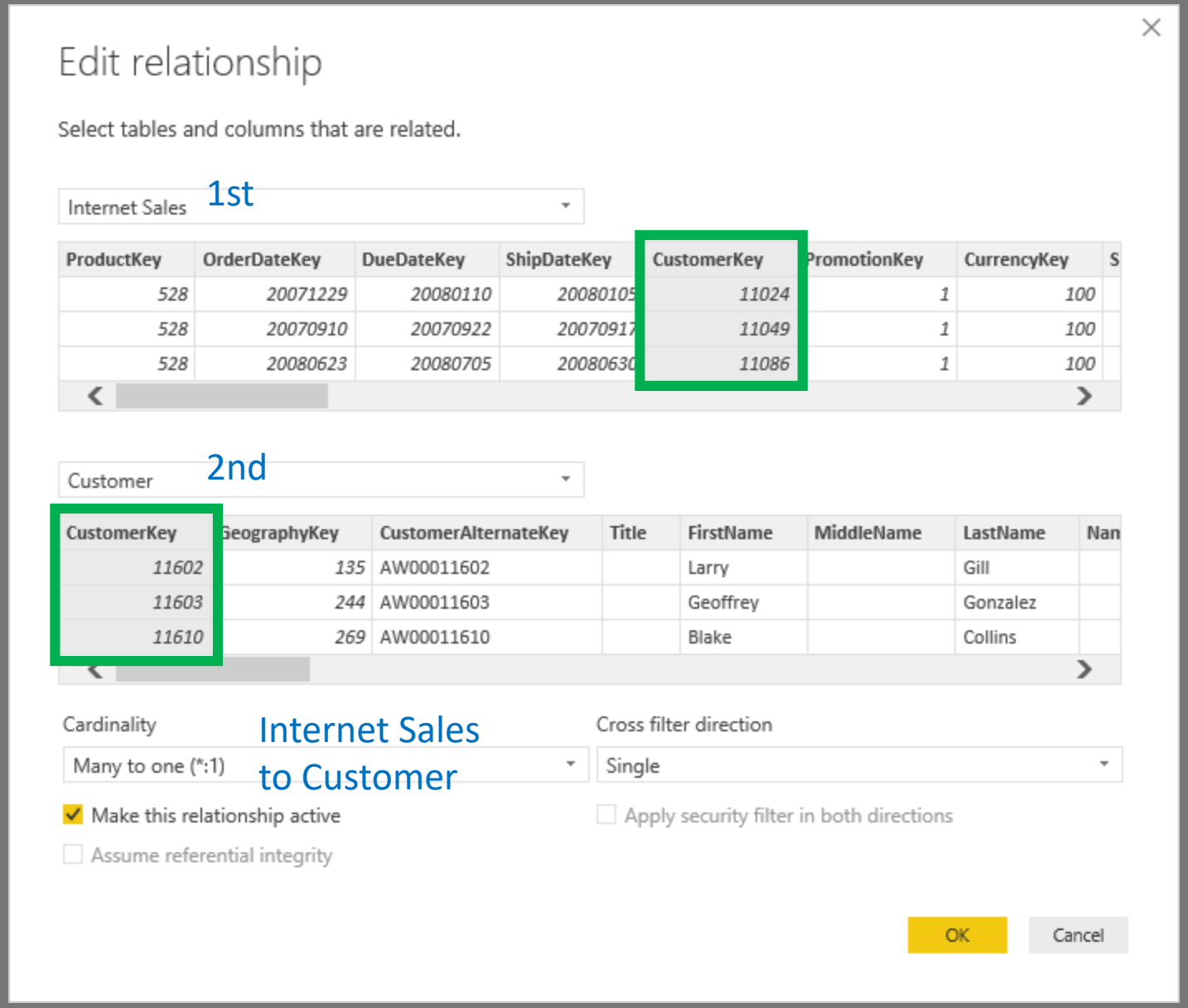

Module 03A - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Filters
Visualizations
Search
General
Style
Grid
Vertical grid
Off
Horizontal grid
On
Horizontal grid color
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
Page 1
PAGE 1 OF 1

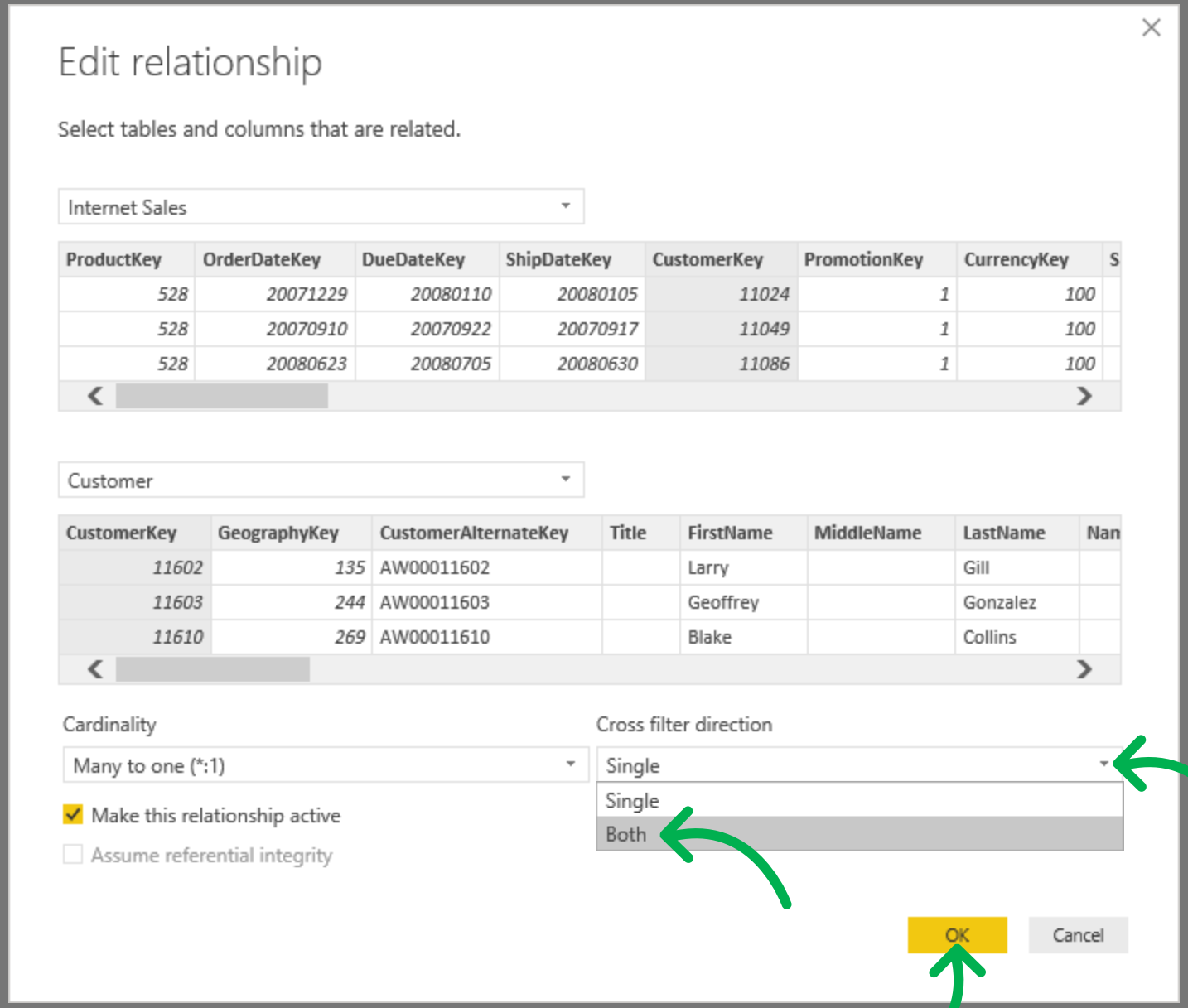

Module 03A - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Cut
Copy
Format Painter
Paste
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
ductName
Count of Cus
e Race
se Bike Stand
o Cap
aring
all
Filters
Visualizations
Search
Outline weight
1
Text size
Text size
16 pt
Image height
75
Revert to default
Column headers
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
Page1
PAGE 1 OF 1

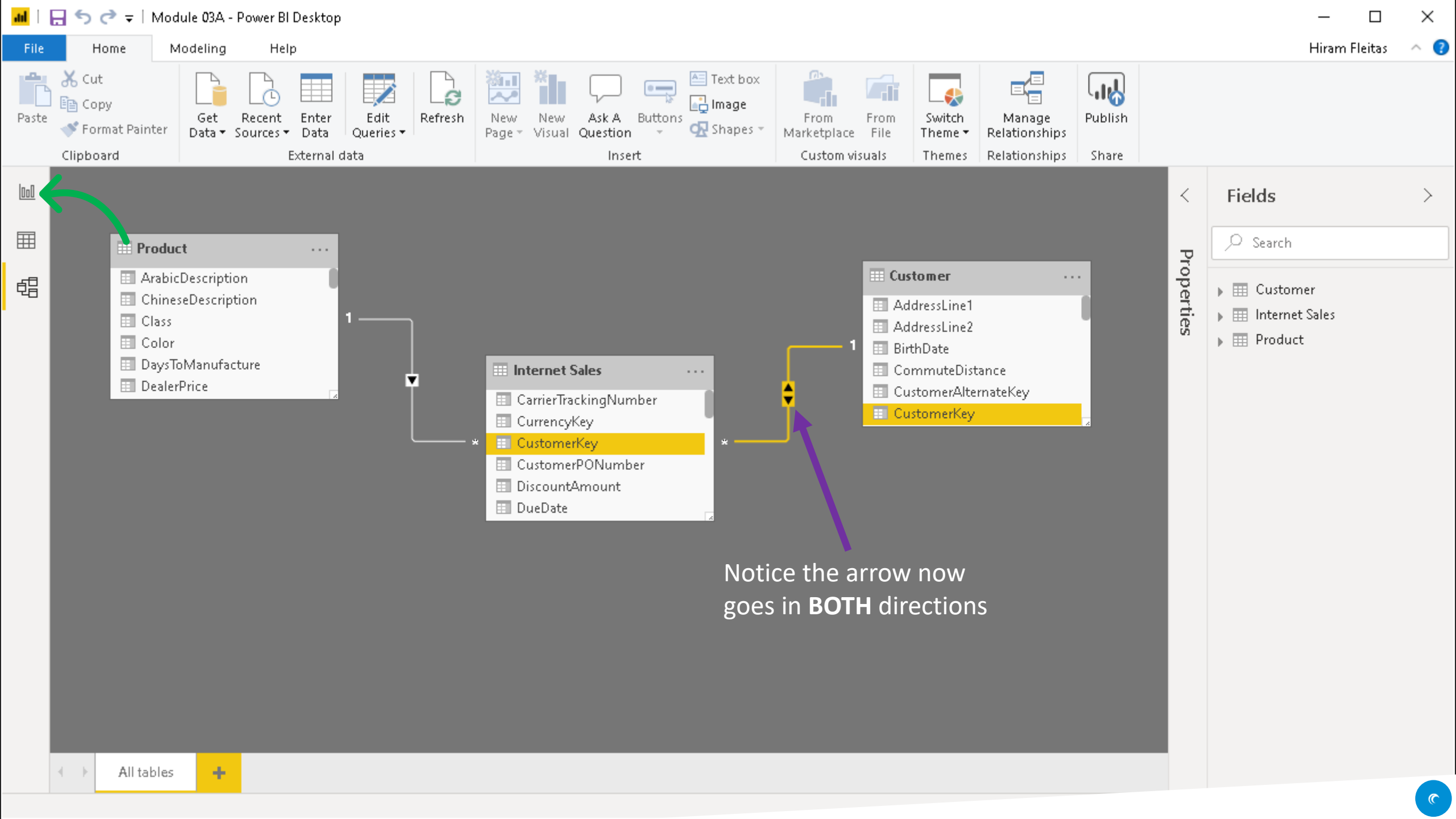

Module 03A - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Phone Layout
Page View
Show Gridlines
Snap Objects to Grid
Lock Objects
Bookmarks Pane
Selection Pane
Sync slicers
Performance Analyzer
View
Show
EnglishProductName
Count of CustomerKey
Adjustable Race 18484
All-Purpose Bike Stand 18484
AWC Logo Cap 18484
BB Ball Bearing 18484
Bearing Ball 18484
Bike Wash - Dissolver 18484
Blade 18484
Cable Lock 18484
Chain 18484
Chain Stays 18484
Chainring 18484
Chainring Bolts 18484
Total 18484
Duplicated value, typically due to a relationship doesn't exist or its on the wrong column or data type.
We want a count of only the customers who purchased that product, not every single customer in the table.
Filters
Visualizations
Values
EnglishProductName
Count of CustomerKey
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
MaritalStatus
Page 1
PAGE 1 OF 1

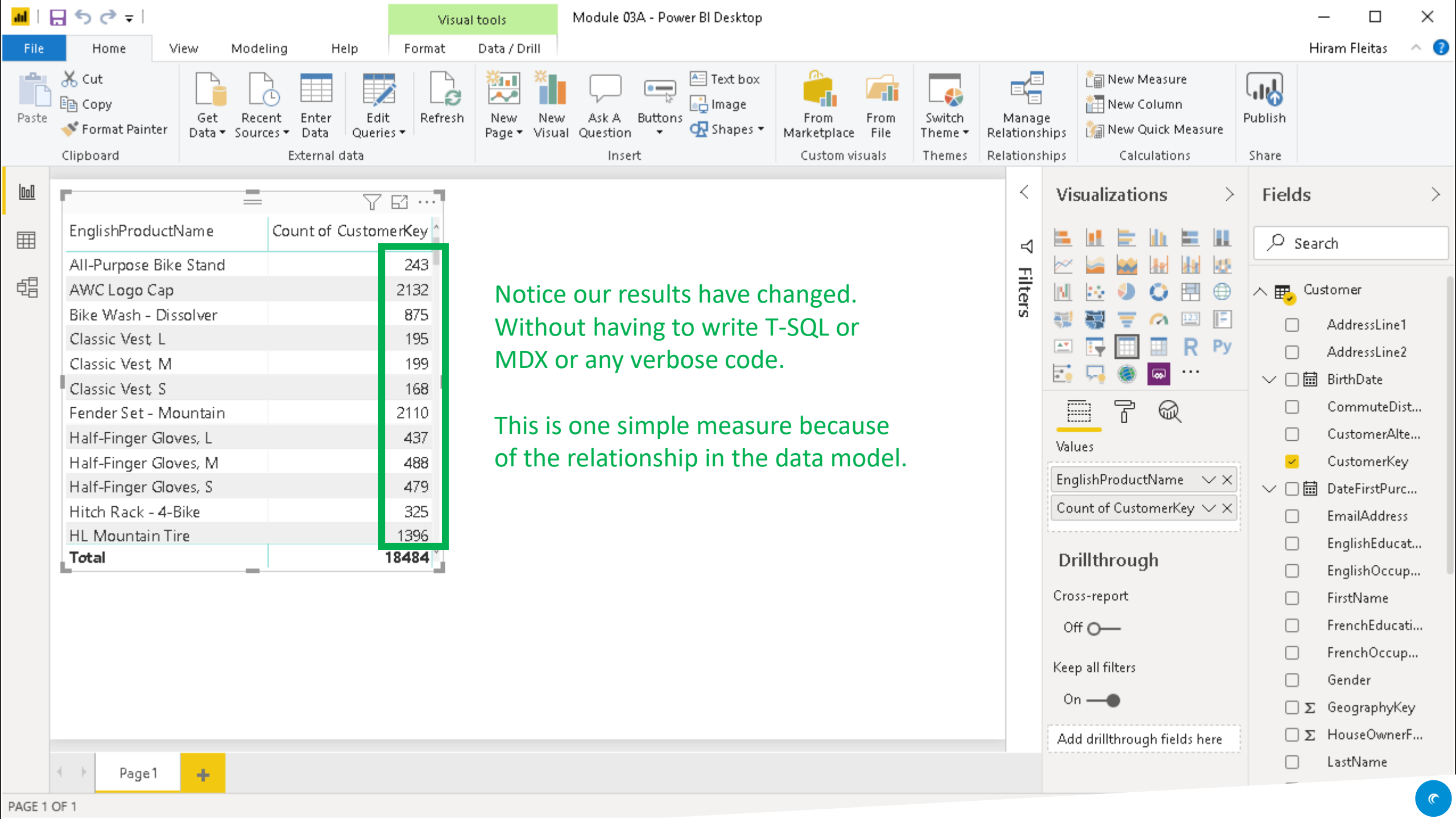

Module 03A - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
1
*
Double-click the relationship
Properties
Fields
Search
Customer
Internet Sales
Product
All tables

Verify the relationship is built correctly. It is on CustomerKey.




Edit relationship
Select tables and columns that are related.
Internet Sales
ProductKey OrderDateKey DueDateKey ShipDateKey CustomerKey PromotionKey CurrencyKey S
528 20071229 20080110 20080105 11024 1 100
528 20070910 20070922 20070917 11049 1 100
528 20080623 20080705 20080630 11086 1 100
Customer
CustomerKey GeographyKey CustomerAlternateKey Title FirstName MiddleName LastName Nan
11602 135 AW00011602 Larry Gill
11603 244 AW00011603 Geoffrey Gonzalez
11610 269 AW00011610 Blake Collins
Cardinality
Many to one (*:1)
Cross filter direction
Single
Single
Both
Make this relationship active
Assume referential integrity
OK
Cancel


Module 03A - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
1
*
1
*
Notice the arrow now goes in BOTH directions
Properties
Fields
Search
Customer
Internet Sales
Product
All tables


Module 03A - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
EnglishProductName
Count of CustomerKey
All-Purpose Bike Stand 243
AWC Logo Cap 2132
Bike Wash - Dissolver 875
Classic Vest, L 195
Classic Vest, M 199
Classic Vest, S 168
Fender Set - Mountain 2110
Half-Finger Gloves, L 437
Half-Finger Gloves, M 488
Half-Finger Gloves, S 479
Hitch Rack - 4-Bike 325
HL Mountain Tire 1396
Total 18484
Notice our results have changed.
Without having to write T-SQL or
MDX or any verbose code.
This is one simple measure because
of the relationship in the data model.
Filters
Visualizations
Values
EnglishProductName
Count of CustomerKey
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
Page1
PAGE 1 OF 1

Review

Relationships

- One to Many
- Many to Many

Filtering

- Single **(default)**
- Both

Pop-Up Quiz # 1
bit.ly/pbi18

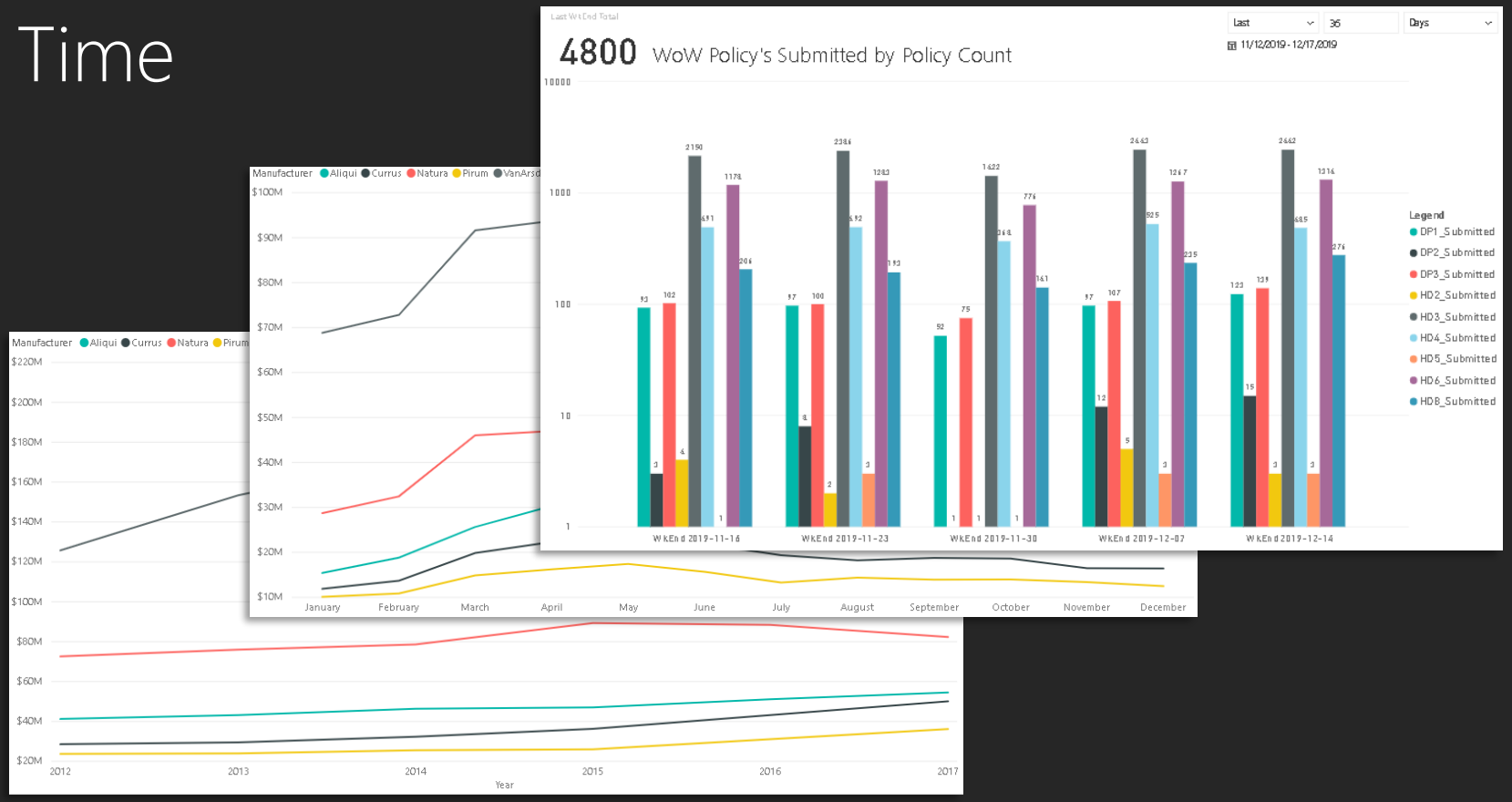
Cross-Filtering and Time Intelligence | Advanced Data Modeling

We’re going to focus now more on Time Intelligence

Using Time Intelligence

Comparing Data over Time

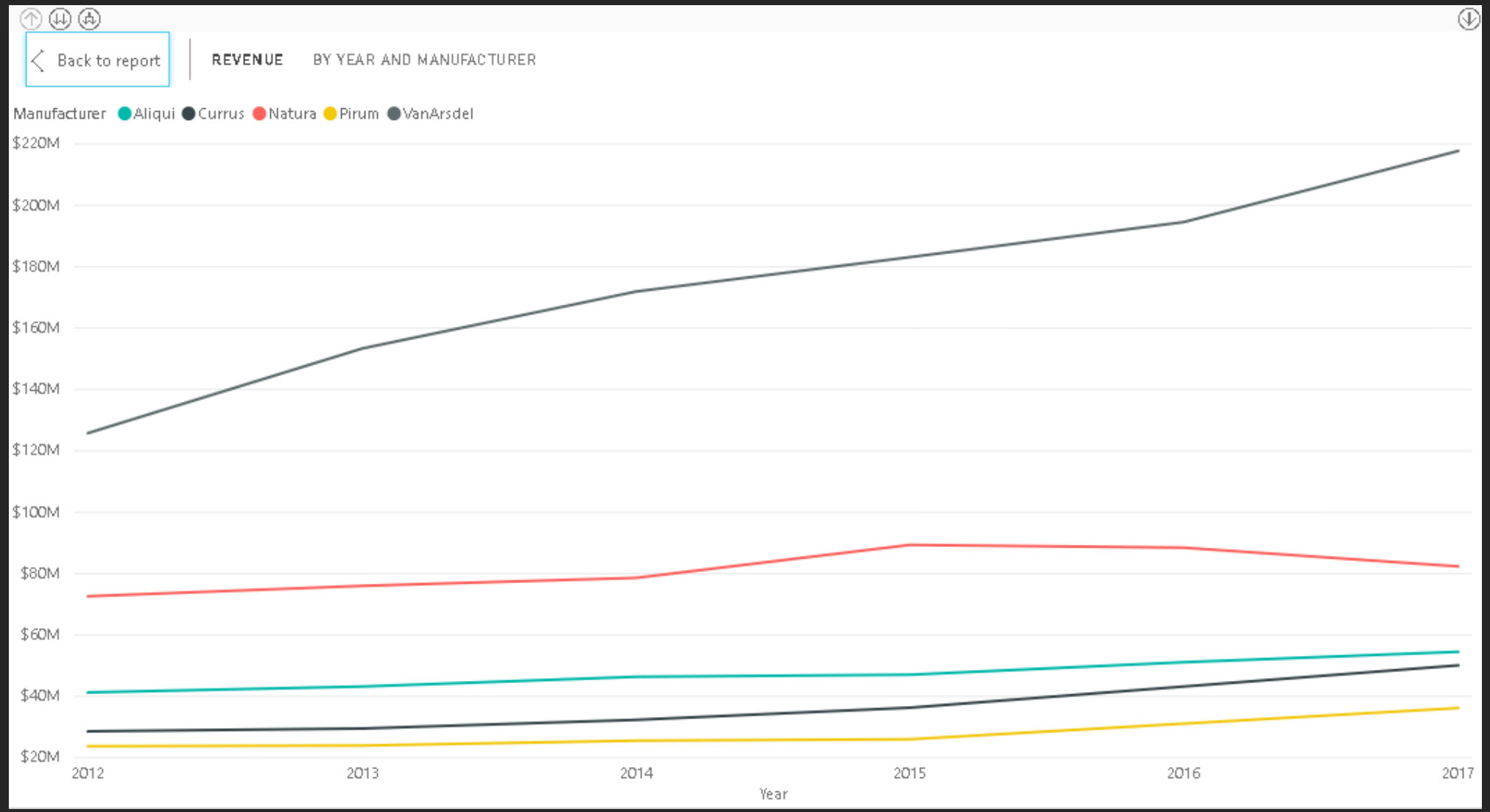
- Year-to-Date
- Year Over Year Growth
- Using a Date Table



We're looking at our data but in perspective of time. This year vs last year. So when you're working with Time Intelligence you need to have a separate table that has a column that has all the dates.

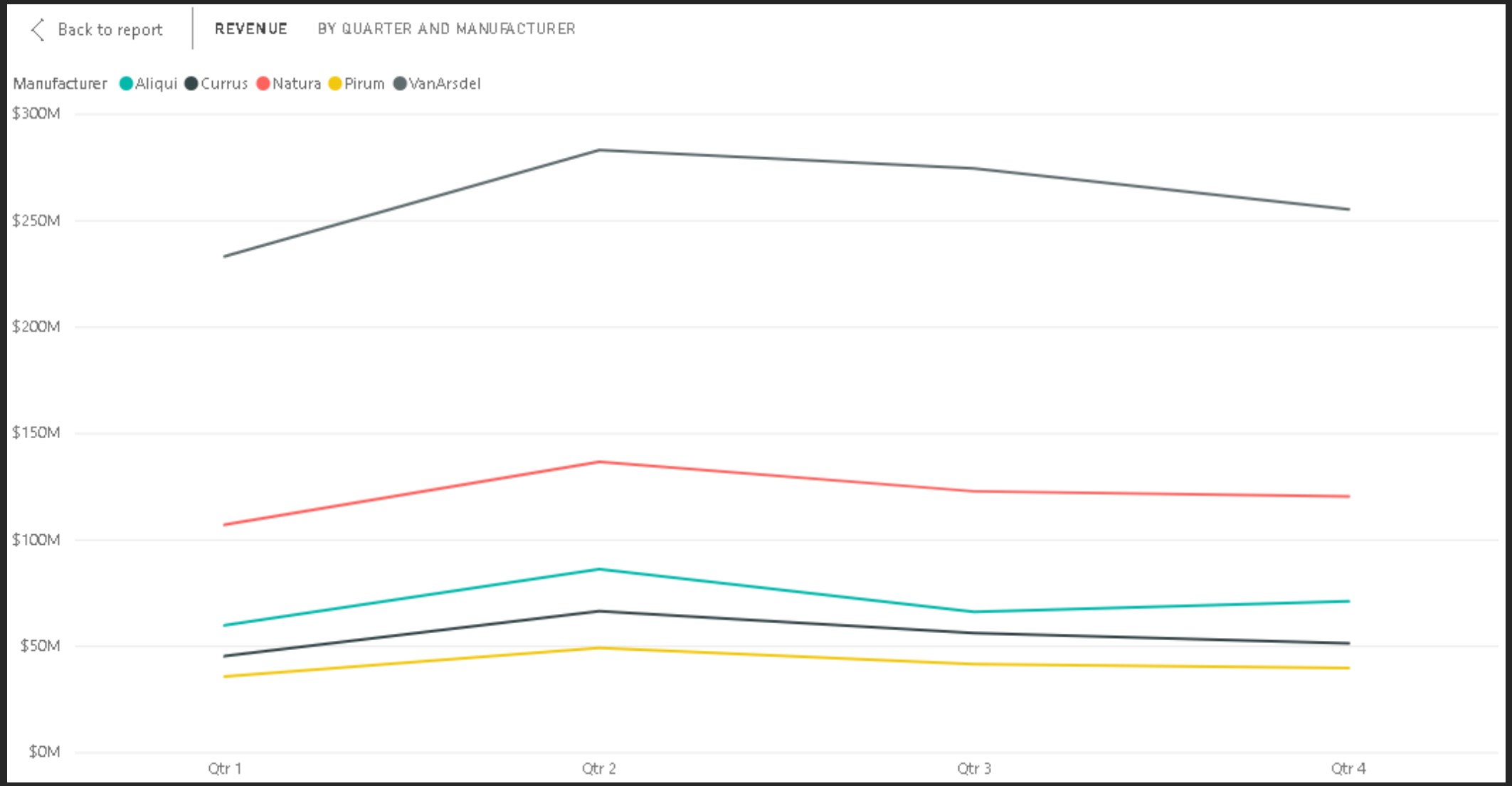
Source:
http://fleitasarts.com, PBI (Demo)

Year over Year



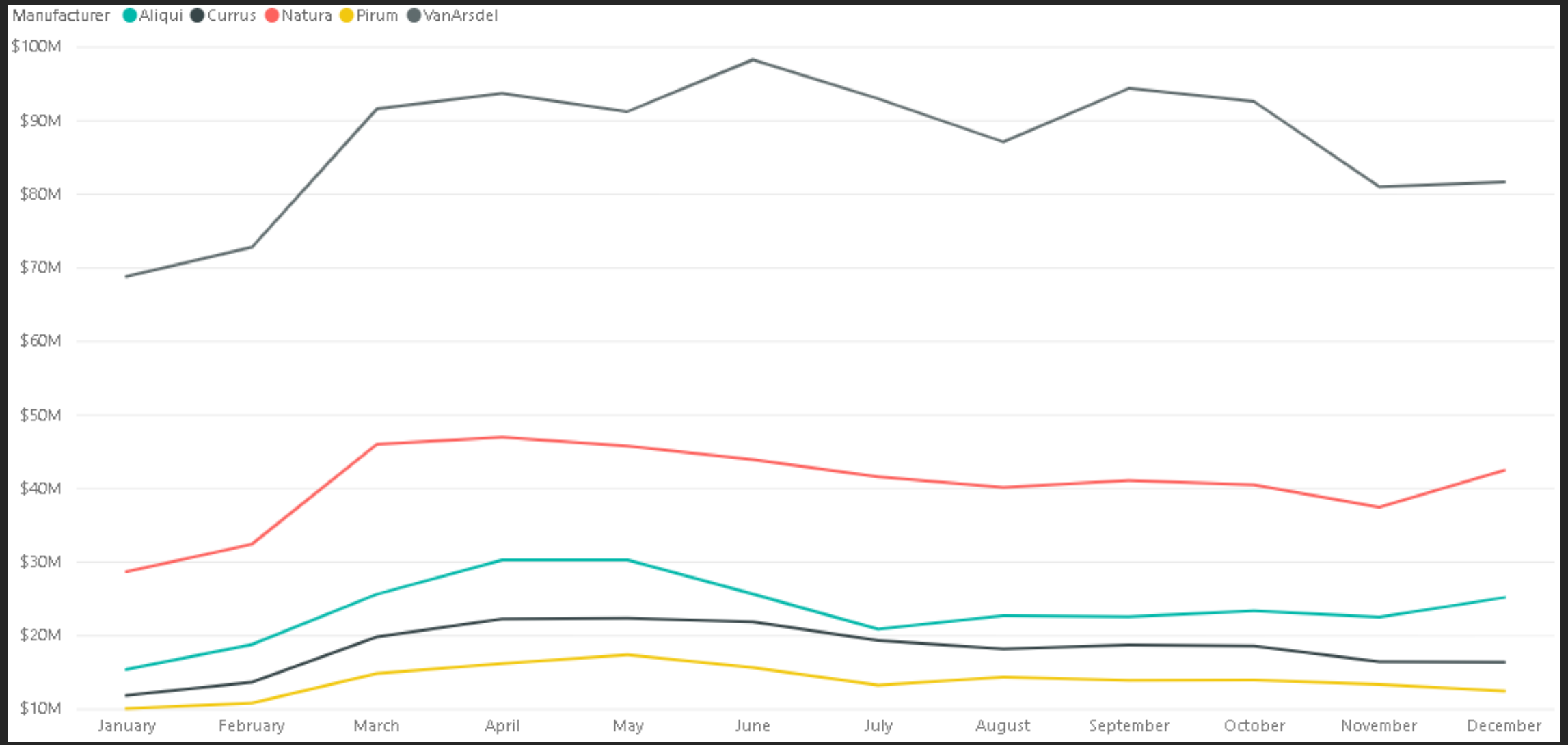
Source:
http://fleitasarts.com, PBI (Demo)

Quarter over Quarter



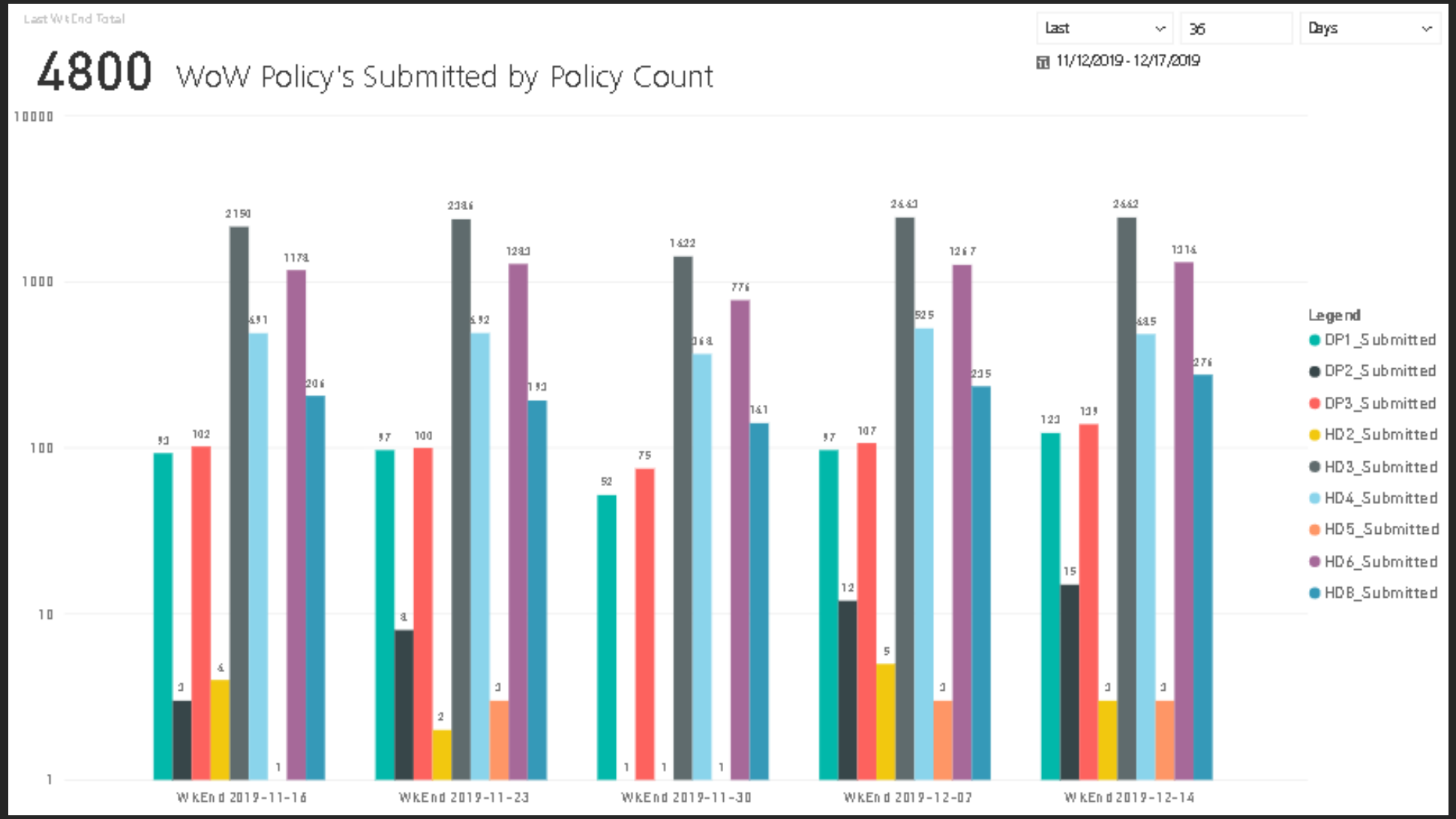
Source:
http://fleitasarts.com, PBI (Demo)

Month over Month



Source:
http://fleitasarts.com, PBI (Demo)

Week over Week



Source:
http://fleitasarts.com, PBI (Demo)

Creating Date Tables

Date Table Requirements

1. One row for every date.
2. Span range of possible dates.
3. Import from source or create a new table in DAX.
4. Mark as a Date Table in Model (Tabular).
5. Date column passed to Time Intelligence functions.

DateKey	DateLabel
1/1/2019 12:00:00 AM	2019-01-01
1/2/2019 12:00:00 AM	2019-01-02
1/3/2019 12:00:00 AM	2019-01-03
1/4/2019 12:00:00 AM	2019-01-04
1/5/2019 12:00:00 AM	2019-01-05
1/6/2019 12:00:00 AM	2019-01-06
1/7/2019 12:00:00 AM	2019-01-07
1/8/2019 12:00:00 AM	2019-01-08
1/9/2019 12:00:00 AM	2019-01-09
1/10/2019 12:00:00 AM	2019-01-10
1/11/2019 12:00:00 AM	2019-01-11

Create a Date Table in DAX

Method 1

```
Date =
CALENDAR ( DATE ( 2000, 1, 1 ), DATE ( 2025, 12, 31 ) )
```

Date
1/1/2000 12:00:00 AM
1/2/2000 12:00:00 AM
1/3/2000 12:00:00 AM
1/4/2000 12:00:00 AM
1/5/2000 12:00:00 AM

Method 2

```
Date =
ADDCOLUMNS (
    CALENDAR ( DATE ( 2000, 1, 1 ), DATE ( 2025, 12, 31 ) ),
    "DateAsInteger", FORMAT ( [Date], "YYYYMMDD" ),
    "Year", YEAR ( [Date] )
)
```

Date	DateAsInteger	Year
1/1/2000 12:00:00 AM	20000101	2000
1/2/2000 12:00:00 AM	20000102	2000
1/3/2000 12:00:00 AM	20000103	2000
1/4/2000 12:00:00 AM	20000104	2000
1/5/2000 12:00:00 AM	20000105	2000
1/6/2000 12:00:00 AM	20000106	2000
1/7/2000 12:00:00 AM	20000107	2000
1/8/2000 12:00:00 AM	20000108	2000
1/9/2000 12:00:00 AM	20000109	2000
1/10/2000 12:00:00 AM	20000110	2000

Steps

Under Modeling, click New Table, and paste in formula bar.

Create a Date Table in DAX

Method 3

```
Date =
ADDCOLUMNS (
    CALENDAR ( DATE ( 2000, 1, 1 ), DATE ( 2025, 12, 31 ) ),
    "DateAsInteger", FORMAT ( [Date], "YYYYMMDD" ),
    "Year", YEAR ( [Date] ),
    "Monthnumber", FORMAT ( [Date], "MM" ),
    "YearMonthnumber", FORMAT ( [Date], "YYYY/MM" ),
    "YearMonthShort", FORMAT ( [Date], "YYYY/mmm" ),
    "MonthNameShort", FORMAT ( [Date], "mmm" ),
    "MonthNameLong", FORMAT ( [Date], "mmmm" ),
    "DayOfWeekNumber", WEEKDAY ( [Date] ),
    "DayOfWeek", FORMAT ( [Date], "dddd" ),
    "DayOfWeekShort", FORMAT ( [Date], "ddd" ),
    "Quarter", "Q" & FORMAT ( [Date], "Q" ),
    "YearQuarter", FORMAT ( [Date], "YYYY" ) & "/Q"
        & FORMAT ( [Date], "Q" )
)
```

Create a Date Table in DAX

Method 3

Date	DateAsInteger	Year	Monthnumber	YearMonthnumber	YearMonthShort	MonthNameShort	MonthNameLong	DayOfWeekNumber	DayOfWeek	DayOfWeekShort	Quarter	YearQuarter
7/2/2000 12:00:00 AM	20000702	2000	07	2000/07	2000/Jul	Jul	July	1	Sunday	Sun	Q3	2000/Q3
7/9/2000 12:00:00 AM	20000709	2000	07	2000/07	2000/Jul	Jul	July	1	Sunday	Sun	Q3	2000/Q3
7/16/2000 12:00:00 AM	20000716	2000	07	2000/07	2000/Jul	Jul	July	1	Sunday	Sun	Q3	2000/Q3
7/23/2000 12:00:00 AM	20000723	2000	07	2000/07	2000/Jul	Jul	July	1	Sunday	Sun	Q3	2000/Q3
7/30/2000 12:00:00 AM	20000730	2000	07	2000/07	2000/Jul	Jul	July	1	Sunday	Sun	Q3	2000/Q3
7/1/2001 12:00:00 AM	20010701	2001	07	2001/07	2001/Jul	Jul	July	1	Sunday	Sun	Q3	2001/Q3
7/8/2001 12:00:00 AM	20010708	2001	07	2001/07	2001/Jul	Jul	July	1	Sunday	Sun	Q3	2001/Q3
7/15/2001 12:00:00 AM	20010715	2001	07	2001/07	2001/Jul	Jul	July	1	Sunday	Sun	Q3	2001/Q3
7/22/2001 12:00:00 AM	20010722	2001	07	2001/07	2001/Jul	Jul	July	1	Sunday	Sun	Q3	2001/Q3
7/29/2001 12:00:00 AM	20010729	2001	07	2001/07	2001/Jul	Jul	July	1	Sunday	Sun	Q3	2001/Q3
7/7/2002 12:00:00 AM	20020707	2002	07	2002/07	2002/Jul	Jul	July	1	Sunday	Sun	Q3	2002/Q3
7/14/2002 12:00:00 AM	20020714	2002	07	2002/07	2002/Jul	Jul	July	1	Sunday	Sun	Q3	2002/Q3
7/21/2002 12:00:00 AM	20020721	2002	07	2002/07	2002/Jul	Jul	July	1	Sunday	Sun	Q3	2002/Q3
7/28/2002 12:00:00 AM	20020728	2002	07	2002/07	2002/Jul	Jul	July	1	Sunday	Sun	Q3	2002/Q3
7/6/2003 12:00:00 AM	20030706	2003	07	2003/07	2003/Jul	Jul	July	1	Sunday	Sun	Q3	2003/Q3
7/13/2003 12:00:00 AM	20030713	2003	07	2003/07	2003/Jul	Jul	July	1	Sunday	Sun	Q3	2003/Q3
7/20/2003 12:00:00 AM	20030720	2003	07	2003/07	2003/Jul	Jul	July	1	Sunday	Sun	Q3	2003/Q3

Cross Filtering

Products

ProdID	Name	Price
101	Bike	250
102	Socks	10
103	Shoes	120
104	Helmet	150
105	Gloves	45

Sales

DateSK	ProdID	Amt	QTY
20190101	102	250	1
20190101	101	20	2
20190102	101	45	1
20190103	105	45	1
20190103	104	150	1
20190104	104	150	1
20190105	101	250	1

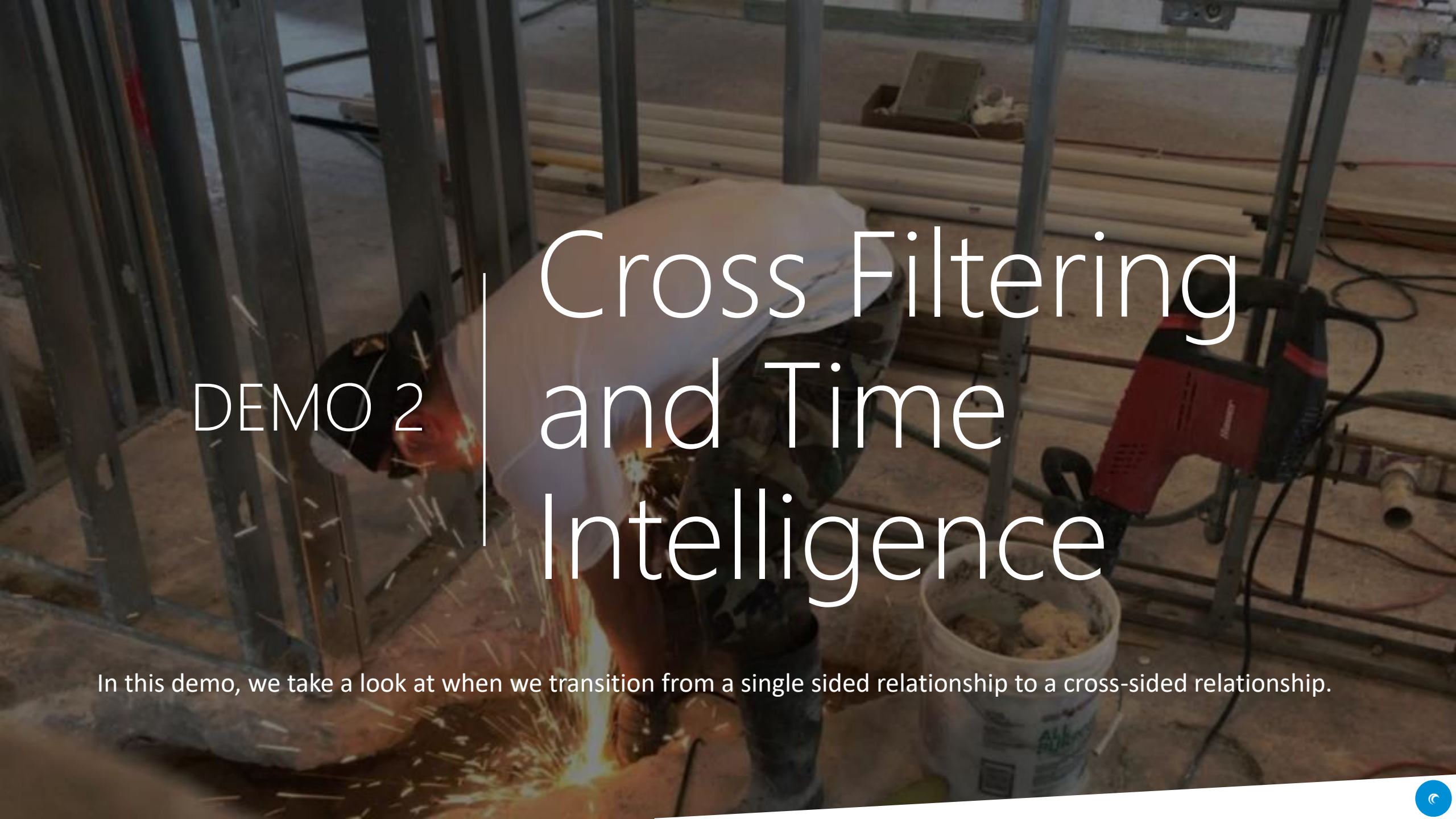
Date

DateSK	Date
20190101	1/1/2019
20190102	1/2/2019
20190103	1/3/2019
20190104	1/4/2019
20190105	1/5/2019

Question

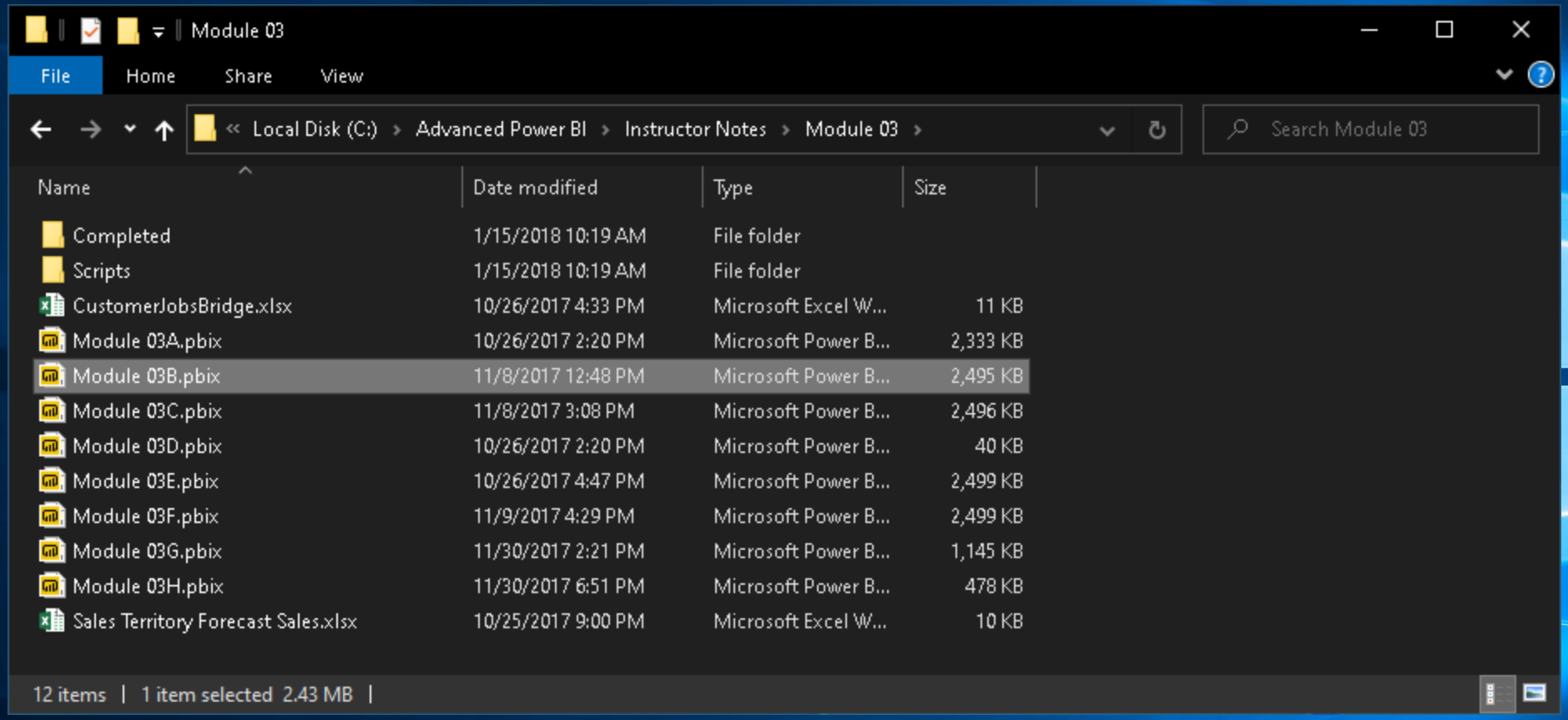
How many dates was a product purchased?

Bikes 3, Socks 1, Shoes 0. But Time Intelligence breaks due to filtered date table. Its not a continuous range of dates.



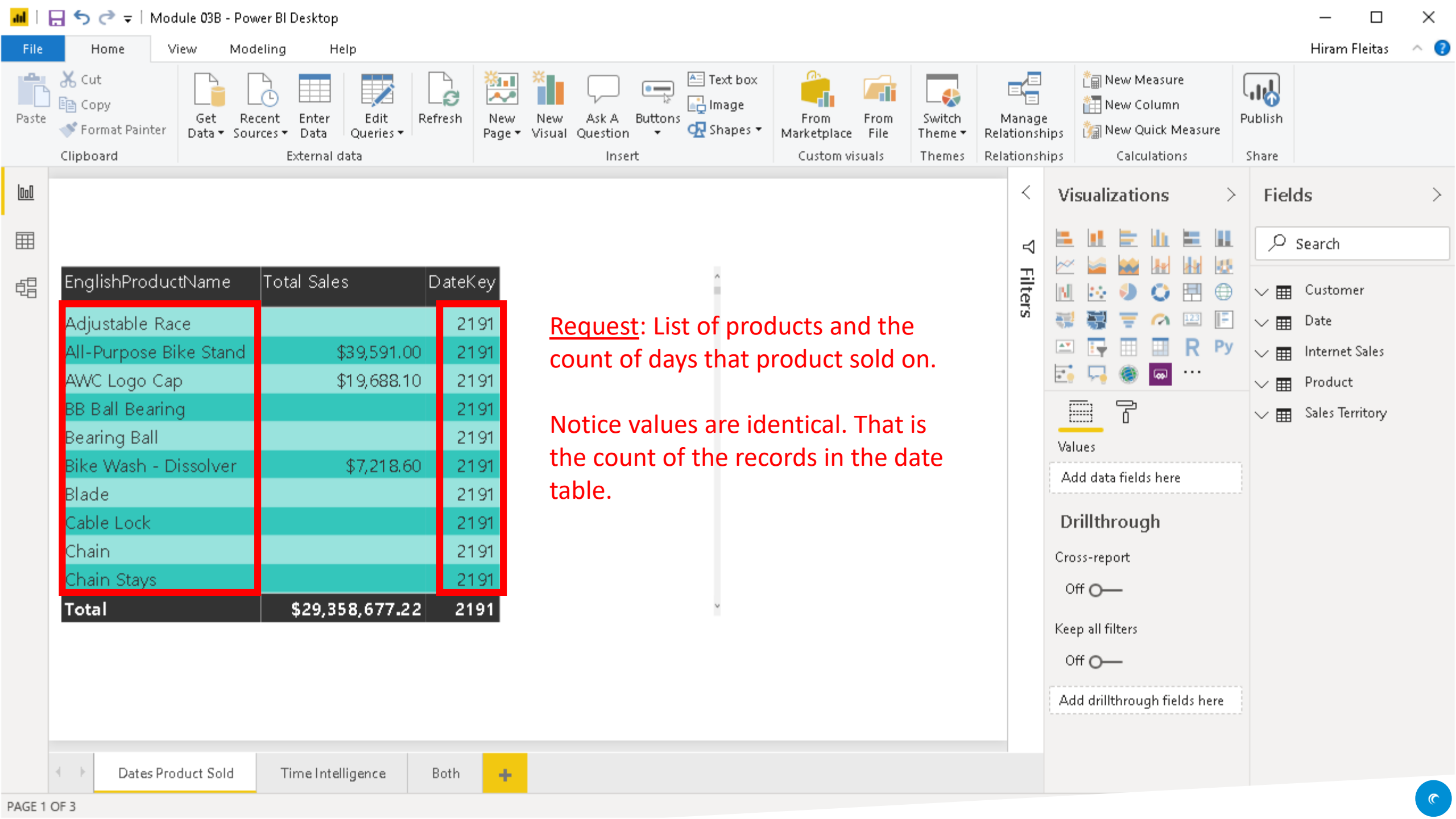
DEMO 2 | Cross Filtering and Time Intelligence

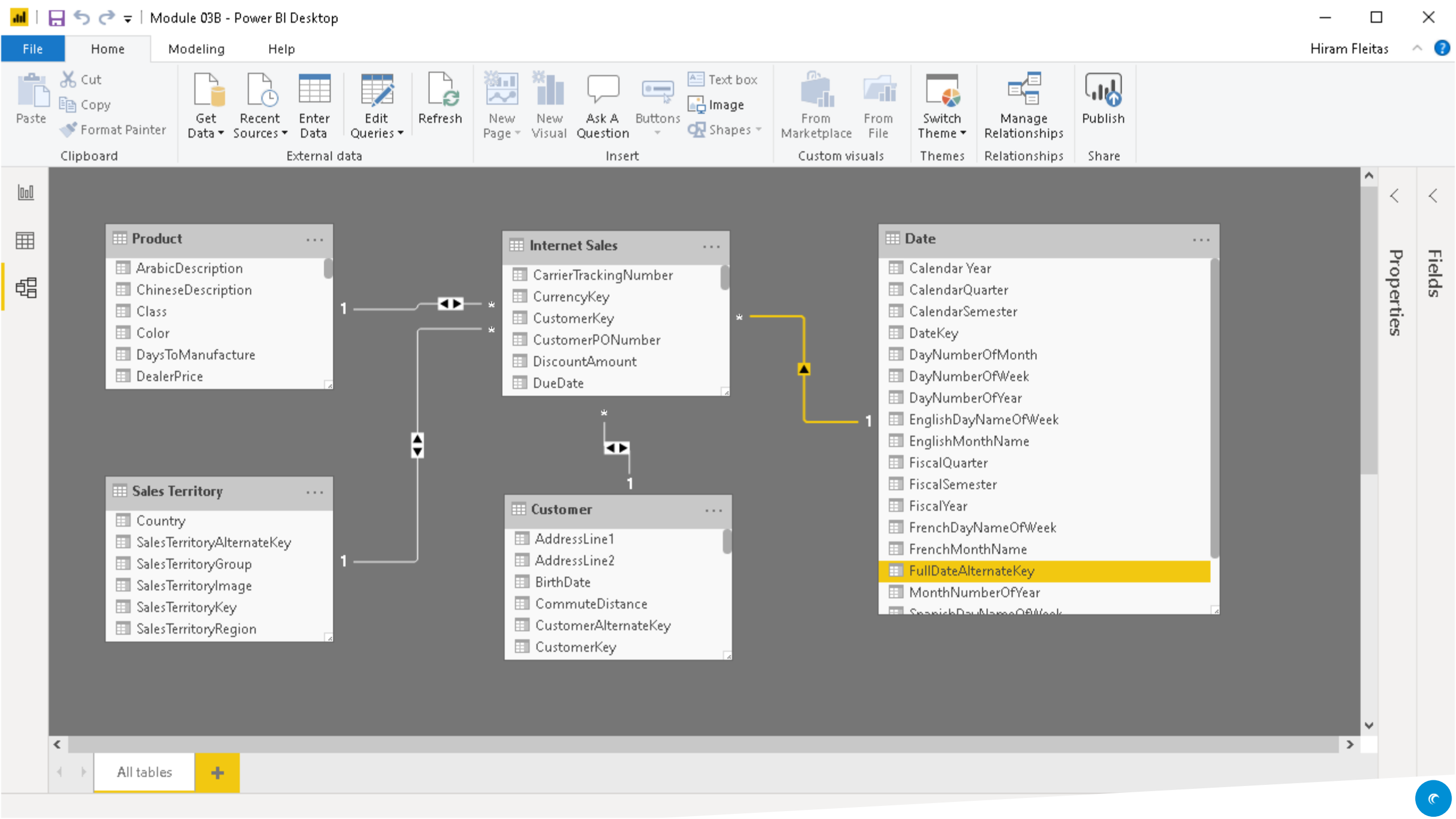
In this demo, we take a look at when we transition from a single sided relationship to a cross-sided relationship.

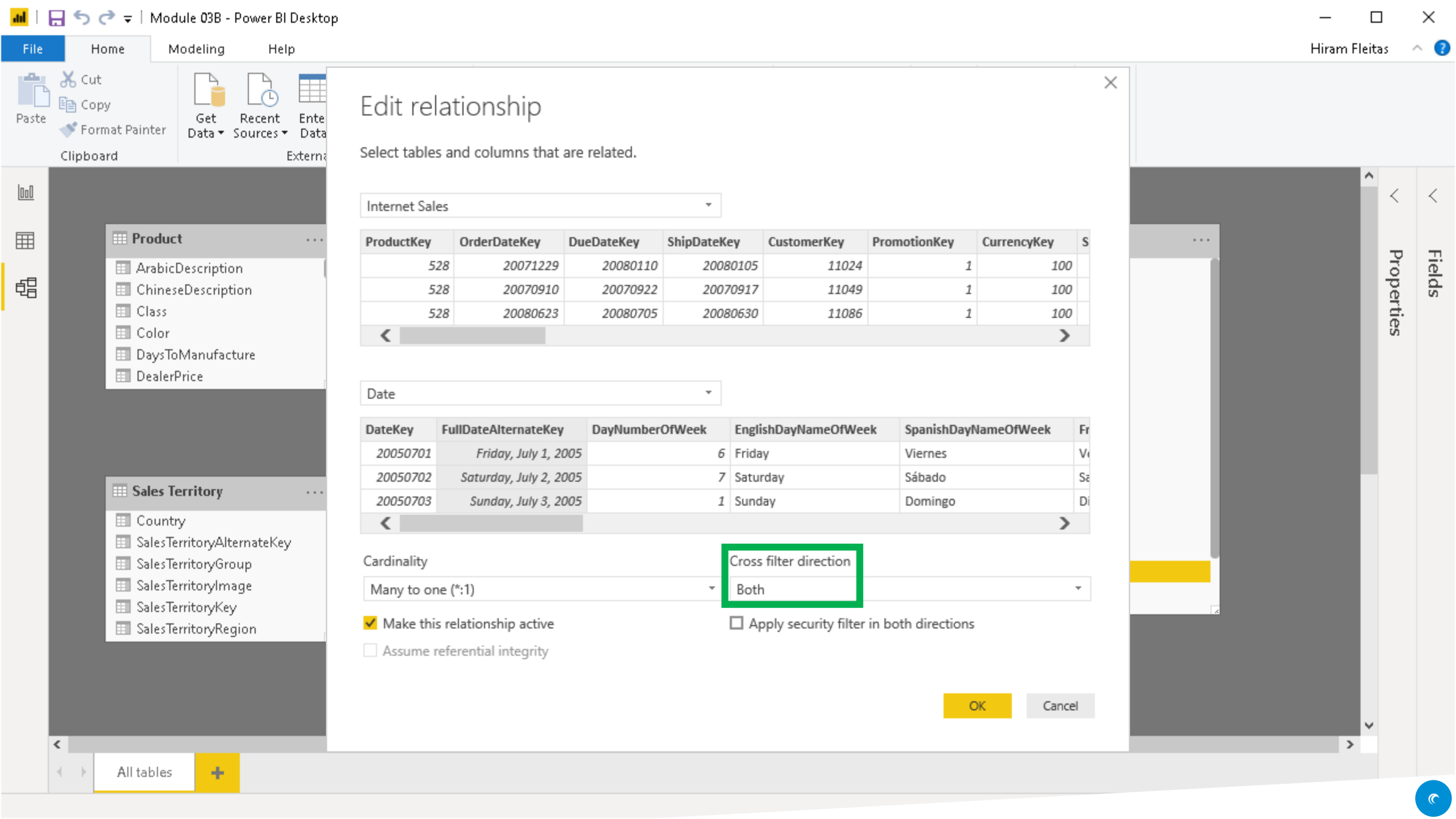


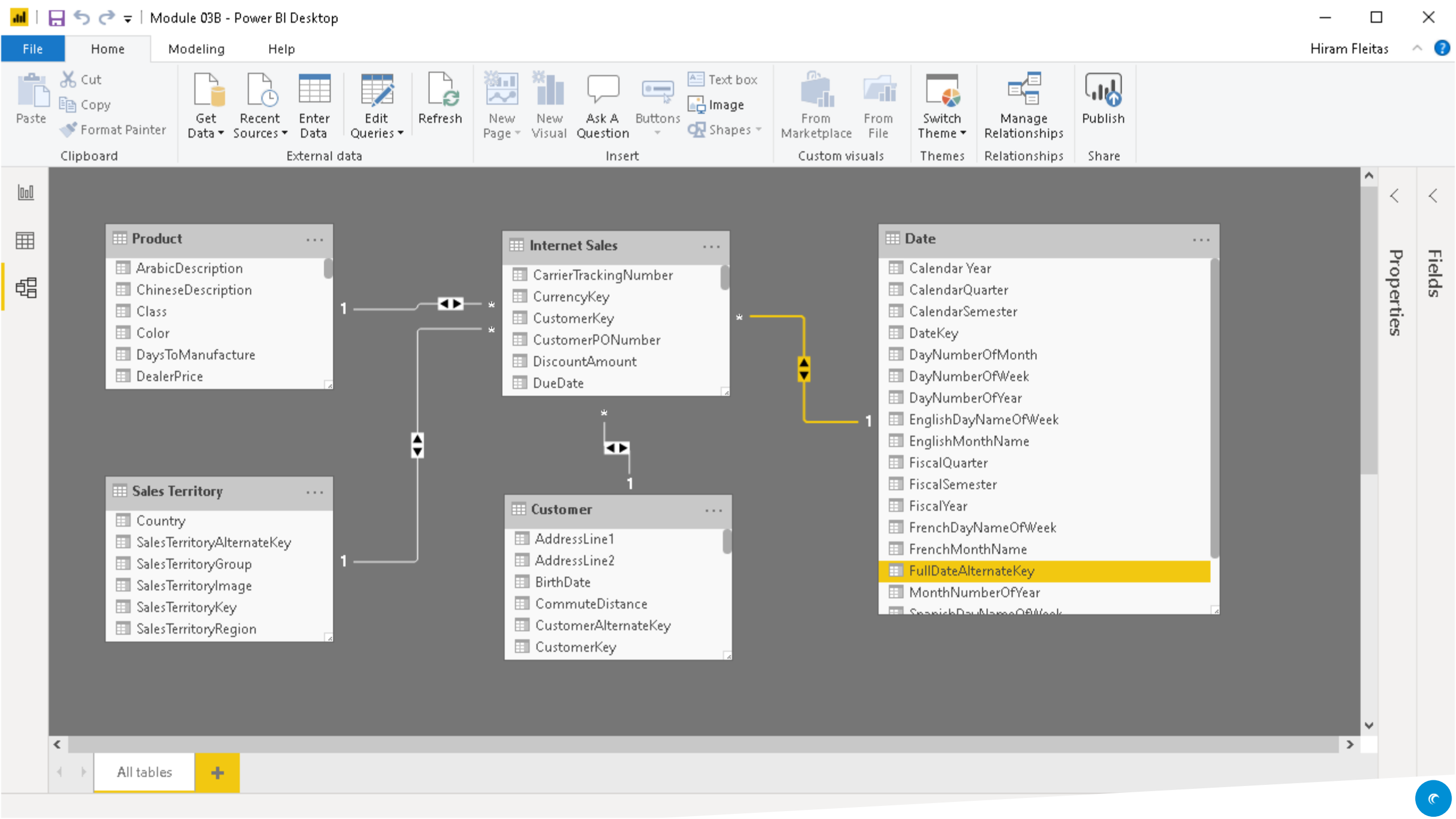
Module 03

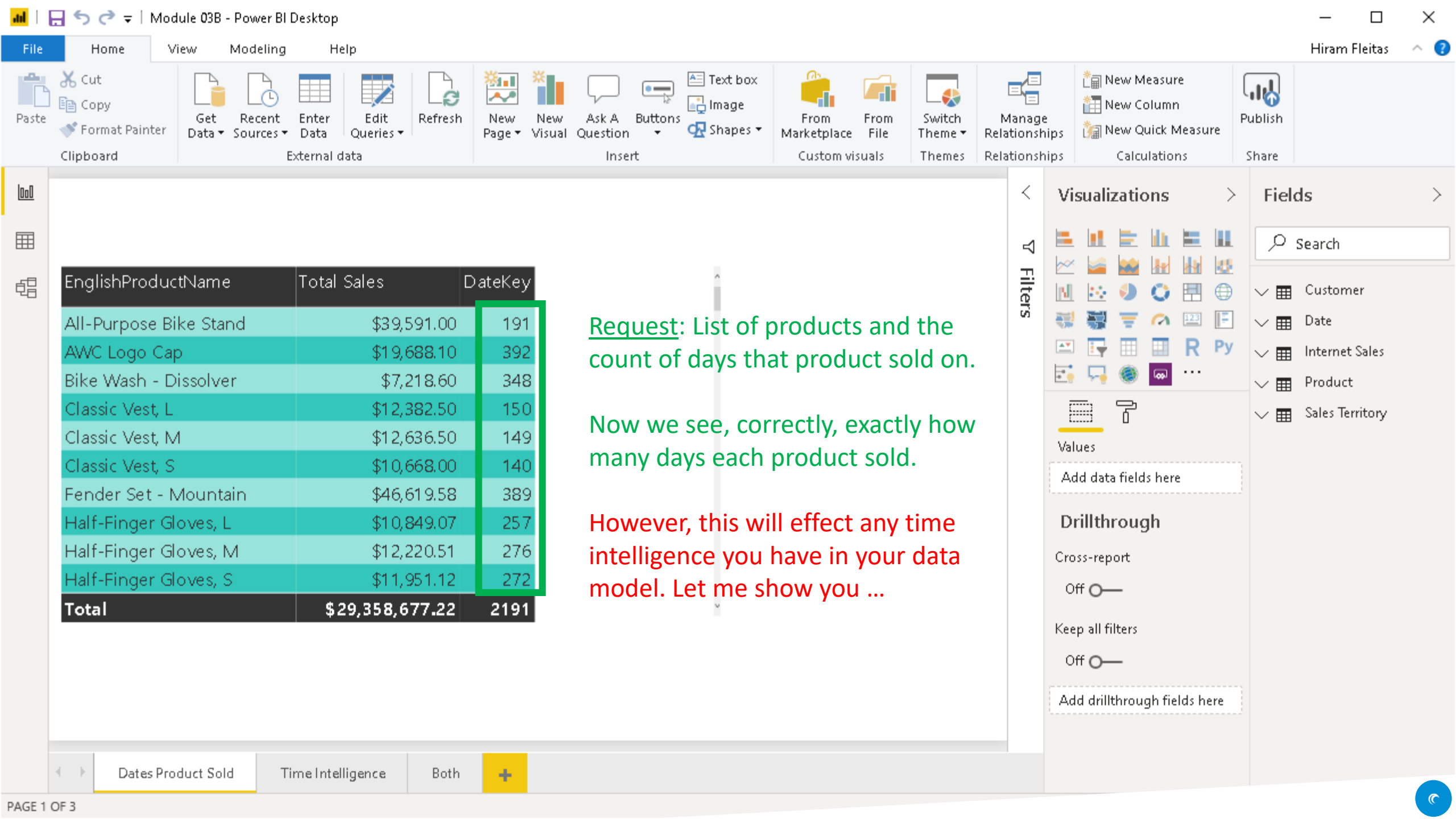
C:\Advanced Power BI\Instructor Notes\Module 03\Module 03B.pbix

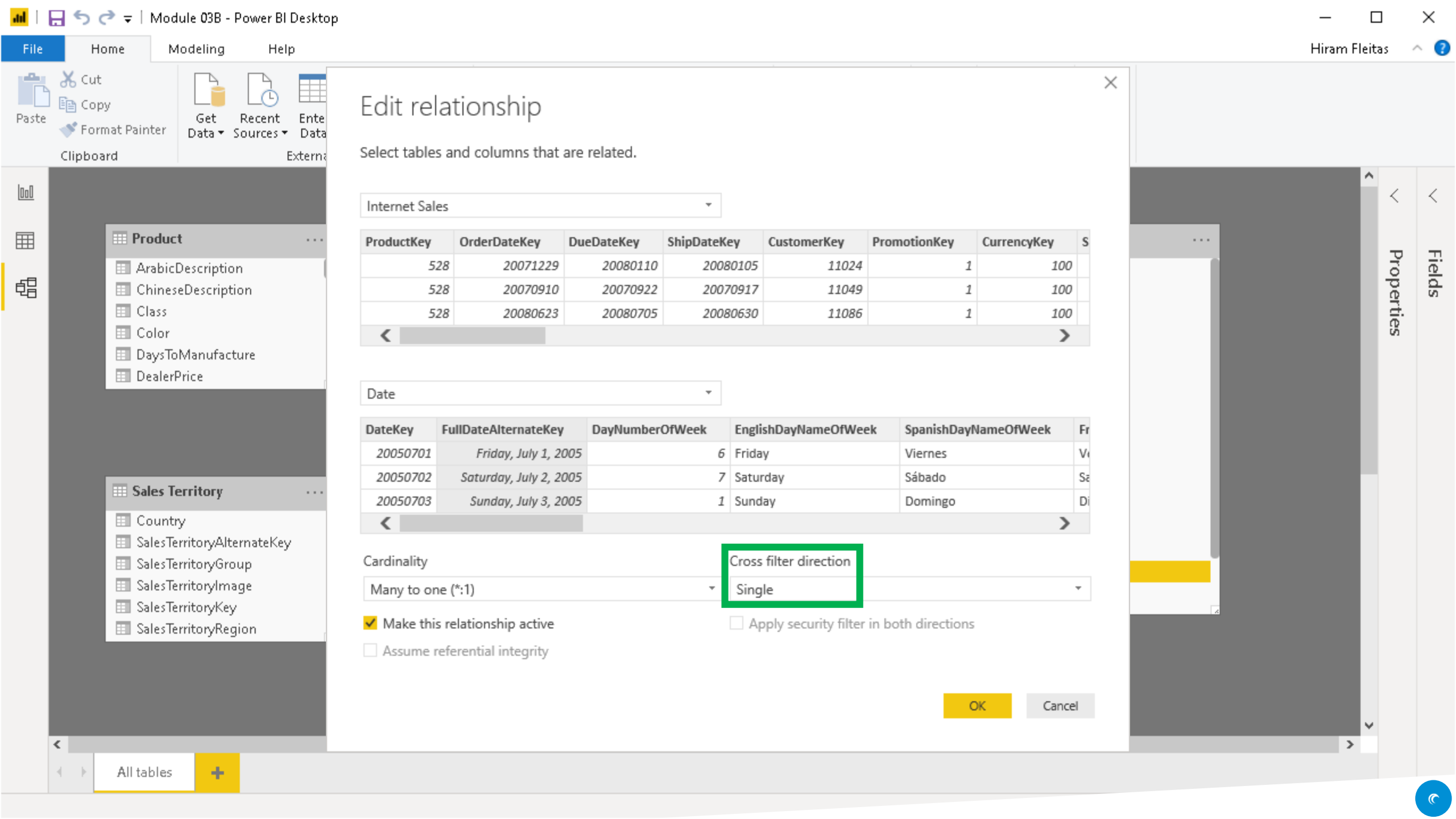

Module 03B - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
EnglishProductName | Total Sales | DateKey
Adjustable Race | | 2191
All-Purpose Bike Stand | $39,591.00 | 2191
AWC Logo Cap | $19,688.10 | 2191
BB Ball Bearing | | 2191
Bearing Ball | | 2191
Bike Wash - Dissolver | $7,218.60 | 2191
Blade | | 2191
Cable Lock | | 2191
Chain | | 2191
Chain Stays | | 2191
Total | $29,358,677.22 | 2191
Request: List of products and the count of days that product sold on.
Notice values are identical. That is the count of the records in the date table.
Filters
Visualizations
Values
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
Date
Internet Sales
Product
Sales Territory
Dates Product Sold
Time Intelligence
Both
PAGE 1 OF 3

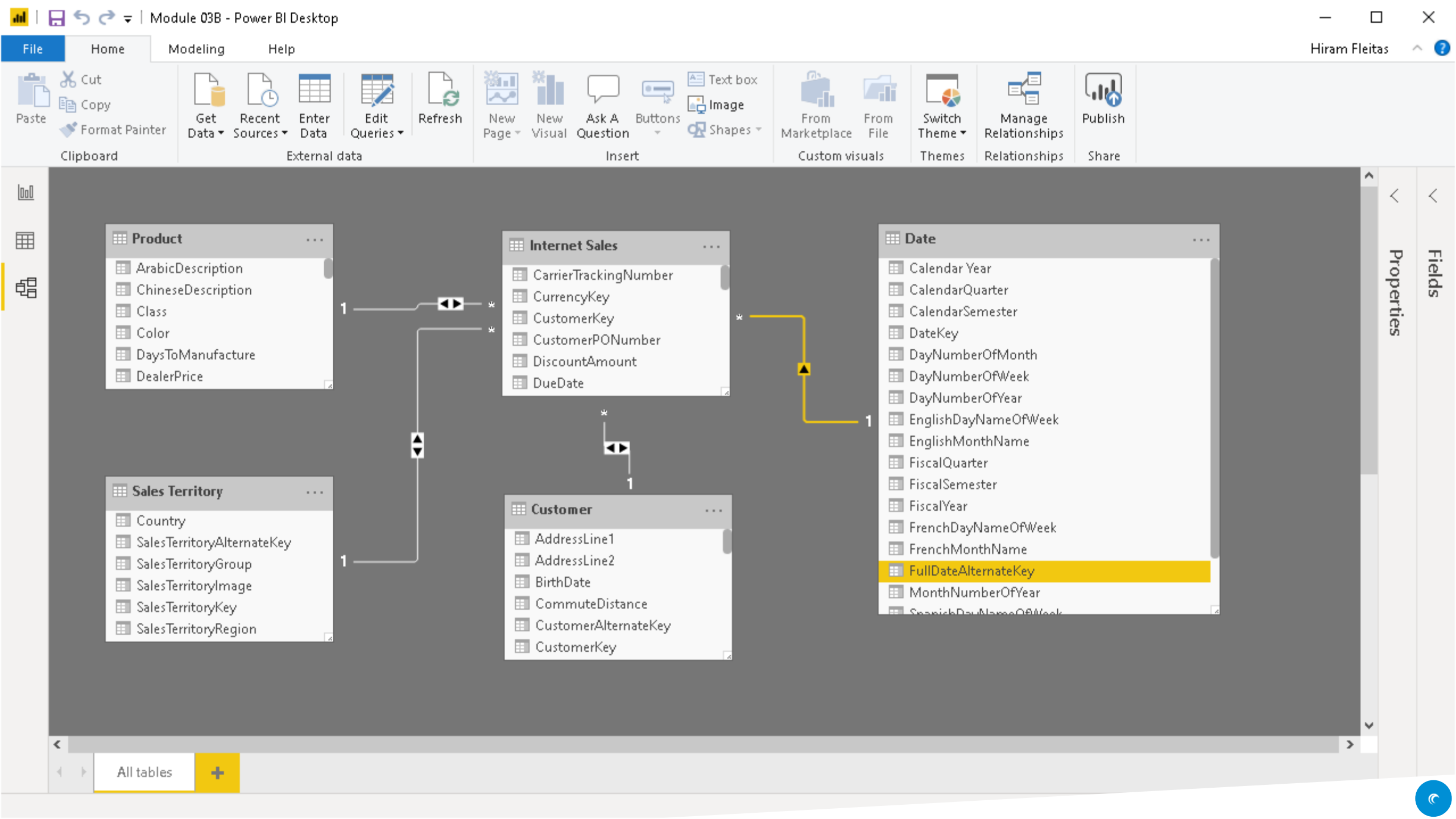

Module 03B - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Date
Calendar Year
CalendarQuarter
CalendarSemester
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
FullDateAlternateKey
MonthNumberOfYear
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
1
*
Properties
Fields
All tables


Module 03B - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Cut
Copy
Format Painter
Paste
Clipboard
Get Data
Recent Sources
Enter Data
Edit relationship
Select tables and columns that are related.
Internet Sales
ProductKey | OrderDateKey | DueDateKey | ShipDateKey | CustomerKey | PromotionKey | CurrencyKey
528 | 20071229 | 20080110 | 20080105 | 11024 | 1 | 100
528 | 20070910 | 20070922 | 20070917 | 11049 | 1 | 100
528 | 20080623 | 20080705 | 20080630 | 11086 | 1 | 100
Date
DateKey | FullDateAlternateKey | DayNumberOfWeek | EnglishDayNameOfWeek | SpanishDayNameOfWeek
20050701 | Friday, July 1, 2005 | 6 | Friday | Viernes
20050702 | Saturday, July 2, 2005 | 7 | Saturday | Sábado
20050703 | Sunday, July 3, 2005 | 1 | Sunday | Domingo
Cardinality
Many to one (*:1)
Cross filter direction
Both
Make this relationship active
Apply security filter in both directions
Assume referential integrity
OK
Cancel
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Properties
Fields
All tables


Module 03B - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Date
Calendar Year
CalendarQuarter
CalendarSemester
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
FullDateAlternateKey
MonthNumberOfYear
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
1
*
Properties
Fields
All tables


Module 03B - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
EnglishProductName | Total Sales | DateKey
All-Purpose Bike Stand | $39,591.00 | 191
AWC Logo Cap | $19,688.10 | 392
Bike Wash - Dissolver | $7,218.60 | 348
Classic Vest, L | $12,382.50 | 150
Classic Vest, M | $12,636.50 | 149
Classic Vest, S | $10,668.00 | 140
Fender Set - Mountain | $46,619.58 | 389
Half-Finger Gloves, L | $10,849.07 | 257
Half-Finger Gloves, M | $12,220.51 | 276
Half-Finger Gloves, S | $11,951.12 | 272
Total | $29,358,677.22 | 2191
Request: List of products and the count of days that product sold on.
Now we see, correctly, exactly how many days each product sold.
However, this will effect any time intelligence you have in your data model. Let me show you …
Filters
Visualizations
Values
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
Date
Internet Sales
Product
Sales Territory
Dates Product Sold
Time Intelligence
Both
PAGE 1 OF 3


Module 03B - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit relationship
Select tables and columns that are related.
Internet Sales
ProductKey
OrderDateKey
DueDateKey
ShipDateKey
CustomerKey
PromotionKey
CurrencyKey
528 20071229 20080110 20080105 11024 1 100
528 20070910 20070922 20070917 11049 1 100
528 20080623 20080705 20080630 11086 1 100
Date
DateKey
FullDateAlternateKey
DayNumberOfWeek
EnglishDayNameOfWeek
SpanishDayNameOfWeek
20050701 Friday, July 1, 2005 6 Friday Viernes
20050702 Saturday, July 2, 2005 7 Saturday Sábado
20050703 Sunday, July 3, 2005 1 Sunday Domingo
Cardinality
Many to one (*:1)
Cross filter direction
Single
Make this relationship active
Apply security filter in both directions
Assume referential integrity
OK
Cancel
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Properties
Fields
All tables


Module 03B - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Date
Calendar Year
CalendarQuarter
CalendarSemester
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
FullDateAlternateKey
MonthNumberOfYear
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
1
*
Properties
Fields
All tables

Module 03B - Power BI Desktop

File Home View Modeling Help

Hiram Fleitas

Paste Cut Copy Format Painter — Clipboard

Get Data Recent Sources Enter Data Edit Queries Refresh — External data

New Page New Visual Ask A Question Buttons Text box Image Shapes — Insert

From Marketplace From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure New Column New Quick Measure — Calculations

Publish — Share

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Calendar Year	Total Sales	PY Sales
2005	$291,590.52	
2006	$591,586.85	$291,590.52
2007	$1,298,248.57	$591,586.85
2008	$1,210,286.27	$1,298,248.57
2009		$1,210,286.27
Total	$3,391,712.21	$3,391,712.21

We have Total Sales and Previous Year Sales.

Filters

Visualizations

Values

Add data fields here

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

Search

Customer
Date
Internet Sales
Product
Sales Territory

Dates Product Sold | Time Intelligence | Both

PAGE 2 OF 3

Module 03B - Power BI Desktop

File | Home | View | Modeling | Help | Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

```
1 PY Sales =
2 CALCULATE(
3     [Total Sales],
4     SAMEPERIODLASTYEAR('Date'[FullDateAlternateKey]))
```

Country

Australia | Kingdom | States

Calendar Year	Total Sales	PY Sales
2005	$291,590.52	
2006	$591,586.85	$291,590.52
2007	$1,298,248.57	$591,586.85
2008	$1,210,286.27	$1,298,248.57
2009		$1,210,286.27
Total	**$3,391,712.21**	**$3,391,712.21**

You can see the Calculated Measure DAX formula for PY Sales.

Filters

Visualizations

Values

Add data fields here

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

py sales

Internet Sales

PY Sales

Dates Product Sold | Time Intelligence | Both | +

PAGE 2 OF 3

Learn More:
https://docs.microsoft.com/dax/sameperiodlastyear-function-dax

Module 03B - Power BI Desktop

File Home View Modeling Help

Hiram Fleitas

Paste Cut Copy Format Painter — Clipboard

Get Data Recent Sources Enter Data Edit Queries Refresh — External data

New Page New Visual Ask A Question Buttons Text box Image Shapes — Insert

From Marketplace From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure New Column New Quick Measure — Calculations

Publish — Share

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Calendar Year	Total Sales	PY Sales
2005	$291,590.52	
2006	$591,586.85	$291,590.52
2007	$1,298,248.57	$591,586.85
2008	$1,210,286.27	$1,298,248.57
2009		$1,210,286.27
Total	**$3,391,712.21**	**$3,391,712.21**

Next: Remove filter by United Kingdom

Filters

Visualizations

Values

Add data fields here

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

Search

Customer

Date

Internet Sales

Product

Sales Territory

Dates Product Sold | Time Intelligence | Both

PAGE 2 OF 3

Module 03B - Power BI Desktop

File | Home | View | Modeling | Help | Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

Country

Australia	Canada	France	Germany	NA	United Kingdom	United States

Calendar Year	Total Sales	PY Sales
2005	$3,266,373.66	
2006	$6,530,343.53	$3,266,373.66
2007	$9,791,060.30	$6,530,343.53
2008	$9,770,899.74	$9,791,060.30
2009		$9,770,899.74
Total	**$29,358,677.22**	**$29,358,677.22**

Filters

Visualizations

Values

Add data fields here

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

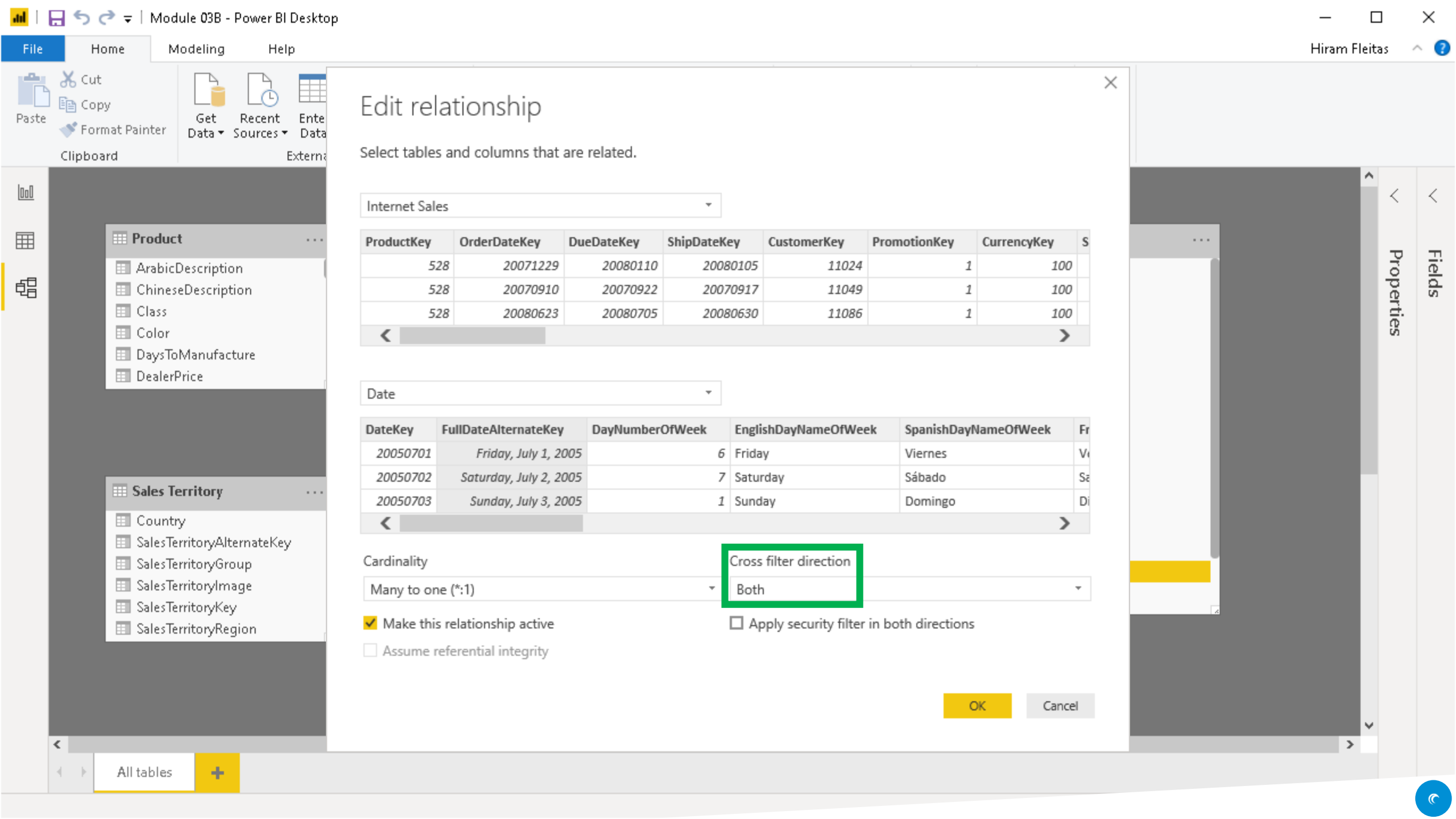
Fields

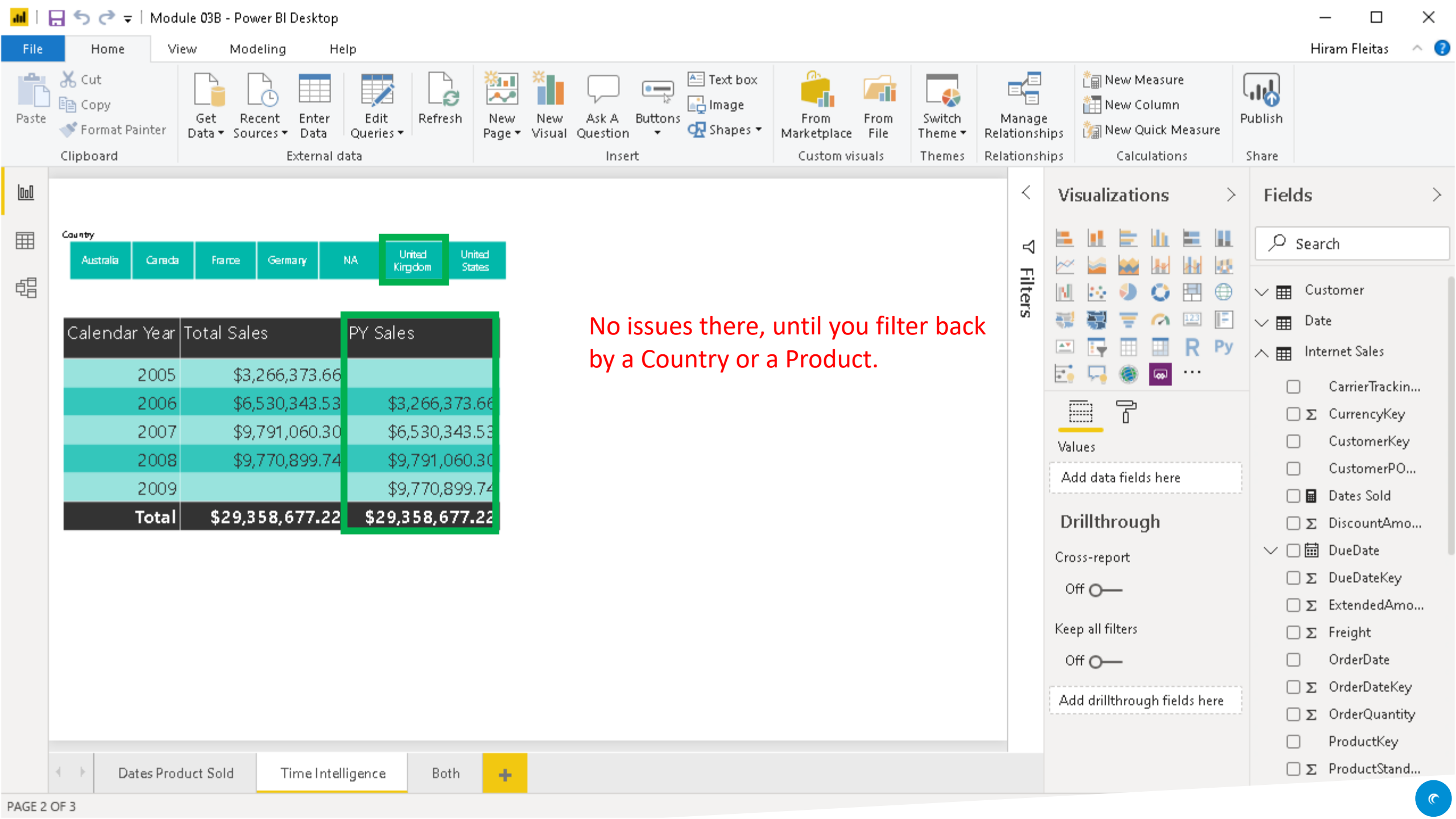
Search

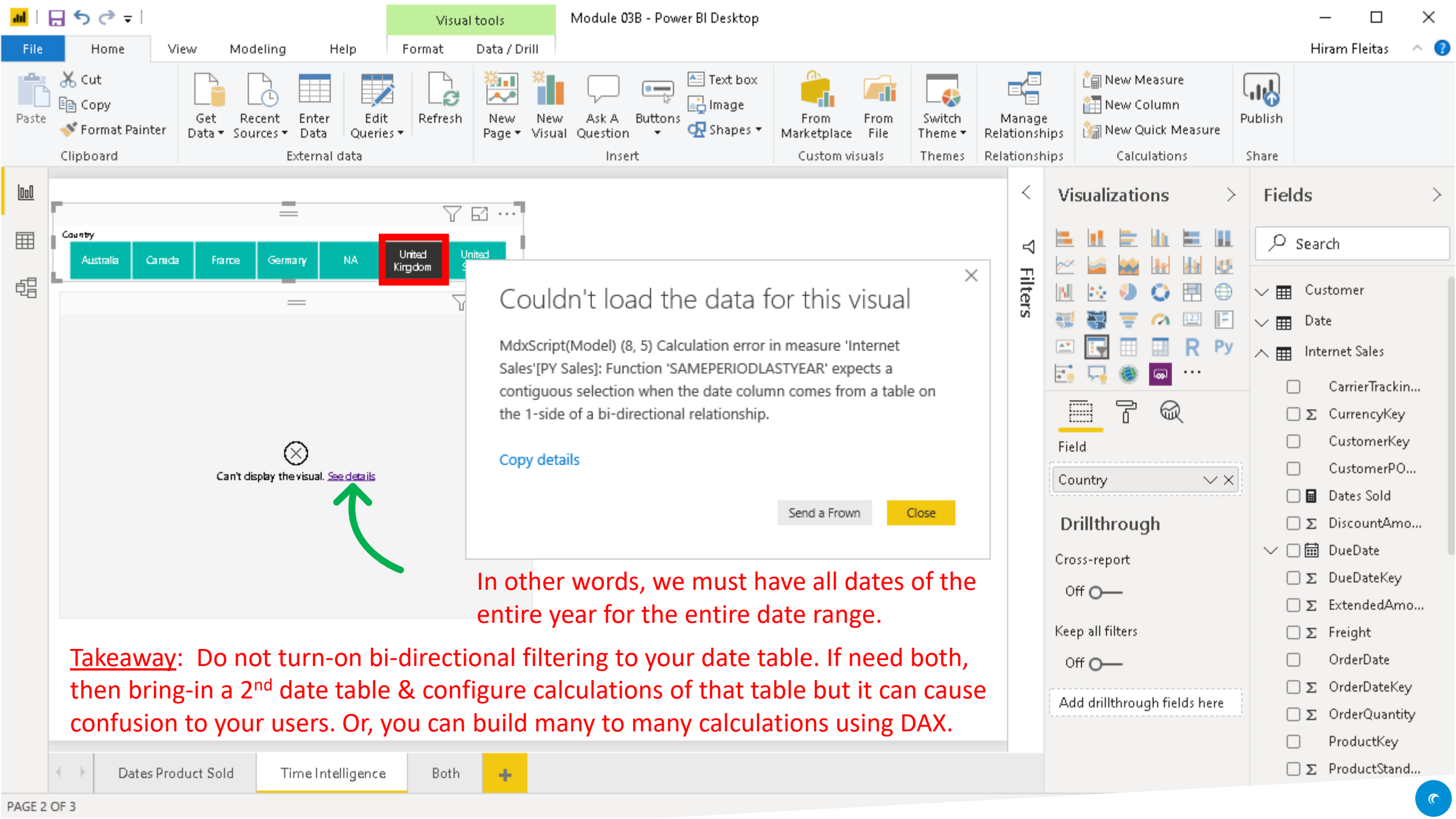
- Customer
- Date
- Internet Sales
  - CarrierTrackin...
  - CurrencyKey
  - CustomerKey
  - CustomerPO...
  - Dates Sold
  - DiscountAmo...
  - DueDate
  - DueDateKey
  - ExtendedAmo...
  - Freight
  - OrderDate
  - OrderDateKey
  - OrderQuantity
  - ProductKey
  - ProductStand...

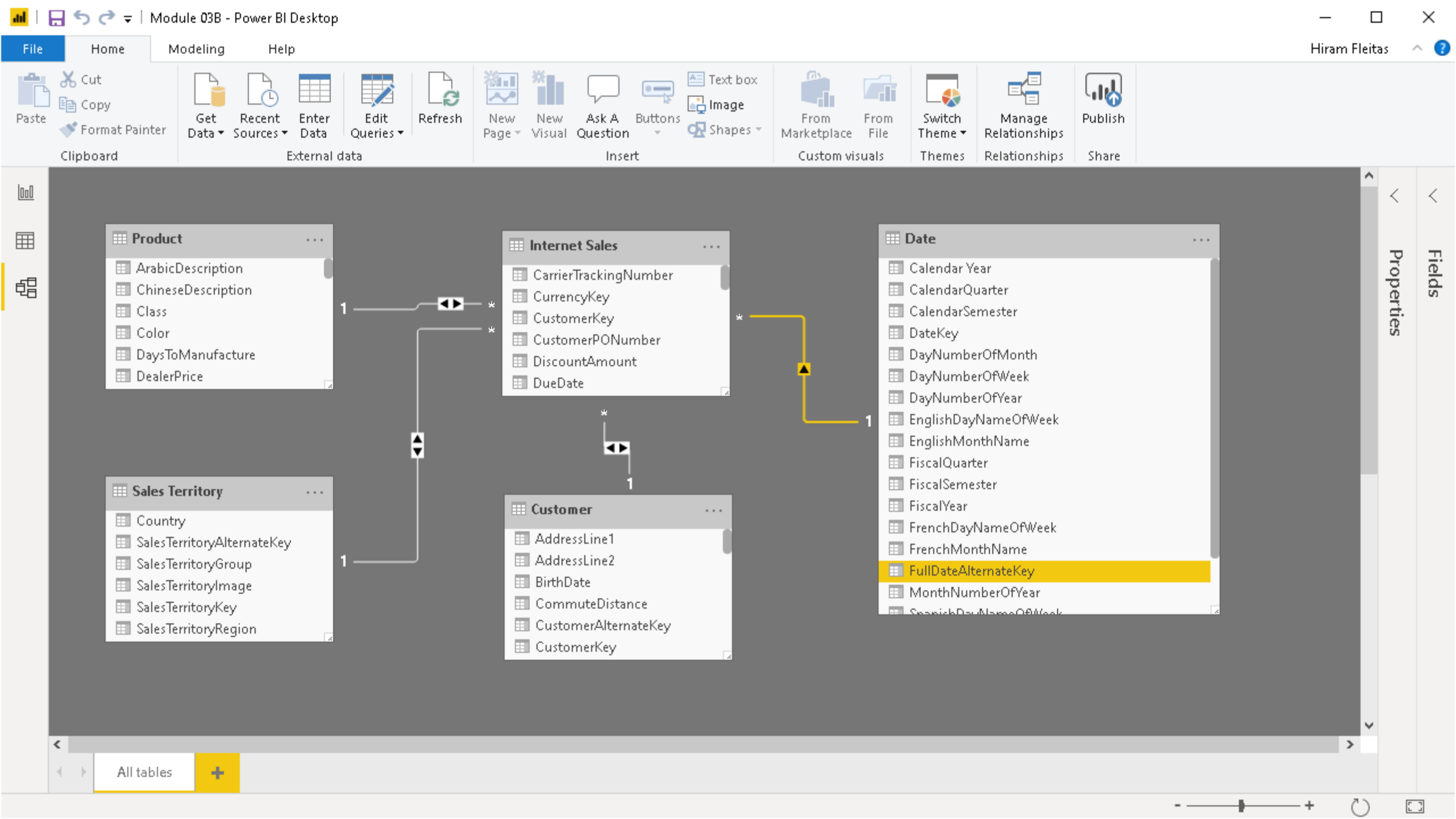
Dates Product Sold | Time Intelligence | Both | +

PAGE 2 OF 3


Module 03B - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Cut
Copy
Format Painter
Paste
Clipboard
Get Data
Recent Sources
Enter Data
Edit relationship
Select tables and columns that are related.
Internet Sales
ProductKey | OrderDateKey | DueDateKey | ShipDateKey | CustomerKey | PromotionKey | CurrencyKey
528 | 20071229 | 20080110 | 20080105 | 11024 | 1 | 100
528 | 20070910 | 20070922 | 20070917 | 11049 | 1 | 100
528 | 20080623 | 20080705 | 20080630 | 11086 | 1 | 100
Date
DateKey | FullDateAlternateKey | DayNumberOfWeek | EnglishDayNameOfWeek | SpanishDayNameOfWeek
20050701 | Friday, July 1, 2005 | 6 | Friday | Viernes
20050702 | Saturday, July 2, 2005 | 7 | Saturday | Sábado
20050703 | Sunday, July 3, 2005 | 1 | Sunday | Domingo
Cardinality
Many to one (*:1)
Cross filter direction
Both
Make this relationship active
Apply security filter in both directions
Assume referential integrity
OK
Cancel
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Properties
Fields
All tables


Module 03B - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Country
Australia
Canada
France
Germany
NA
United Kingdom
United States
Calendar Year
Total Sales
PY Sales
2005
$3,266,373.66
2006
$6,530,343.53
$3,266,373.66
2007
$9,791,060.30
$6,530,343.53
2008
$9,770,899.74
$9,791,060.30
2009
$9,770,899.74
Total
$29,358,677.22
$29,358,677.22
No issues there, until you filter back by a Country or a Product.
Filters
Visualizations
Values
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
Date
Internet Sales
CarrierTrackin...
CurrencyKey
CustomerKey
CustomerPO...
Dates Sold
DiscountAmo...
DueDate
DueDateKey
ExtendedAmo...
Freight
OrderDate
OrderDateKey
OrderQuantity
ProductKey
ProductStand...
Dates Product Sold
Time Intelligence
Both
PAGE 2 OF 3


Module 03B - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Country
Australia
Canada
France
Germany
NA
United Kingdom
Can't display the visual. See details
Couldn't load the data for this visual
MdxScript(Model) (8, 5) Calculation error in measure 'Internet Sales'[PY Sales]: Function 'SAMEPERIODLASTYEAR' expects a contiguous selection when the date column comes from a table on the 1-side of a bi-directional relationship.
Copy details
Send a Frown
Close
In other words, we must have all dates of the entire year for the entire date range.
Takeaway: Do not turn-on bi-directional filtering to your date table. If need both, then bring-in a 2nd date table & configure calculations of that table but it can cause confusion to your users. Or, you can build many to many calculations using DAX.
Filters
Visualizations
Field
Country
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
Date
Internet Sales
CarrierTrackin...
CurrencyKey
CustomerKey
CustomerPO...
Dates Sold
DiscountAmo...
DueDate
DueDateKey
ExtendedAmo...
Freight
OrderDate
OrderDateKey
OrderQuantity
ProductKey
ProductStand...
Dates Product Sold
Time Intelligence
Both
PAGE 2 OF 3


Module 03B - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Date
Calendar Year
CalendarQuarter
CalendarSemester
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
FullDateAlternateKey
MonthNumberOfYear
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
1
*
Properties
Fields
All tables

Review

Date Table Requirements

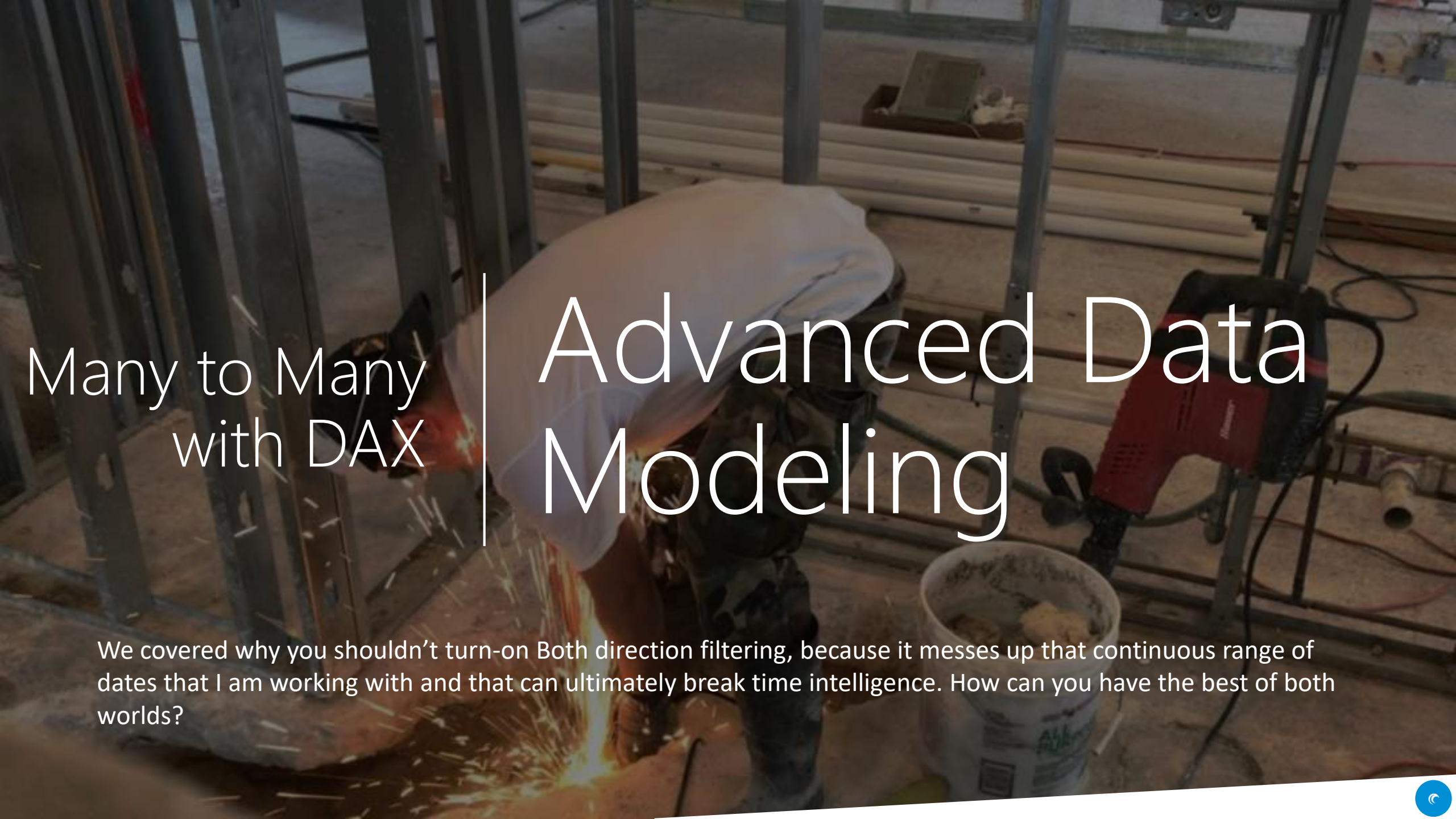
1. One row for every possible date
2. Span range of possible dates

Pop-Up Quiz # 2
bit.ly/pbi18

Cross Filtering and Time Intelligence

This is a great feature that Microsoft has put into Power BI.

Note, additional date tables can consume more memory in your model. The other option via DAX to calculate the measure would per attribute ie. product, country, etc. And, that also adds a little more overhead.



Many to Many with DAX

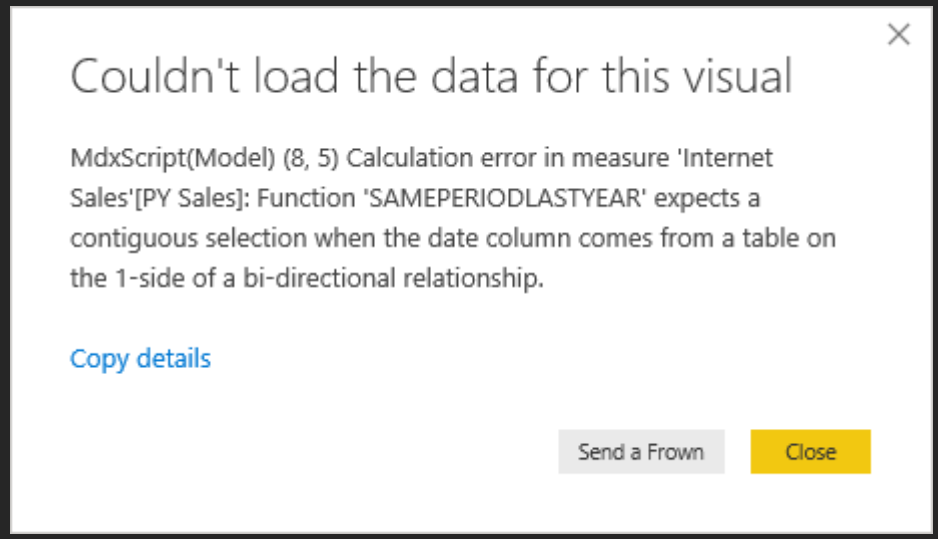
Advanced Data Modeling

We covered why you shouldn’t turn-on Both direction filtering, because it messes up that continuous range of dates that I am working with and that can ultimately break time intelligence. How can you have the best of both worlds?

Cross-Filtering with Date Table

Enabled

EnglishProductName	Total Sales	DateKey
All-Purpose Bike Stand	$39,591.00	191
AWC Logo Cap	$19,688.10	392
Bike Wash - Dissolver	$7,218.60	348
Classic Vest, L	$12,382.50	150
Classic Vest, M	$12,636.50	149
Classic Vest, S	$10,668.00	140
Fender Set - Mountain	$46,619.58	389
Half-Finger Gloves, L	$10,849.07	257
Half-Finger Gloves, M	$12,220.51	276
Half-Finger Gloves, S	$11,951.12	272
Total	**$29,358,677.22**	**2191**



This is how the model looks like when we enable cross-filtering. But, when we looked at one of our report visuals that had time intelligence, it no longer worked. We know that we don't want to turn on both directions. Before, Microsoft introduced bi-directional filtering, we handled this using DAX in a couple lines of code specially with the Calculate function.

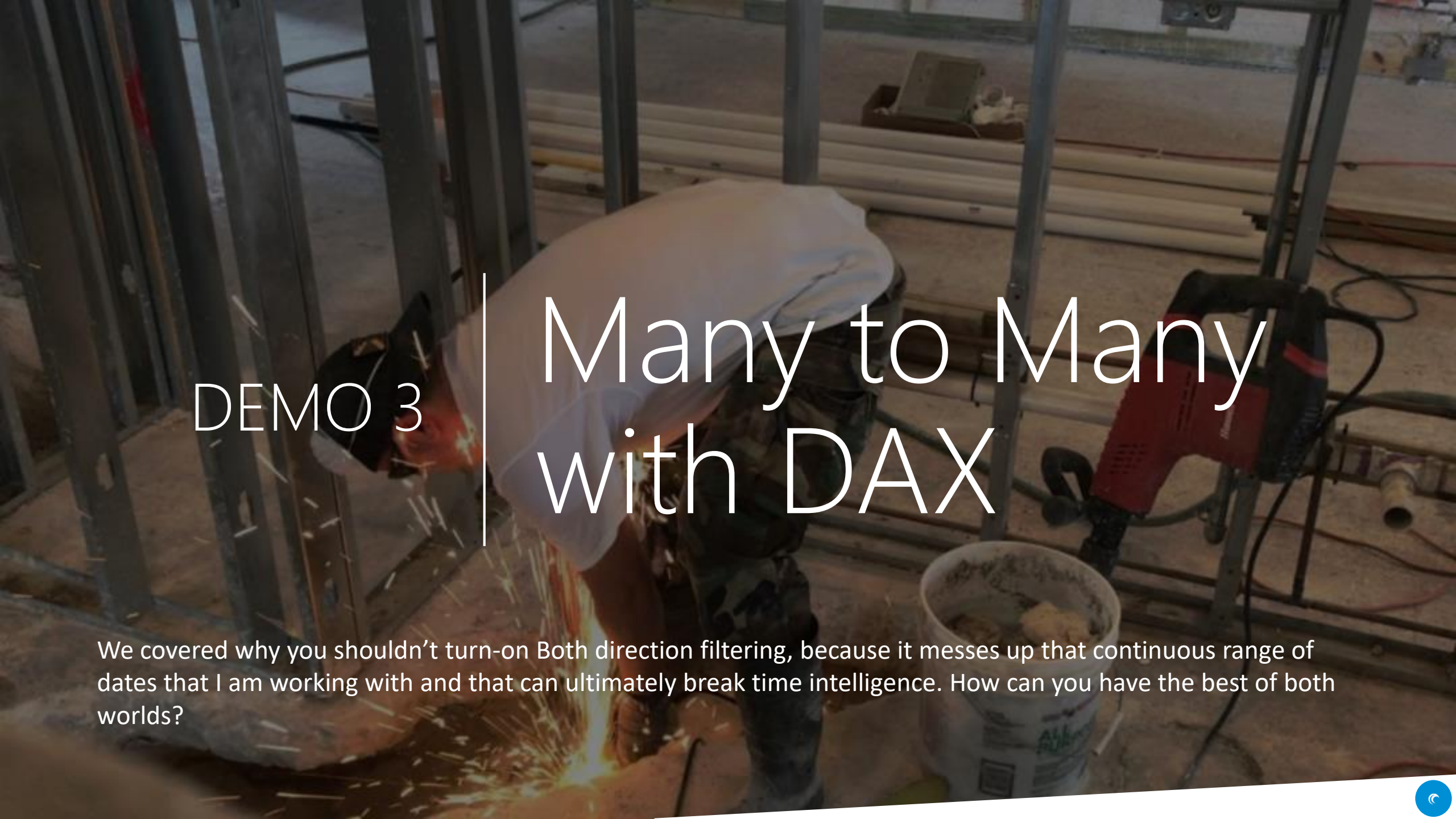
Many to Many support with DAX

Pseudo Code:

```
CALCULATE (
    <Aggregate>,
    <Bridge Table>)
```

More Info:

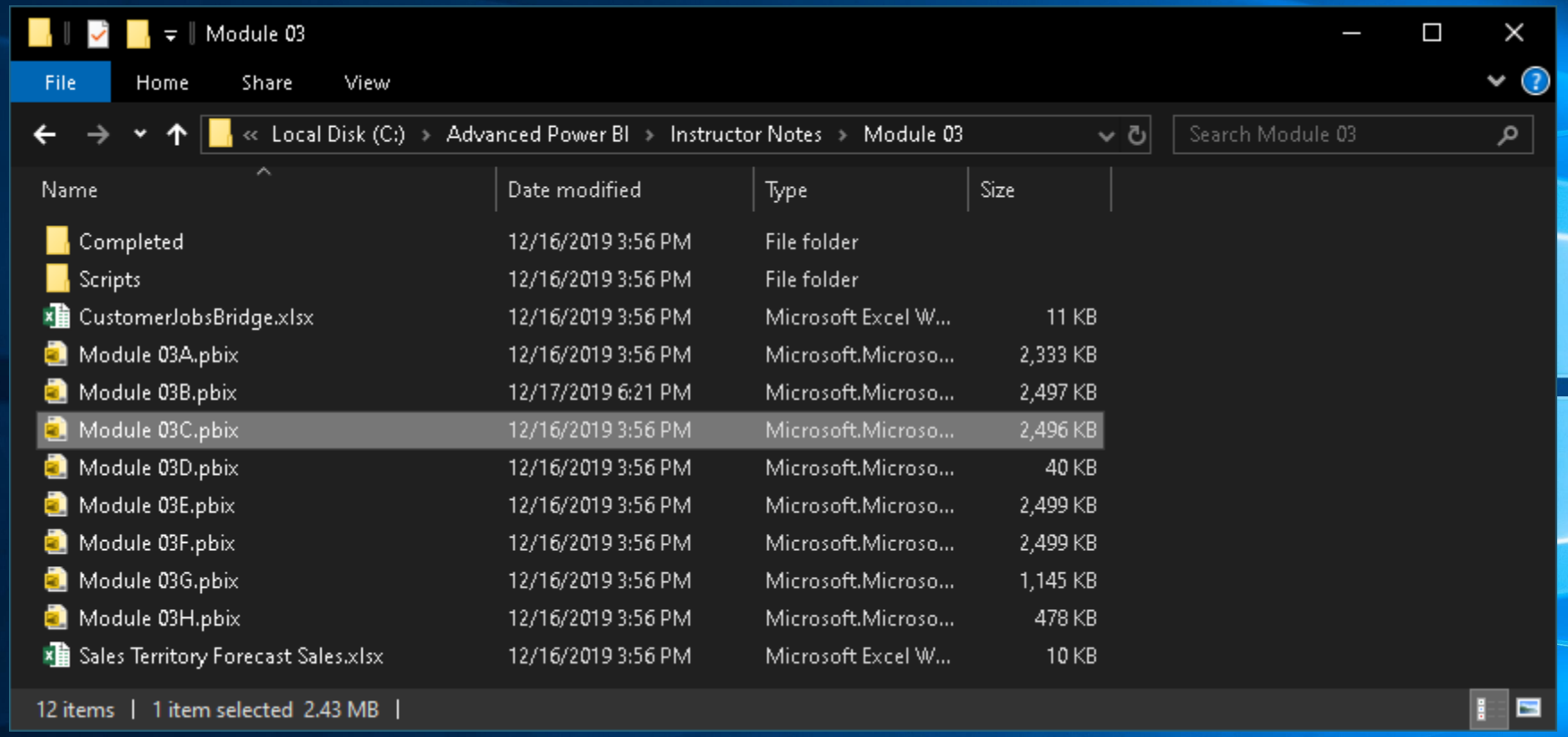
Take essentially our aggregation, whatever it is, and wrap that around the calculate statement. The calculate is going to take that aggregation as the first parameter. The second, parameter is very simple. It just the name of the bridge table in your data model. For the most part, we don't use this code anymore since bi-directional support was made available. However, in a situation like this Calculate is going to be very good.



DEMO 3

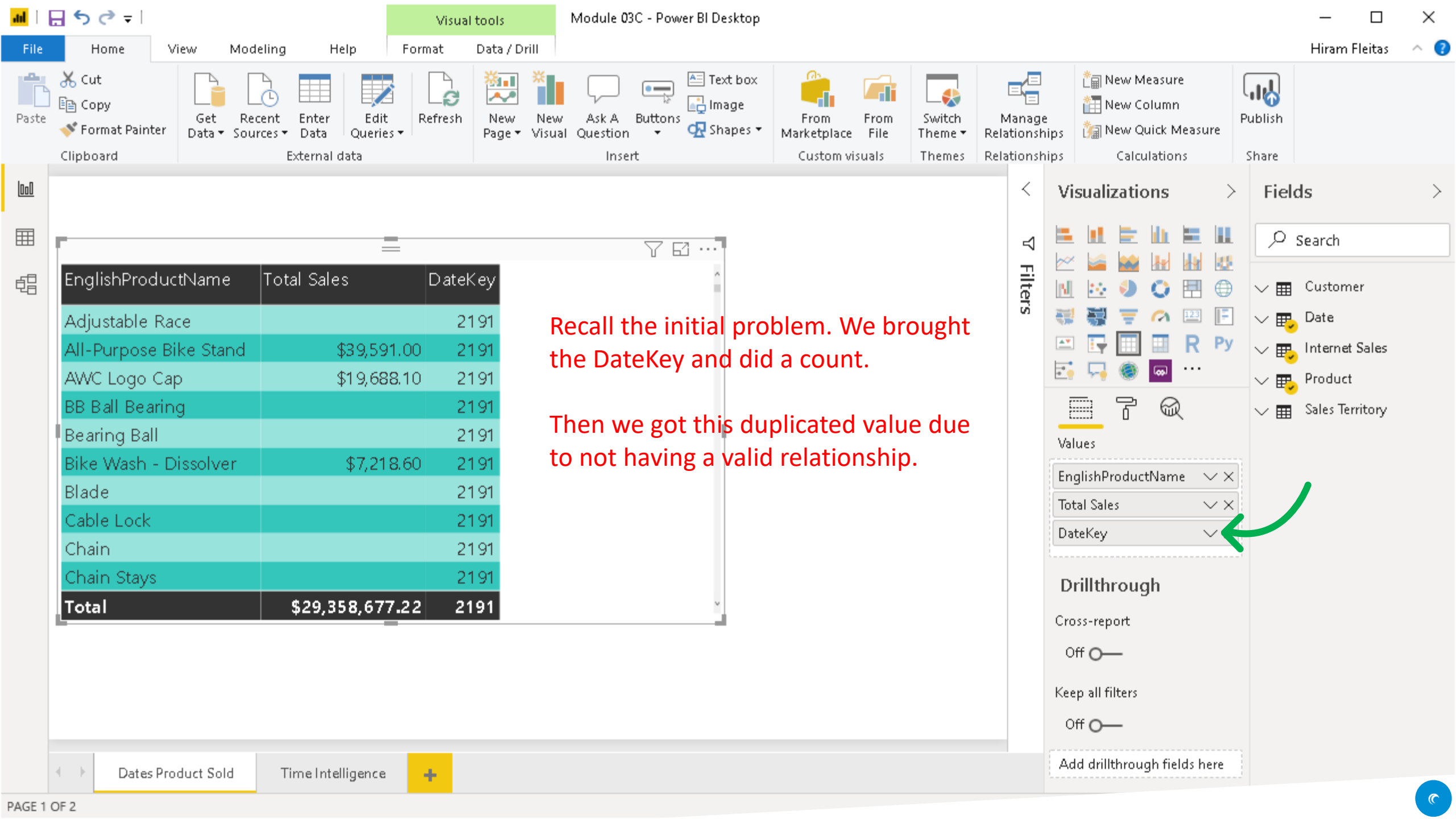
Many to Many with DAX

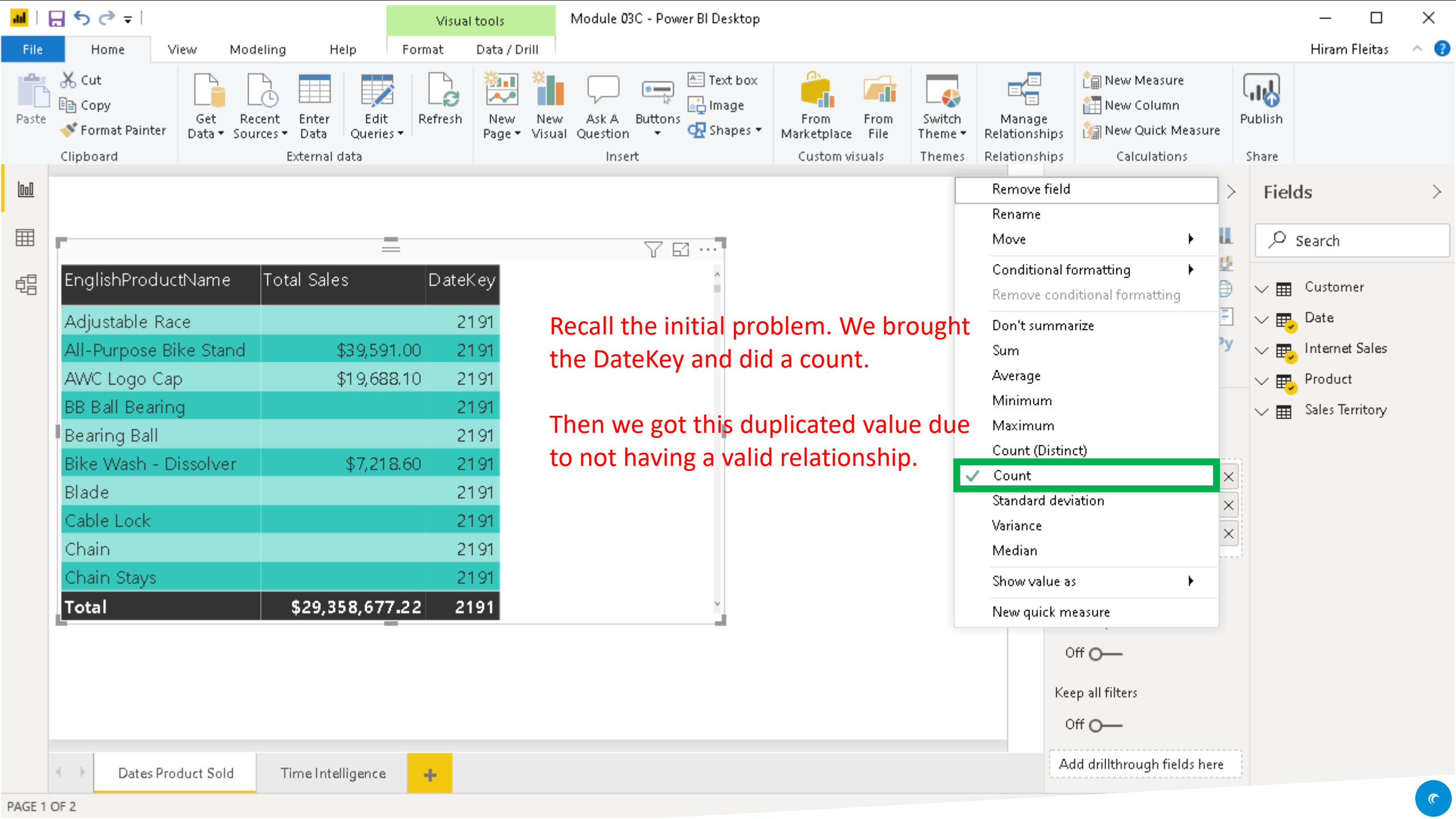
We covered why you shouldn’t turn-on Both direction filtering, because it messes up that continuous range of dates that I am working with and that can ultimately break time intelligence. How can you have the best of both worlds?

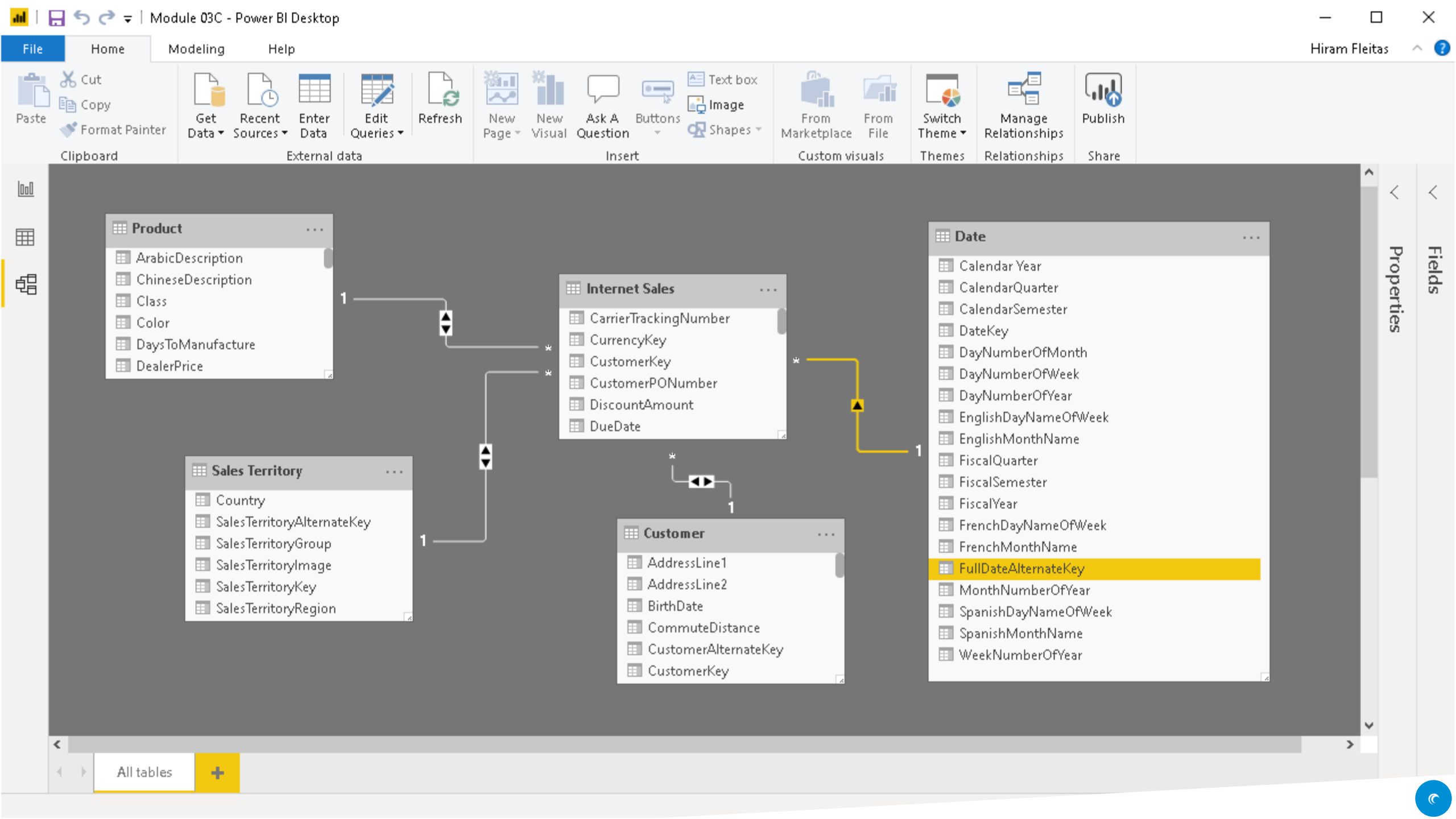


Module 03

C:\Advanced Power BI\Instructor Notes\Module 03\Module 03C.pbix


Module 03C - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
EnglishProductName | Total Sales | DateKey
Adjustable Race | | 2191
All-Purpose Bike Stand | $39,591.00 | 2191
AWC Logo Cap | $19,688.10 | 2191
BB Ball Bearing | | 2191
Bearing Ball | | 2191
Bike Wash - Dissolver | $7,218.60 | 2191
Blade | | 2191
Cable Lock | | 2191
Chain | | 2191
Chain Stays | | 2191
Total | $29,358,677.22 | 2191
Recall the initial problem. We brought the DateKey and did a count.
Then we got this duplicated value due to not having a valid relationship.
Filters
Visualizations
Values
EnglishProductName
Total Sales
DateKey
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
Date
Internet Sales
Product
Sales Territory
Dates Product Sold
Time Intelligence
PAGE 1 OF 2


Module 03C - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
EnglishProductName
Total Sales
DateKey
Adjustable Race 2191
All-Purpose Bike Stand $39,591.00 2191
AWC Logo Cap $19,688.10 2191
BB Ball Bearing 2191
Bearing Ball 2191
Bike Wash - Dissolver $7,218.60 2191
Blade 2191
Cable Lock 2191
Chain 2191
Chain Stays 2191
Total $29,358,677.22 2191
Recall the initial problem. We brought the DateKey and did a count.
Then we got this duplicated value due to not having a valid relationship.
Remove field
Rename
Move
Conditional formatting
Remove conditional formatting
Don't summarize
Sum
Average
Minimum
Maximum
Count (Distinct)
Count
Standard deviation
Variance
Median
Show value as
New quick measure
Fields
Search
Customer
Date
Internet Sales
Product
Sales Territory
Off
Keep all filters
Off
Add drillthrough fields here
Dates Product Sold
Time Intelligence
PAGE 1 OF 2


Module 03C - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Date
Calendar Year
CalendarQuarter
CalendarSemester
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
FullDateAlternateKey
MonthNumberOfYear
SpanishDayNameOfWeek
SpanishMonthName
WeekNumberOfYear
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
1
*
Properties
Fields
All tables

Module 03C - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: | Format: | Home Table: | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

New Measure

Add a measure to the selected table.

EnglishProductName	Total Sales	DateKey
Adjustable Race		2191
All-Purpose Bike Stand	$39,591.00	2191
AWC Logo Cap	$19,688.10	2191
BB Ball Bearing		2191
Bearing Ball		2191
Bike Wash - Dissolver	$7,218.60	2191
Blade		2191
Cable Lock		2191
Chain		2191
Chain Stays		2191
Total	**$29,358,677.22**	**2191**

To solve a problem like this, we say first we just need to count the number of rows in my date table. So we create a New Measure.

Filters

Visualizations

Values

EnglishProductName

Total Sales

DateKey

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

Search

Customer

Date

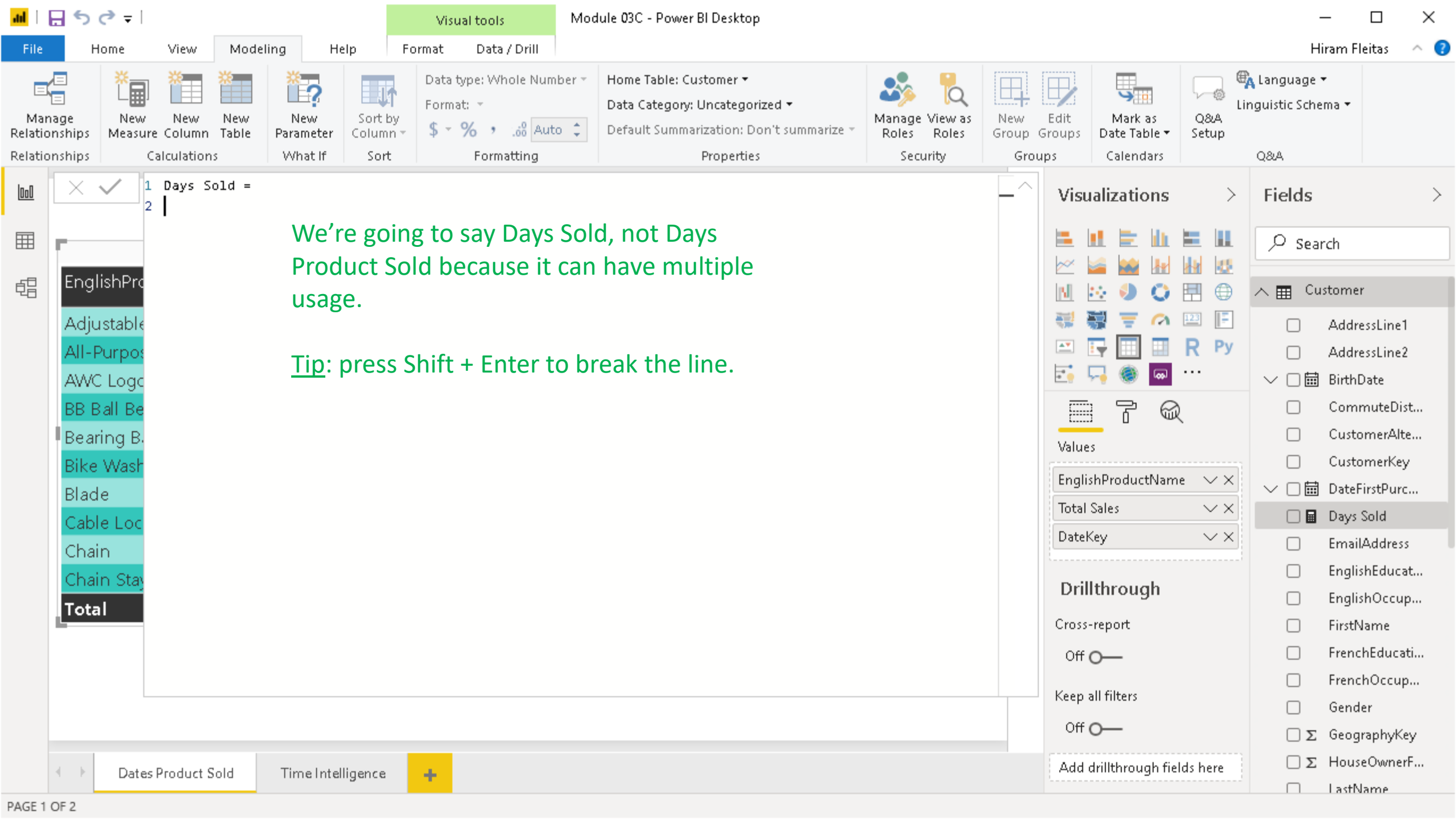
Internet Sales

Product

Sales Territory

Dates Product Sold | Time Intelligence | +

PAGE 1 OF 2


Module 03C - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format:
Auto
Home Table: Customer
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Days Sold =
2
We're going to say Days Sold, not Days Product Sold because it can have multiple usage.
Tip: press Shift + Enter to break the line.
EnglishPro
Adjustable
All-Purpos
AWC Logo
BB Ball Be
Bearing B.
Bike Wash
Blade
Cable Loc
Chain
Chain Stay
Total
Visualizations
Values
EnglishProductName
Total Sales
DateKey
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
Dates Product Sold
Time Intelligence
PAGE 1 OF 2

Module 03C - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: Whole number | $ % , .00 0 | Home Table: Customer | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Days Sold =
2 COUNTROWS('Date')
```

EnglishProductName	Total Sales	DateKey
Adjustable Race		2191
All-Purpose Bike Stand	$39,591.00	2191
AWC Logo Cap	$19,688.10	2191
BB Ball Bearing		2191
Bearing Ball		2191
Bike Wash - Dissolver	$7,218.60	2191
Blade		2191
Cable Lock		2191
Chain		2191
Chain Stays		2191
Total	**$29,358,677.22**	**2191**

Filters

Visualizations

Values

EnglishProductName

Total Sales

DateKey

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

Search

Customer

- AddressLine1
- AddressLine2
- BirthDate
- CommuteDist...
- CustomerAlte...
- CustomerKey
- DateFirstPurc...
- Days Sold
- EmailAddress
- EnglishEducat...
- EnglishOccup...
- FirstName
- FrenchEducati...
- FrenchOccup...
- Gender
- GeographyKey
- HouseOwnerF...

Dates Product Sold | Time Intelligence | +

PAGE 1 OF 2

Module 03C - Power BI Desktop

File | Home | View | Modeling | Help | Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: Whole number | $ % , .00 0 | Home Table: Customer | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Days Sold =
2 COUNTROWS('Date')
```

Thousands separator

Display the values in the field with a thousands separator.

Benefit: Measures can be formatted.

EnglishProductName	Total Sales	DateKey	Days Sold
Adjustable Race		2191	2,191
All-Purpose Bike Stand	$39,591.00	2191	2,191
AWC Logo Cap	$19,688.10	2191	2,191
BB Ball Bearing		2191	2,191
Bearing Ball		2191	2,191
Bike Wash - Dissolver	$7,218.60	2191	2,191
Blade		2191	2,191
Cable Lock		2191	2,191
Chain		2191	2,191
Chain Stays		2191	2,191
Total	**$29,358,677.22**	**2191**	**2,191**

After adding the field to our visual we're getting the same result.

Now we can remove DateKey and **use the new DAX calculated measure** as the recommended method.

Filters

Visualizations

Values

Add data fields here

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

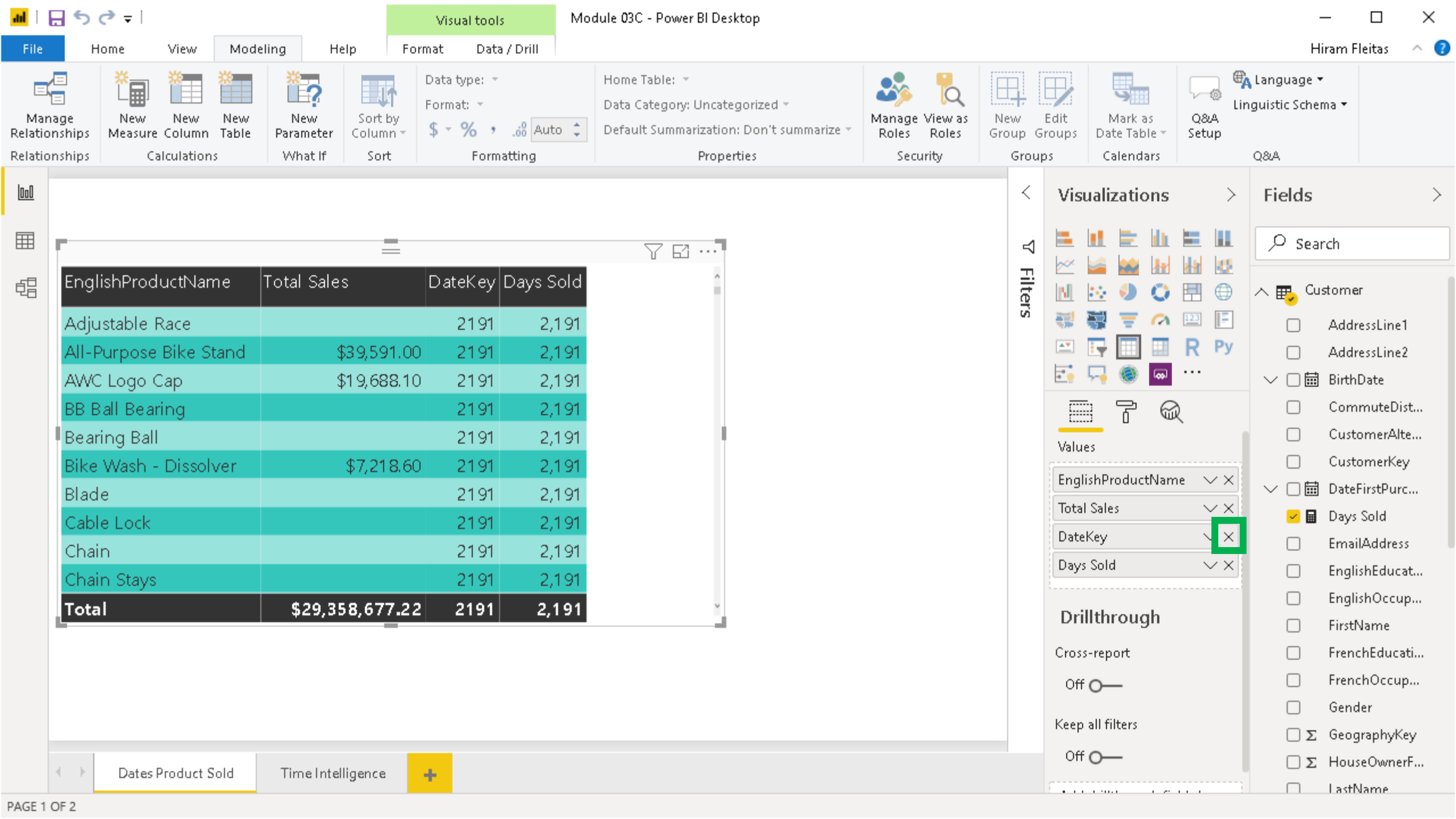
Search

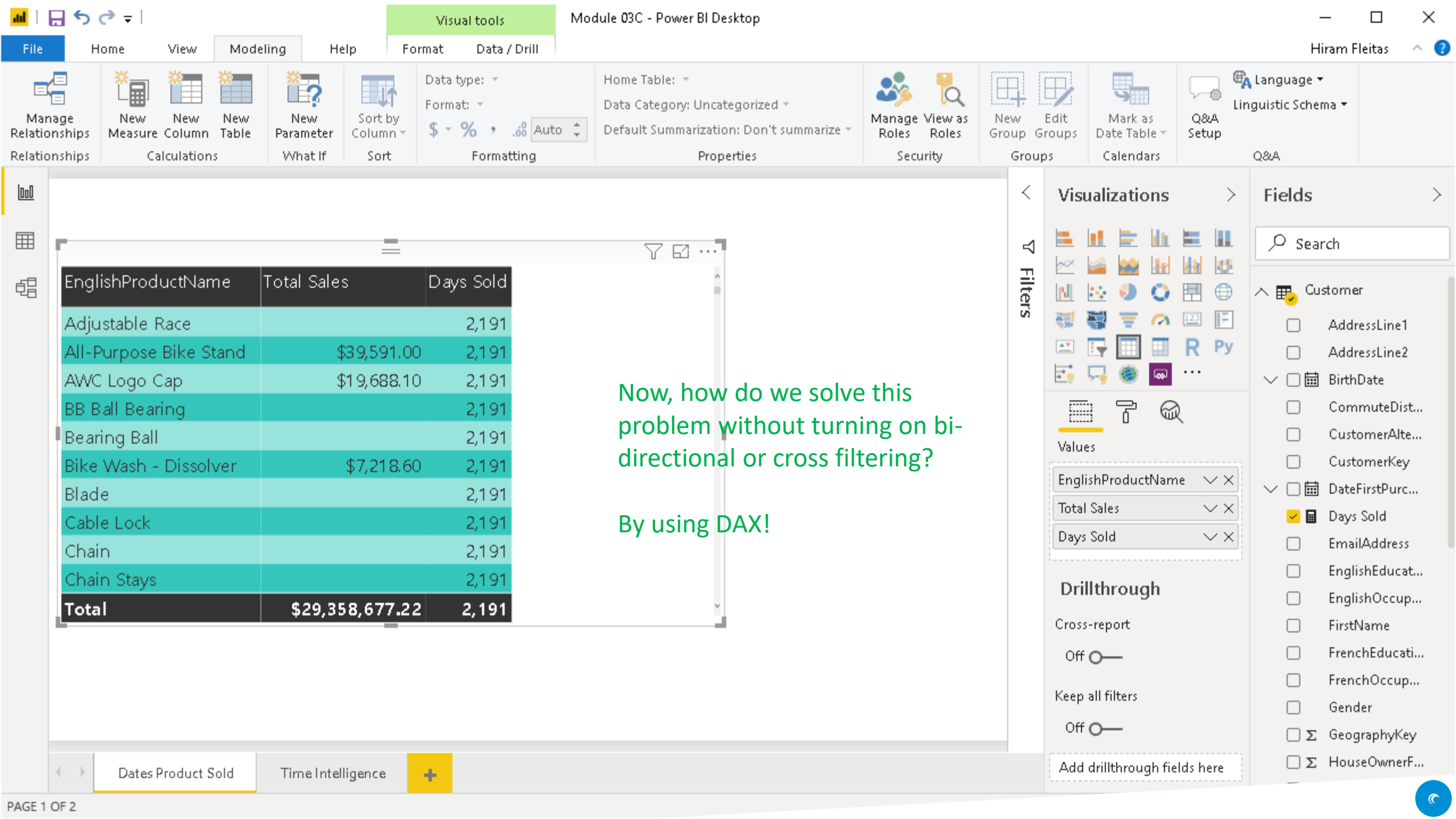
Customer

AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...

Dates Product Sold | Time Intelligence | +

PAGE 1 OF 2


Visual tools
Module 03C - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type:
Format:
Auto
Home Table:
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
EnglishProductName | Total Sales | DateKey | Days Sold
Adjustable Race | 2191 | 2,191
All-Purpose Bike Stand | $39,591.00 | 2191 | 2,191
AWC Logo Cap | $19,688.10 | 2191 | 2,191
BB Ball Bearing | 2191 | 2,191
Bearing Ball | 2191 | 2,191
Bike Wash - Dissolver | $7,218.60 | 2191 | 2,191
Blade | 2191 | 2,191
Cable Lock | 2191 | 2,191
Chain | 2191 | 2,191
Chain Stays | 2191 | 2,191
Total | $29,358,677.22 | 2191 | 2,191
Filters
Visualizations
Values
EnglishProductName
Total Sales
DateKey
Days Sold
Drillthrough
Cross-report
Off
Keep all filters
Off
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
Dates Product Sold
Time Intelligence
PAGE 1 OF 2


Visual tools
Module 03C - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type:
Format:
Auto
Home Table:
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
EnglishProductName
Total Sales
Days Sold
Adjustable Race 2,191
All-Purpose Bike Stand $39,591.00 2,191
AWC Logo Cap $19,688.10 2,191
BB Ball Bearing 2,191
Bearing Ball 2,191
Bike Wash - Dissolver $7,218.60 2,191
Blade 2,191
Cable Lock 2,191
Chain 2,191
Chain Stays 2,191
Total $29,358,677.22 2,191
Now, how do we solve this problem without turning on bi-directional or cross filtering?
By using DAX!
Filters
Visualizations
Values
EnglishProductName
Total Sales
Days Sold
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
Dates Product Sold
Time Intelligence
PAGE 1 OF 2

Module 03C - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: Whole number | $ % , .00 0 | Home Table: Customer | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Days Sold =
2 CALCULATE(
```

CALCULATE(**Expression**, [Filter1], ...)
Evaluates an expression in a context modified by filters.

We're going to use Calculate.

EnglishProductName	Total Sales	Days Sold
Adjustable Race		2,191
All-Purpose Bike Stand	$39,591.00	2,191
AWC Logo Cap	$19,688.10	2,191
BB Ball Bearing		2,191
Bearing Ball		2,191
Bike Wash - Dissolver	$7,218.60	2,191
Blade		2,191
Cable Lock		2,191
Chain		2,191
Chain Stays		2,191
Total	**$29,358,677.22**	**2,191**

Filters

Visualizations

Values

EnglishProductName

Total Sales

Days Sold

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

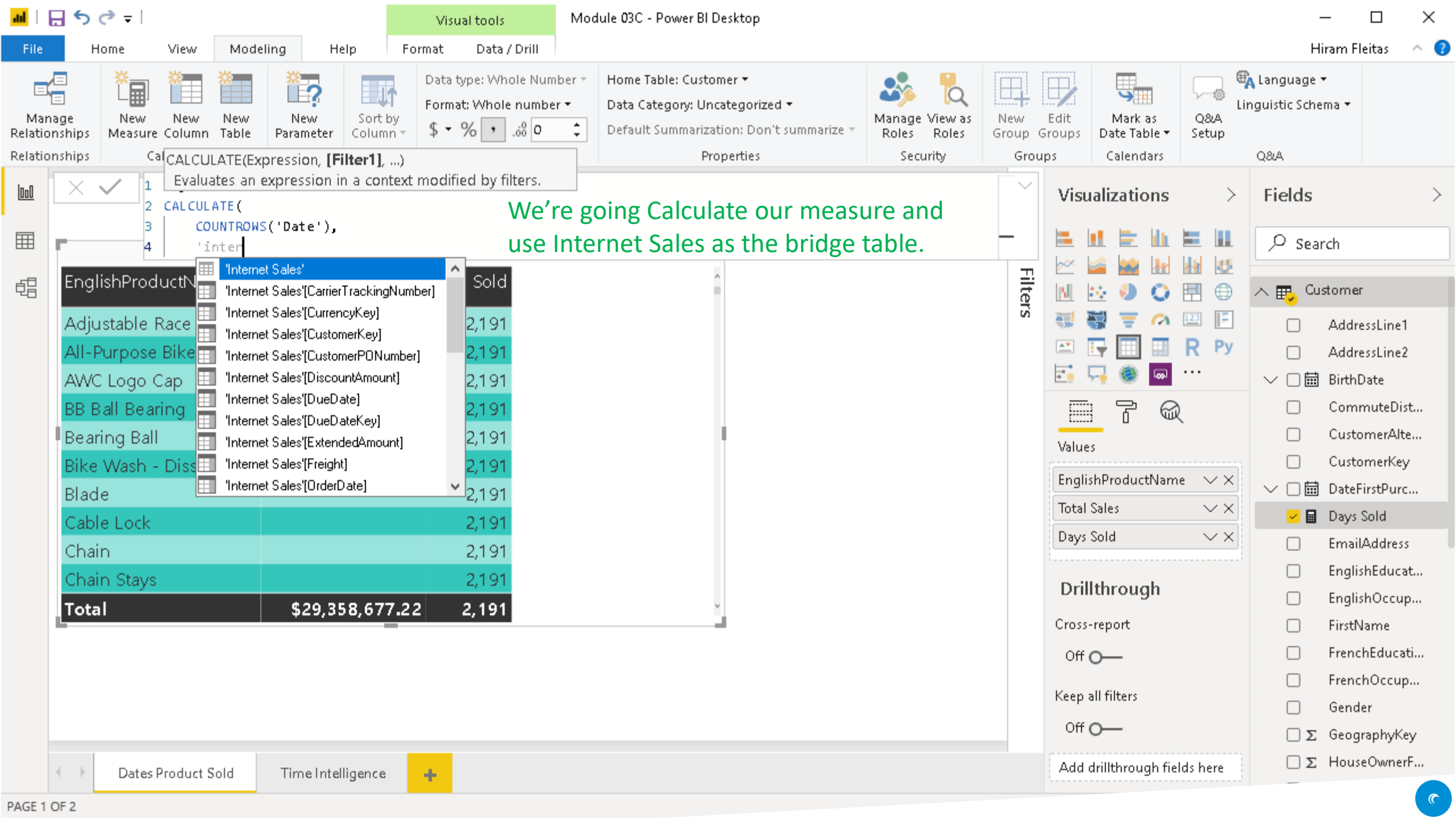
Search

Customer

- AddressLine1
- AddressLine2
- BirthDate
- CommuteDist...
- CustomerAlte...
- CustomerKey
- DateFirstPurc...
- Days Sold
- EmailAddress
- EnglishEducat...
- EnglishOccup...
- FirstName
- FrenchEducati...
- FrenchOccup...
- Gender
- GeographyKey
- HouseOwnerF...

Dates Product Sold | Time Intelligence | +

PAGE 1 OF 2


Module 03C - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format: Whole number
Home Table: Customer
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Properties
Security
Groups
Calendars
Q&A
CALCULATE(Expression, [Filter1], ...)
Evaluates an expression in a context modified by filters.
1
2 CALCULATE(
3 COUNTROWS('Date'),
4 'inter
'Internet Sales'
'Internet Sales'[CarrierTrackingNumber]
'Internet Sales'[CurrencyKey]
'Internet Sales'[CustomerKey]
'Internet Sales'[CustomerPONumber]
'Internet Sales'[DiscountAmount]
'Internet Sales'[DueDate]
'Internet Sales'[DueDateKey]
'Internet Sales'[ExtendedAmount]
'Internet Sales'[Freight]
'Internet Sales'[OrderDate]
We're going Calculate our measure and use Internet Sales as the bridge table.
EnglishProductN
Sold
Adjustable Race 2,191
All-Purpose Bike 2,191
AWC Logo Cap 2,191
BB Ball Bearing 2,191
Bearing Ball 2,191
Bike Wash - Diss 2,191
Blade 2,191
Cable Lock 2,191
Chain 2,191
Chain Stays 2,191
Total $29,358,677.22 2,191
Filters
Visualizations
Values
EnglishProductName
Total Sales
Days Sold
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
Dates Product Sold
Time Intelligence
PAGE 1 OF 2

Module 03C - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: Whole number | $ % , .00 0 | Home Table: Customer | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Days Sold =
2 CALCULATE(
3     COUNTROWS('Date'),
4     'Internet Sales')
```

EnglishProductName	Total Sales	Days Sold
All-Purpose Bike Stand	$39,591.00	191
AWC Logo Cap	$19,688.10	392
Bike Wash - Dissolver	$7,218.60	348
Classic Vest, L	$12,382.50	150
Classic Vest, M	$12,636.50	149
Classic Vest, S	$10,668.00	140
Fender Set - Mountain	$46,619.58	389
Half-Finger Gloves, L	$10,849.07	257
Half-Finger Gloves, M	$12,220.51	276
Half-Finger Gloves, S	$11,951.12	272
Total	**$29,358,677.22**	**1,124**

It works!

Filters

Visualizations

Values

EnglishProductName

Total Sales

Days Sold

Drillthrough

Cross-report

Off

Keep all filters

Off

Add drillthrough fields here

Fields

Search

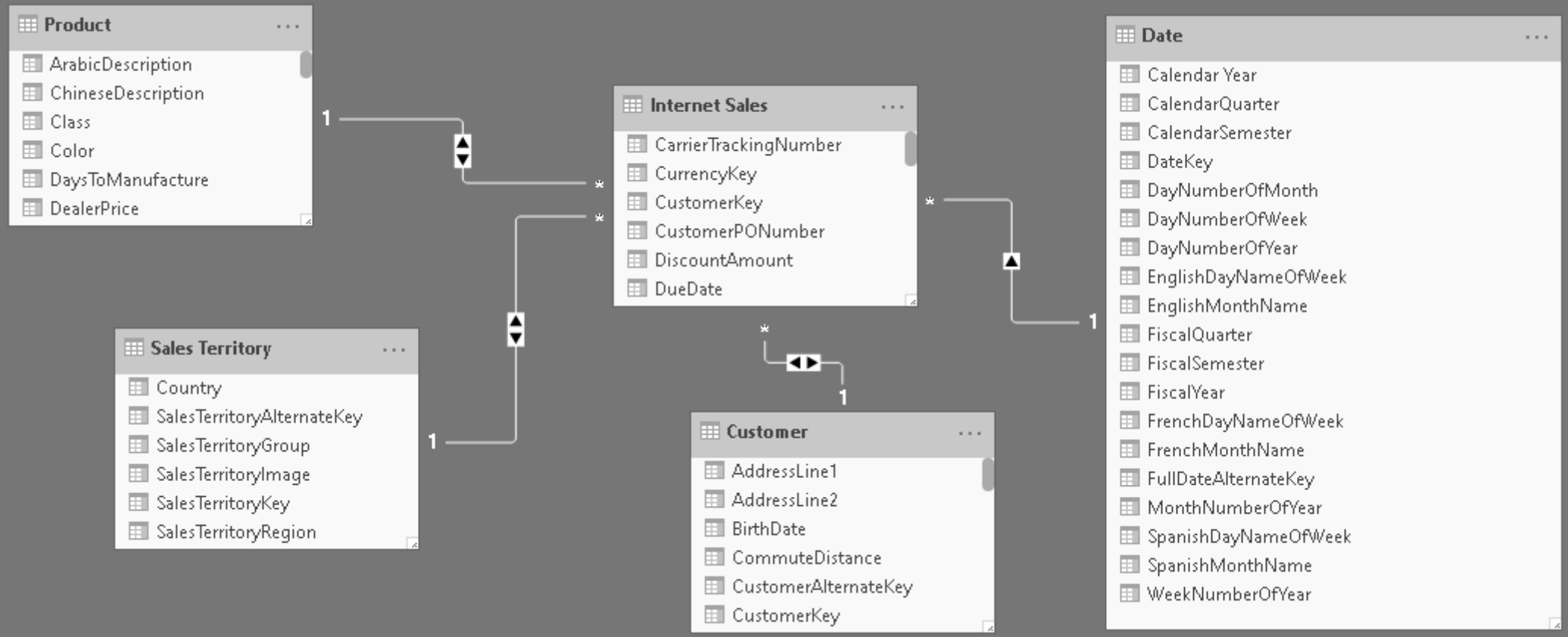
Customer

AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...

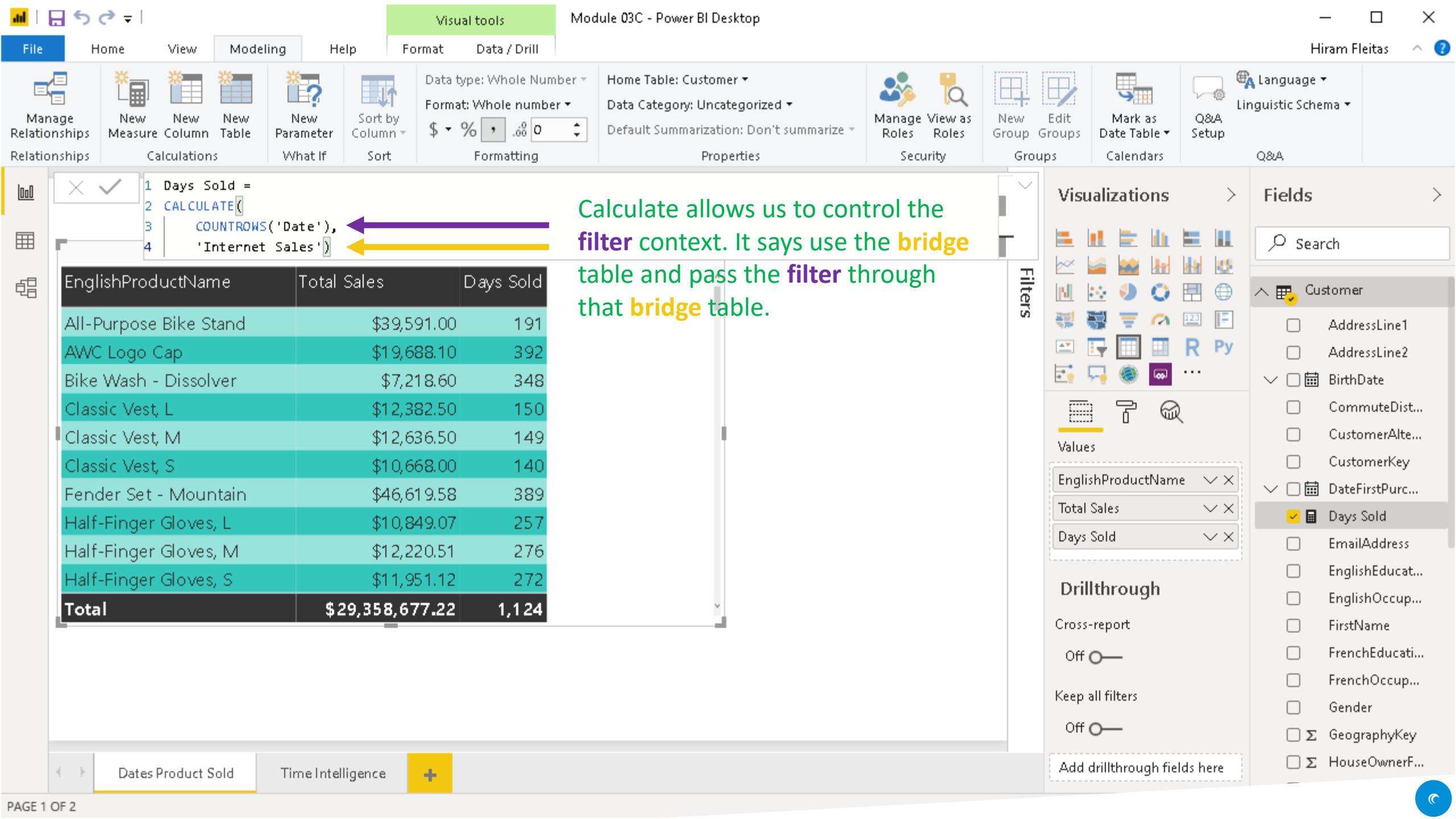
Dates Product Sold | Time Intelligence | +

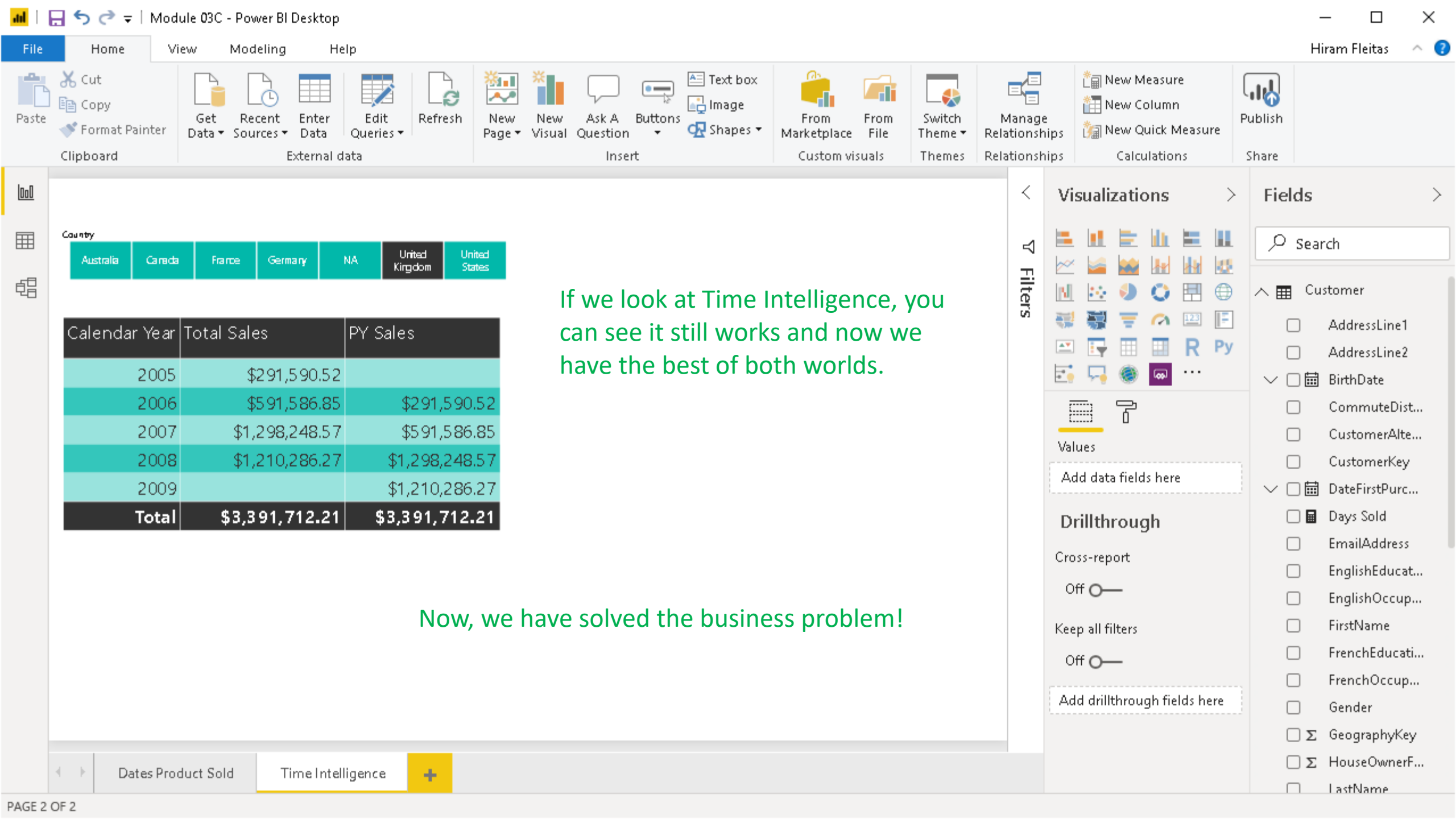
PAGE 1 OF 2

A product can be sold on many dates. A date can have multiple products. So there's a many to many relationship between these to tables, but there's no way to build a relationship.



If you add a product to the date table, that wouldn't work cause you would have only one product per date and vise versa on if you try it on the product table. What we need is a bridge table to store the relationship of when every single time a product sold and when it sold on.


Module 03C - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format: Whole number
Home Table: Customer
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Days Sold =
2 CALCULATE(
3 COUNTROWS('Date'),
4 'Internet Sales')
Calculate allows us to control the filter context. It says use the bridge table and pass the filter through that bridge table.
EnglishProductName | Total Sales | Days Sold
All-Purpose Bike Stand | $39,591.00 | 191
AWC Logo Cap | $19,688.10 | 392
Bike Wash - Dissolver | $7,218.60 | 348
Classic Vest, L | $12,382.50 | 150
Classic Vest, M | $12,636.50 | 149
Classic Vest, S | $10,668.00 | 140
Fender Set - Mountain | $46,619.58 | 389
Half-Finger Gloves, L | $10,849.07 | 257
Half-Finger Gloves, M | $12,220.51 | 276
Half-Finger Gloves, S | $11,951.12 | 272
Total | $29,358,677.22 | 1,124
Filters
Visualizations
Values
EnglishProductName
Total Sales
Days Sold
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
Dates Product Sold
Time Intelligence
PAGE 1 OF 2


Module 03C - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Country
Australia
Canada
France
Germany
NA
United Kingdom
United States
Calendar Year
Total Sales
PY Sales
2005 $291,590.52
2006 $591,586.85 $291,590.52
2007 $1,298,248.57 $591,586.85
2008 $1,210,286.27 $1,298,248.57
2009 $1,210,286.27
Total $3,391,712.21 $3,391,712.21
If we look at Time Intelligence, you can see it still works and now we have the best of both worlds.
Now, we have solved the business problem!
Filters
Visualizations
Values
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
Off
Add drillthrough fields here
Fields
Search
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurc...
Days Sold
EmailAddress
EnglishEducat...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccup...
Gender
GeographyKey
HouseOwnerF...
LastName
Dates Product Sold
Time Intelligence
PAGE 2 OF 2

Review

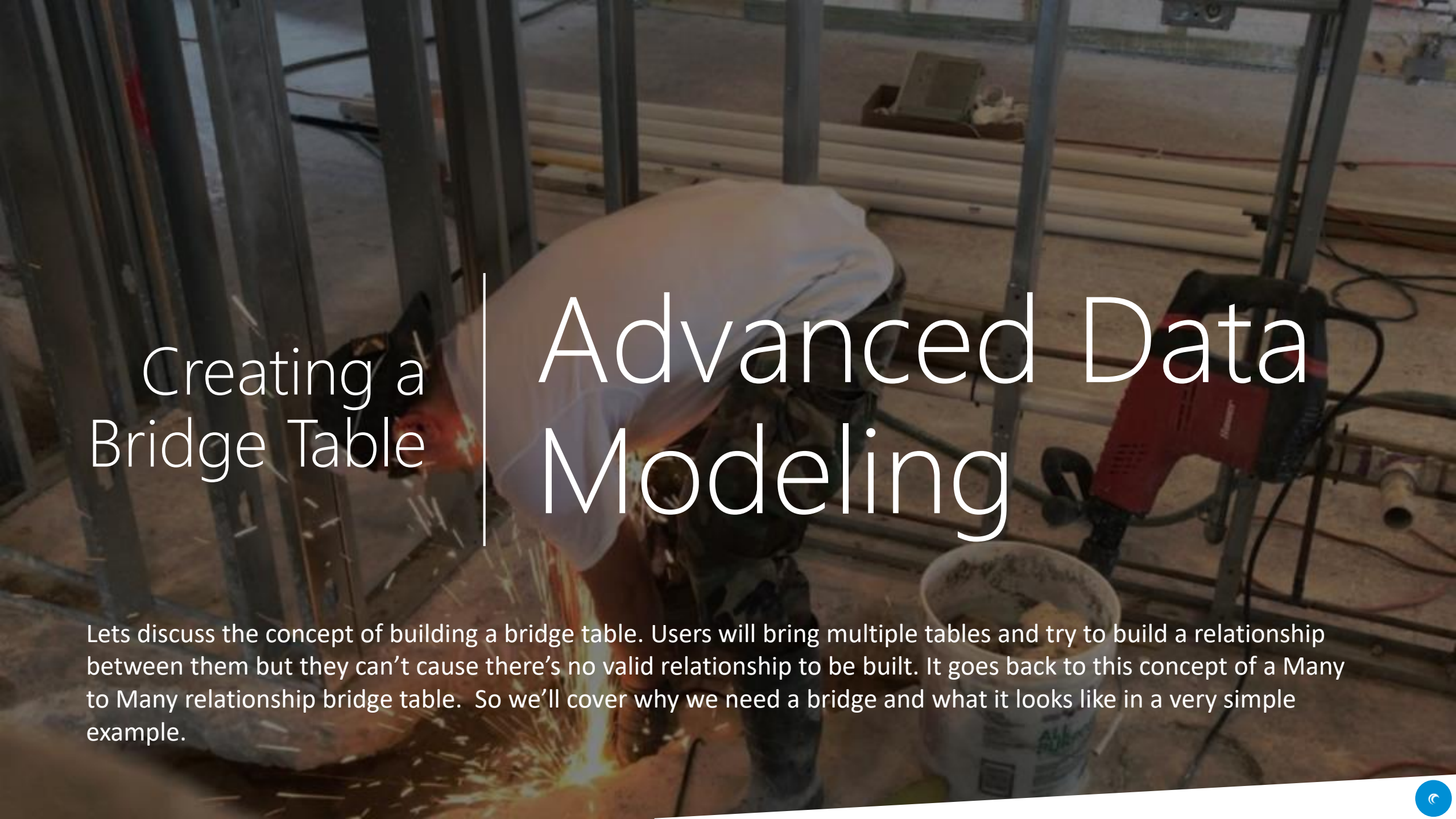
Bi-Directional Filtering

Problem with the date table
Solving the problem using DAX

Pop-Up Quiz # 3
bit.ly/pbi18

Many to Many with DAX

Specifically the reason why we don't use this anymore is because now we can just turn on Both directions, which we didn't have in the past.

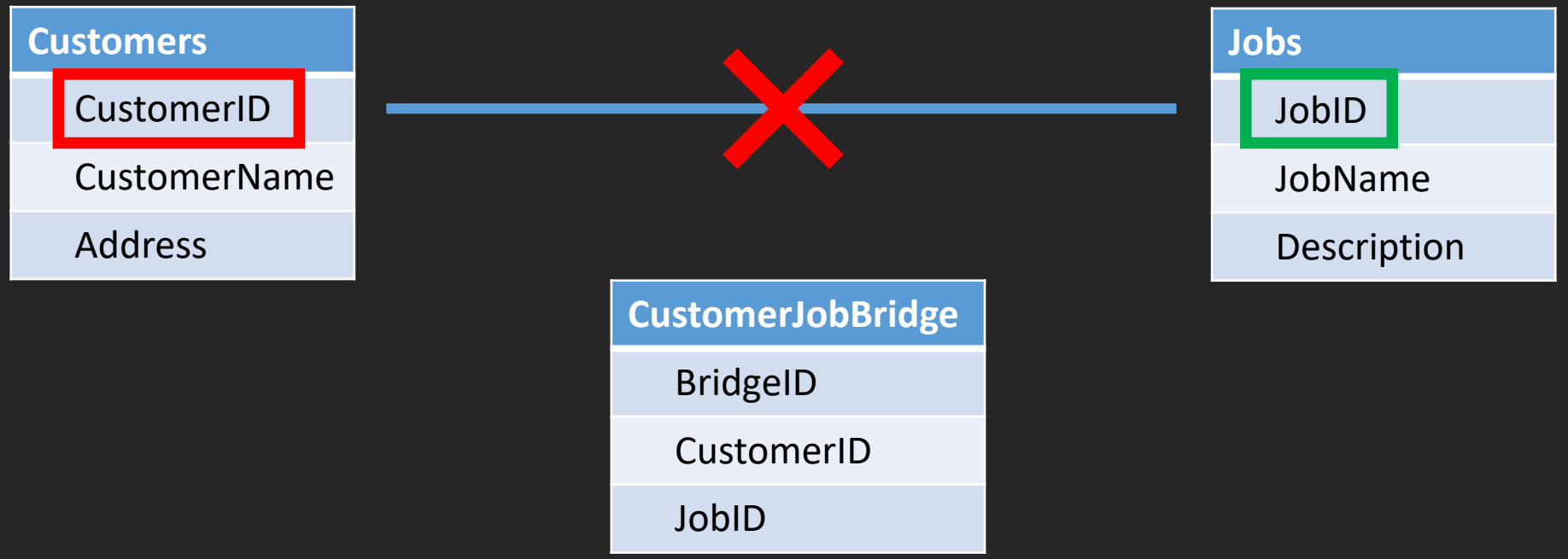


Creating a Bridge Table

Advanced Data Modeling

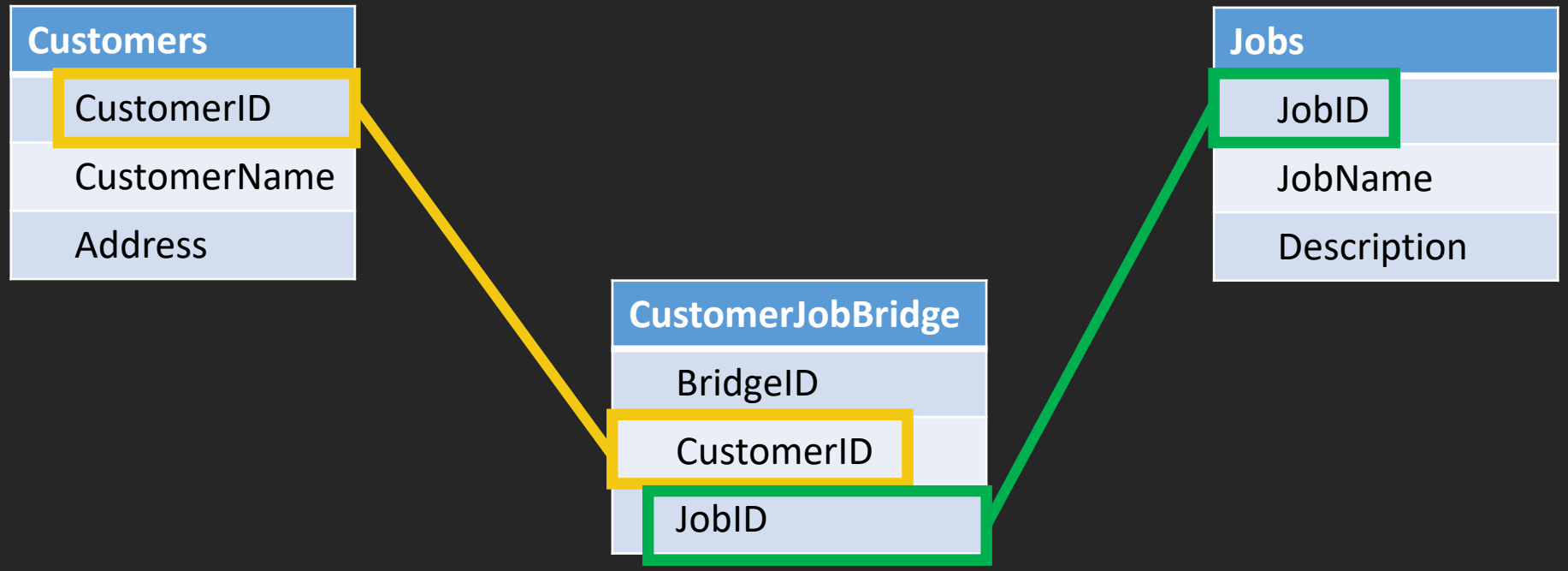
Lets discuss the concept of building a bridge table. Users will bring multiple tables and try to build a relationship between them but they can't cause there's no valid relationship to be built. It goes back to this concept of a Many to Many relationship bridge table. So we'll cover why we need a bridge and what it looks like in a very simple example.

Creating a Bridge Table (Factless Fact)



A bridge table is a table that essentially stores a relationship between two tables. What most people do, is add the JobID to the Customers table. That works one time, until you have a customer that's had multiple jobs in the last few months; therefore, this doesn't work anymore. So that's not a good way to build a relationship and a lot of times that's not even an option. A better way is a bridge table. Each customer will have an entry in the bridge table for each job that they held, plus other attributes ie. start date, etc.

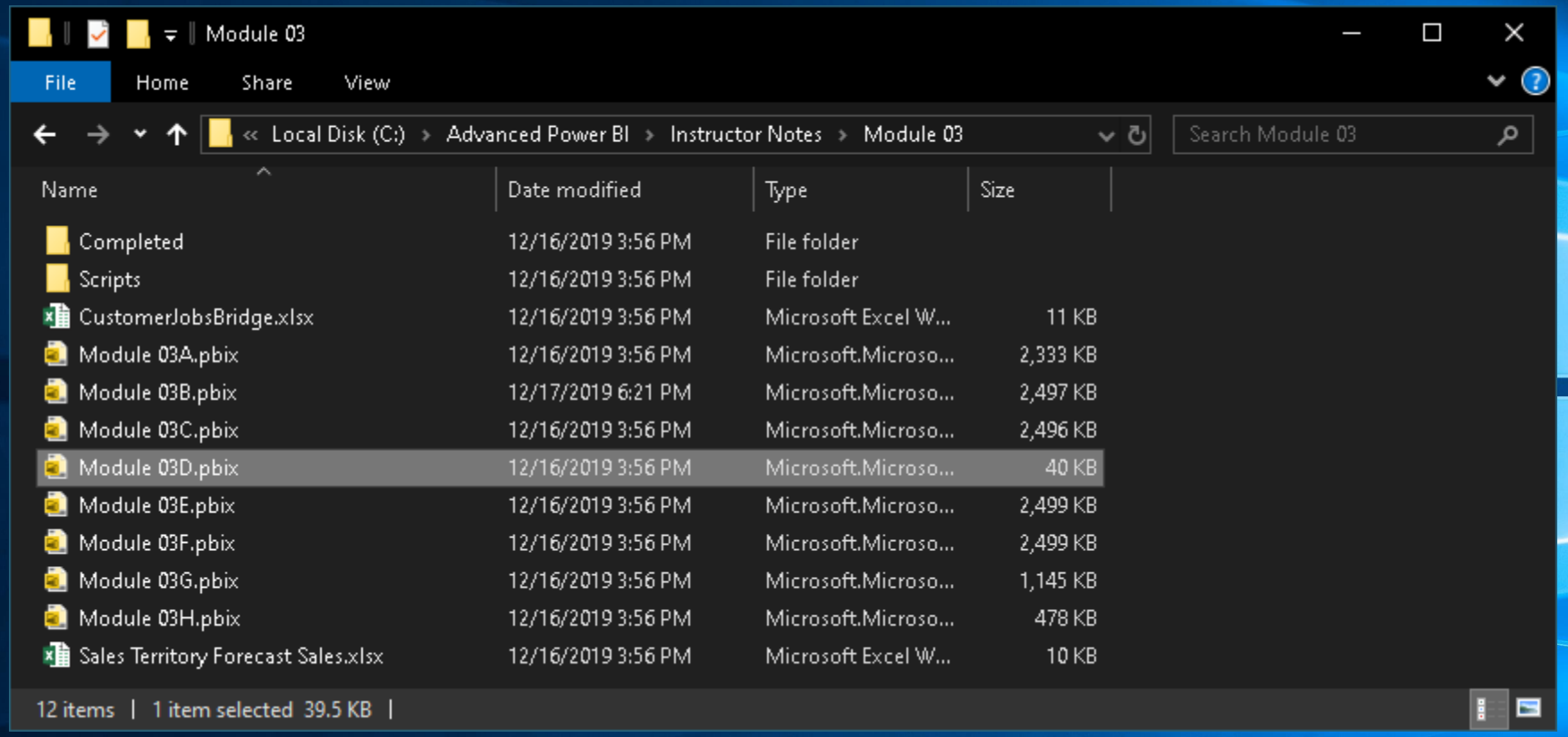
Creating a Bridge Table (Factless Fact)



A bridge table is a table that essentially stores a relationship between two tables. What most people do, is add the JobID to the Customers table. That works one time, until you have a customer that's had multiple jobs in the last few months; therefore, this doesn't work anymore. So that's not a good way to build a relationship and a lot of times that's not even an option. A better way is a bridge table. Each customer will have an entry in the bridge table for each job that they held, plus other attributes ie. start date, etc.

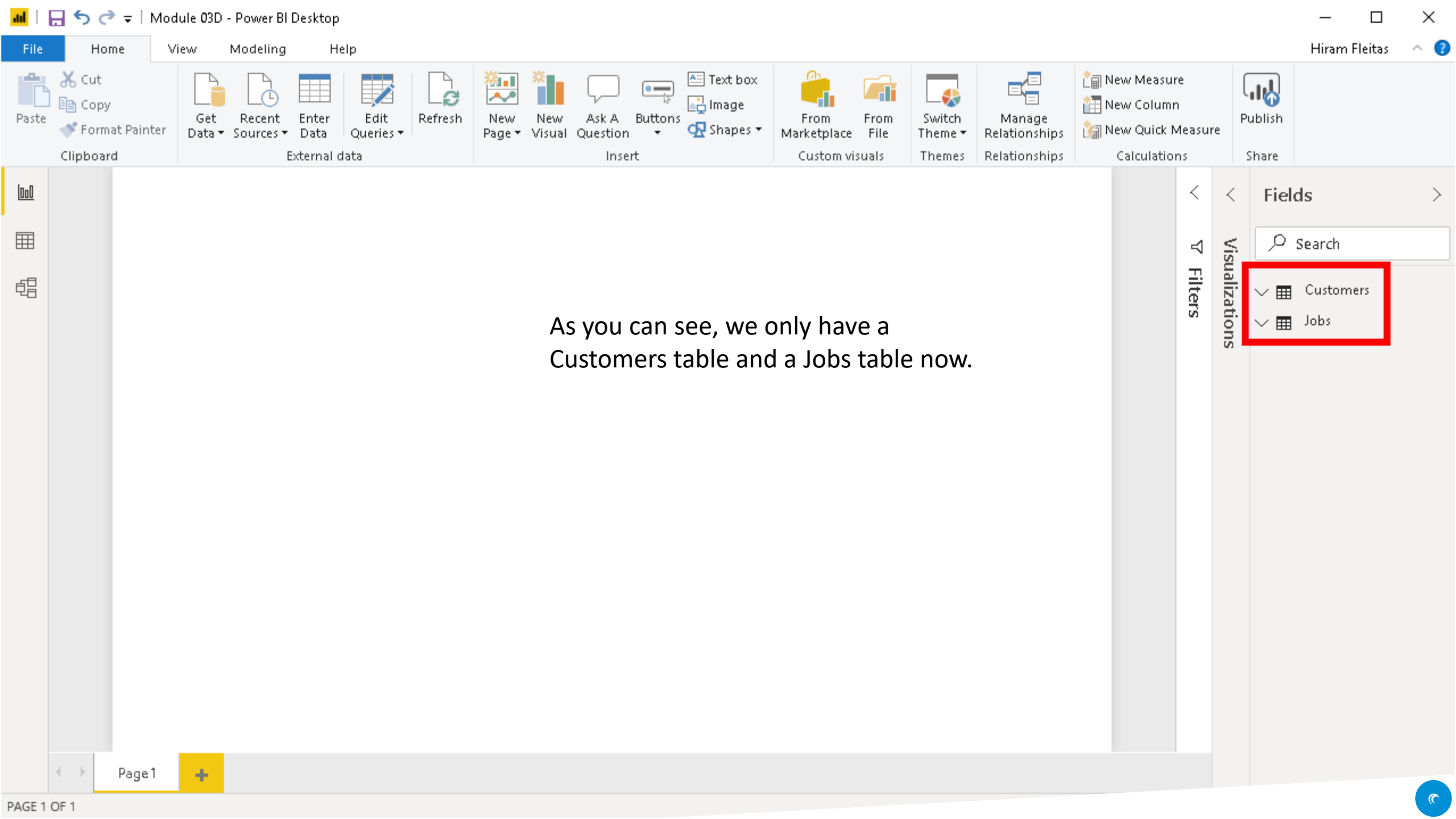
DEMO 4 | Factless Fact Table (Bridge)

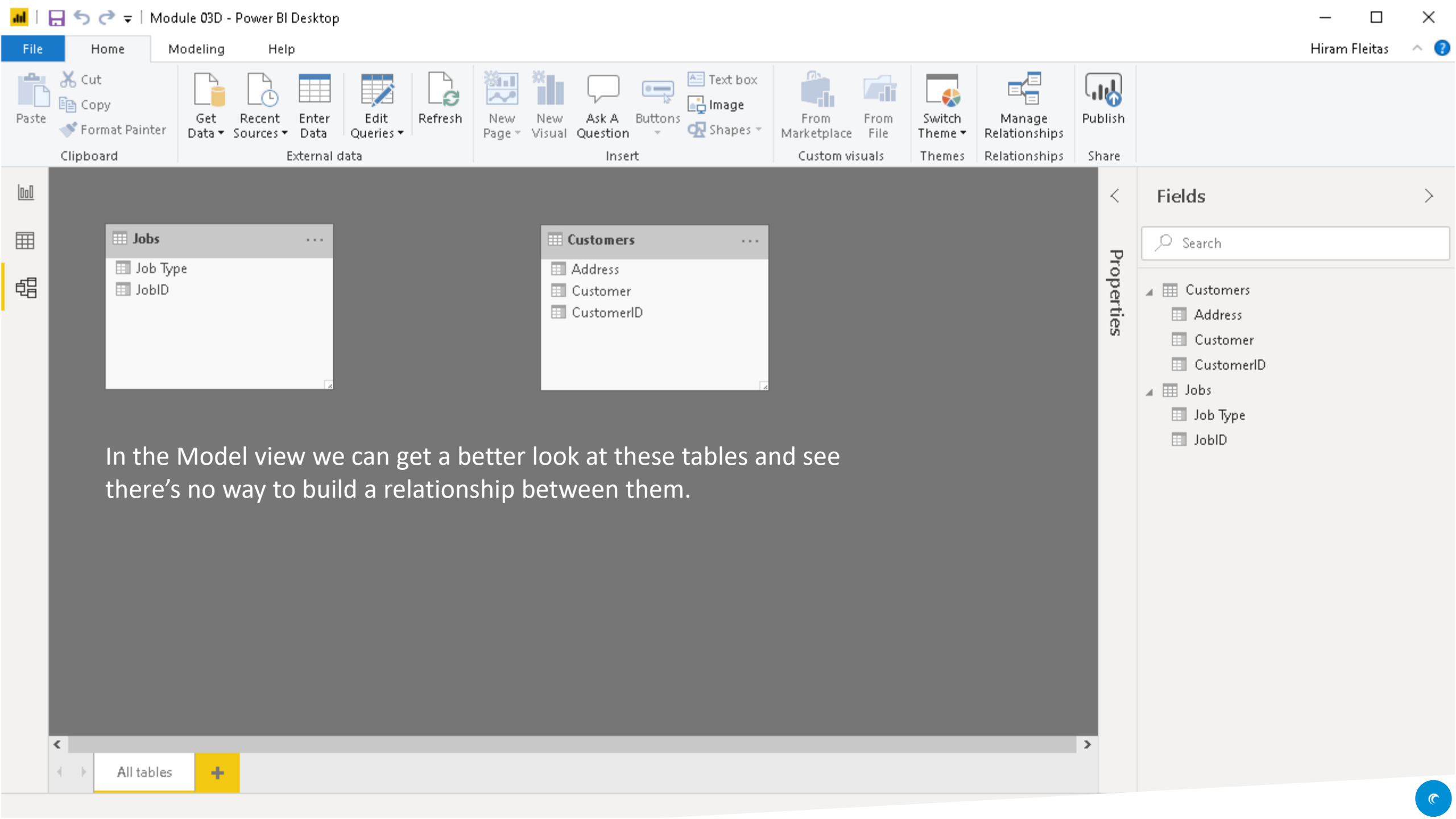
Lets discuss the concept of building a bridge table. Users will bring multiple tables and try to build a relationship between them but they can’t cause there’s no valid relationship to be built. It goes back to this concept of a Many to Many relationship bridge table. So we’ll cover why we need a bridge and what it looks like in a very simple example.



Module 03

C:\Advanced Power BI\Instructor Notes\Module 03\Module 03D.pbix


Module 03D - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Cut
Copy
Format Painter
Paste
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
As you can see, we only have a Customers table and a Jobs table now.
Filters
Visualizations
Fields
Search
Customers
Jobs
Page 1
PAGE 1 OF 1


Module 03D - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Jobs
Job Type
JobID
Customers
Address
Customer
CustomerID
In the Model view we can get a better look at these tables and see there's no way to build a relationship between them.
Properties
Fields
Search
Customers
Address
Customer
CustomerID
Jobs
Job Type
JobID
All tables

Module 03D - Power BI Desktop

File | Home | Modeling | Help

Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

CustomerID	Customer	Address
1	Mitchell	400 Main St
2	Devin	500 Main St
3	Audra	475 Main St
4	Manuel	403 Main St
5	Ken	515 Main St
6	Erica	373 Main St
7	Brian	373 Main St
8	Bob	475 Main St

In the Data view we can the columns as well as the rows in those columns.

Fields

Search

Customers

Jobs

TABLE: Customers (8 rows)

Module 03D - Power BI Desktop

File | Home | Modeling | Help | Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

JobID	Job Type
1000	Construction
1001	Retail
1002	Sales
1003	Consultant

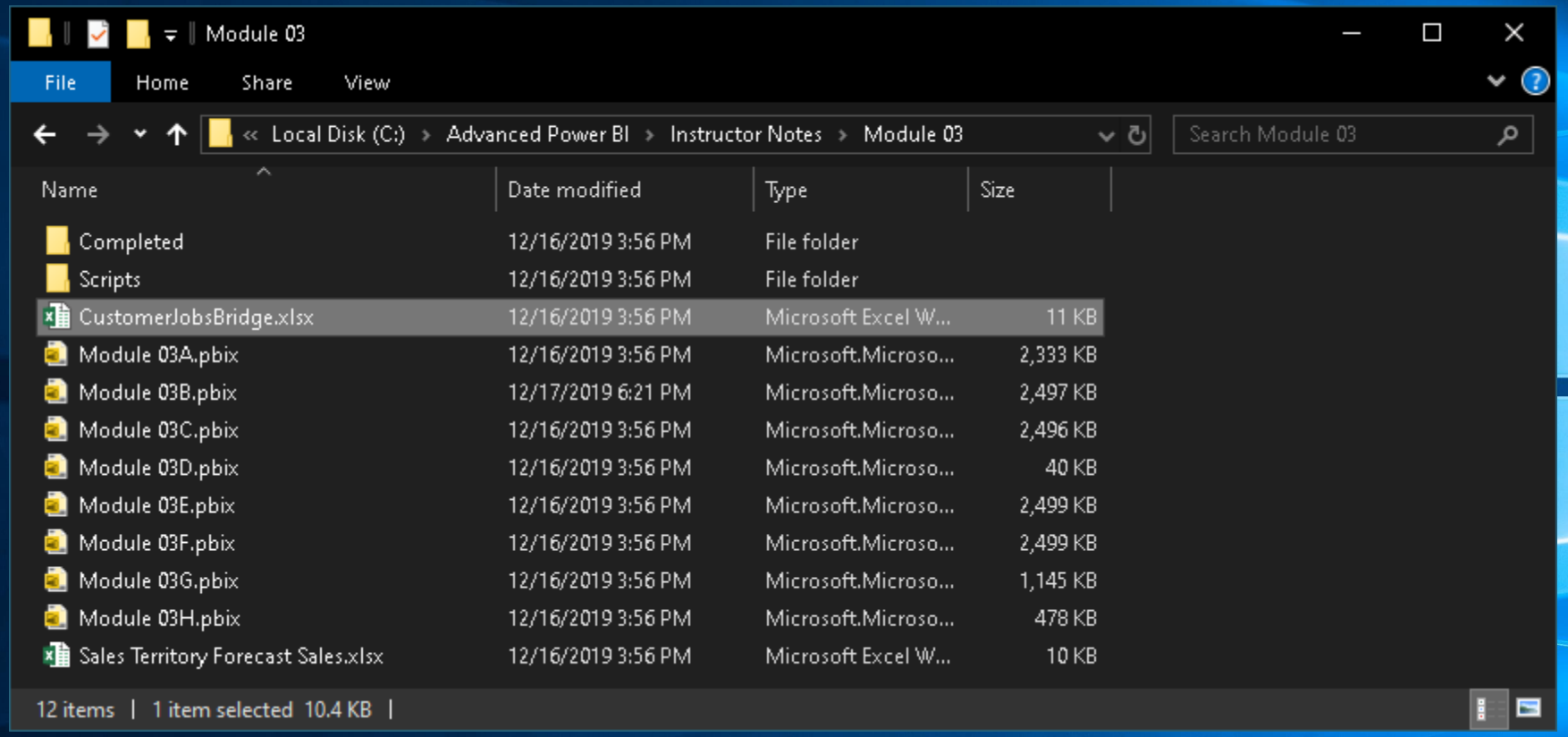
We can notice there's one row per job and one row per customer.

Fields

Search

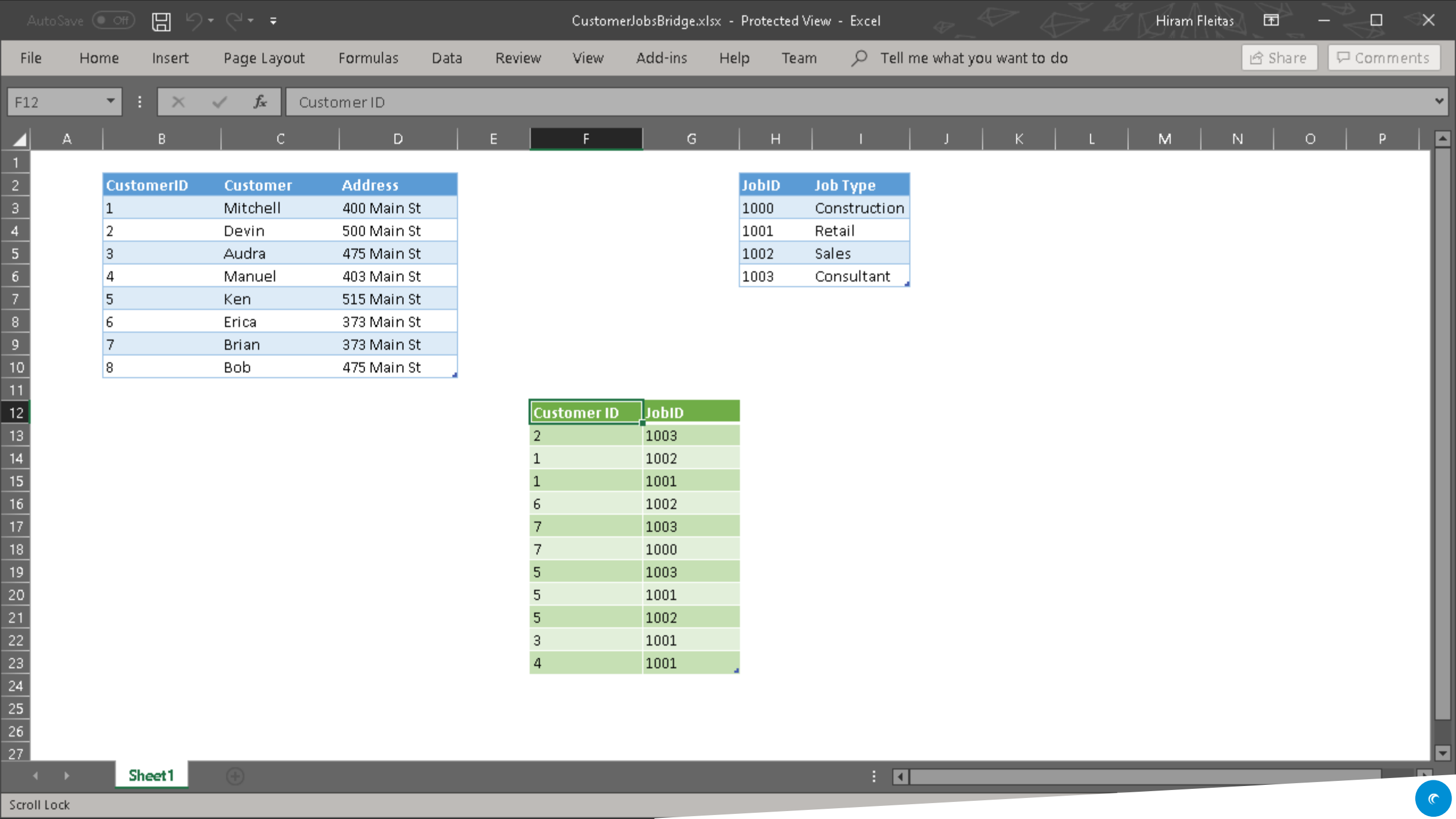
- Customers
  - Address
  - Customer
  - CustomerID
- Jobs
  - Job Type
  - JobID

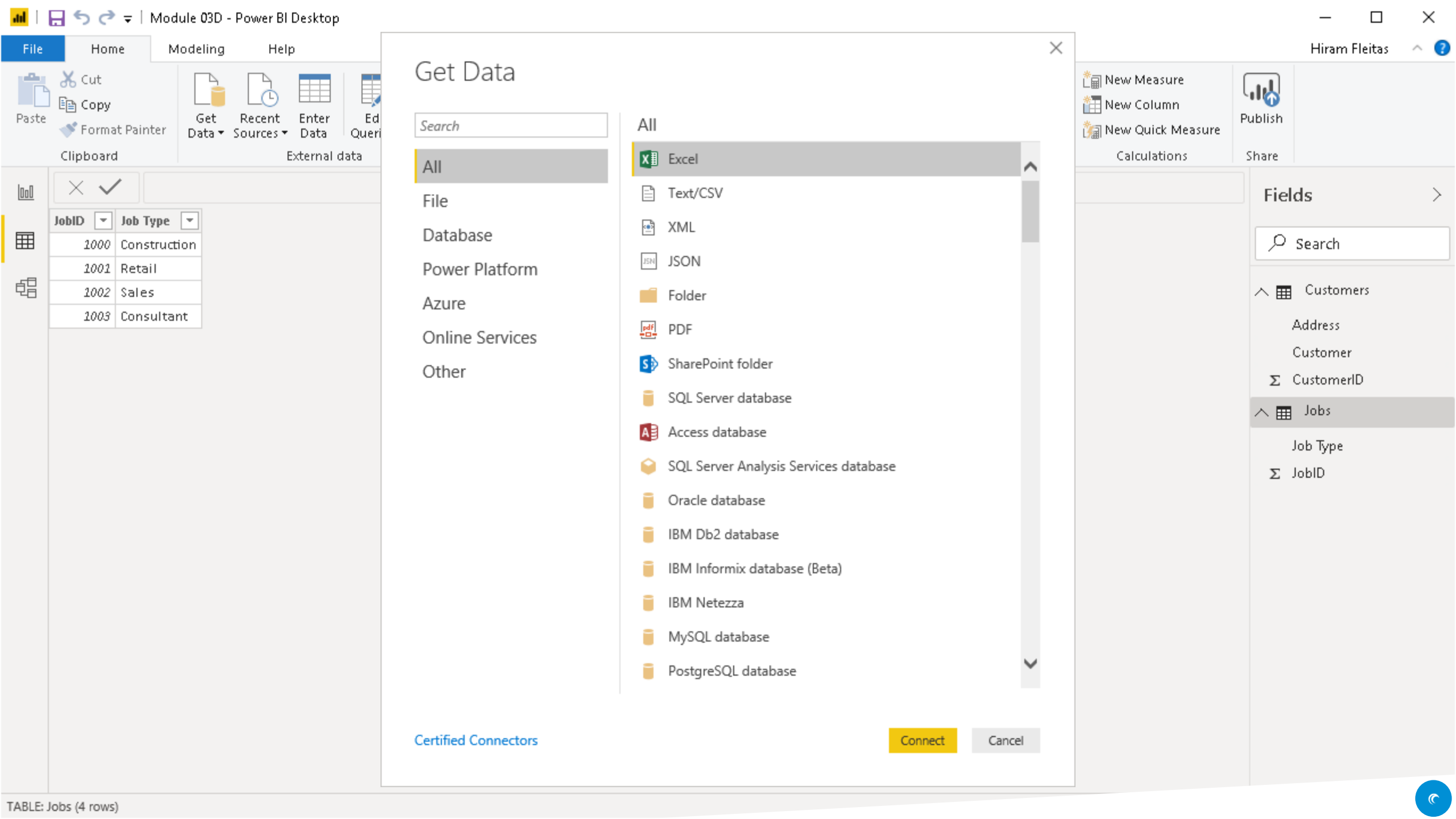
TABLE: Jobs (4 rows)

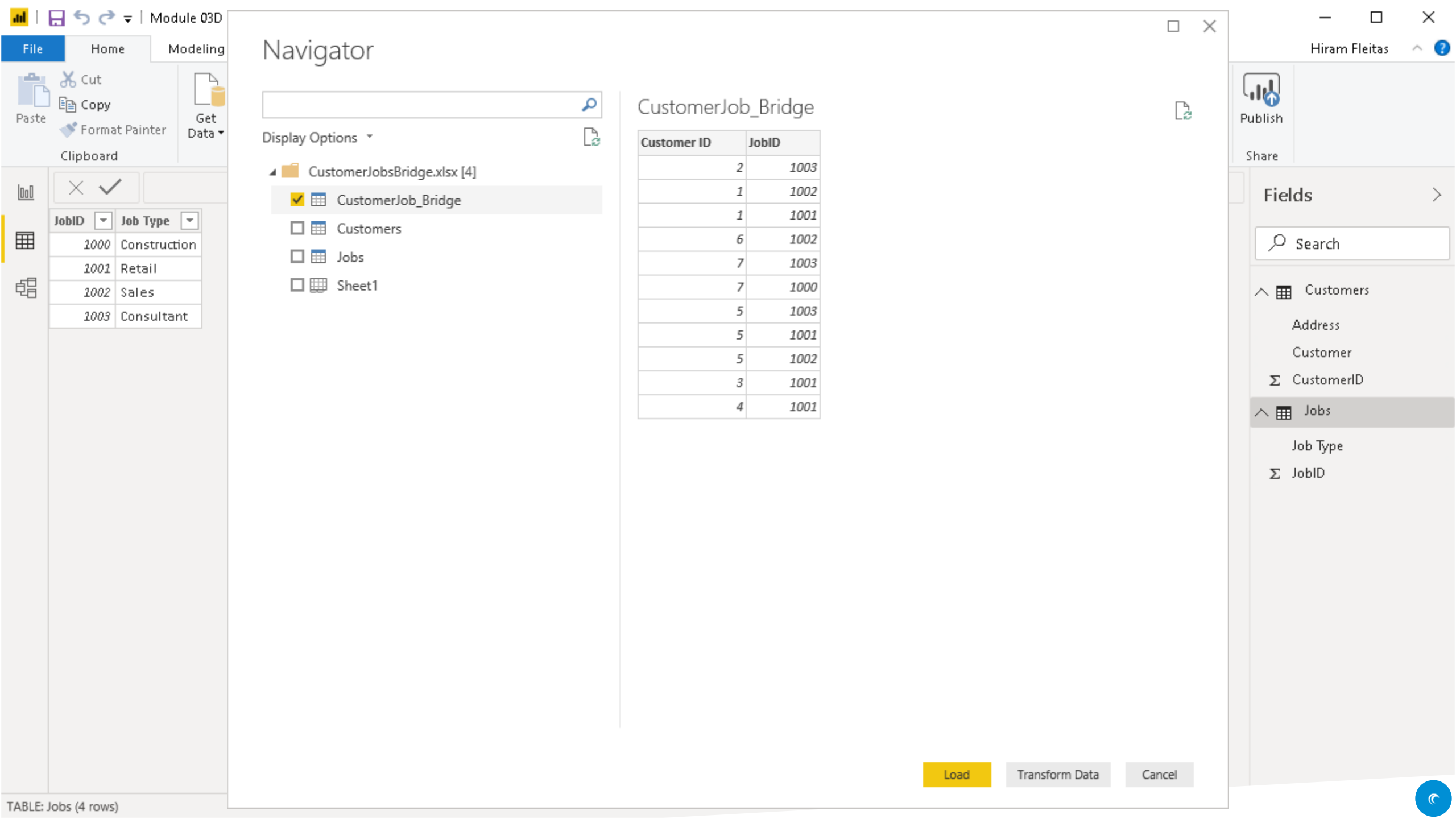


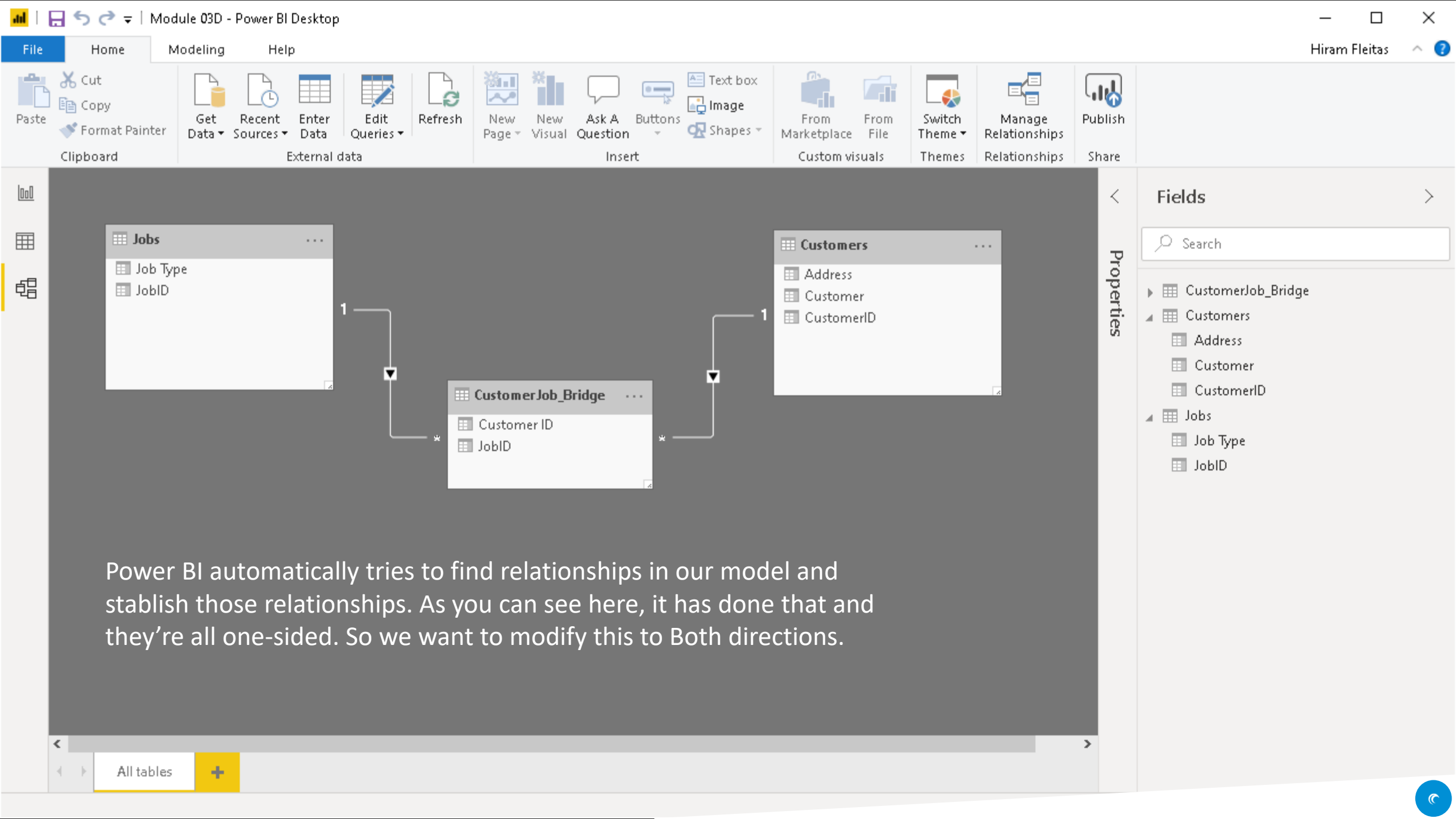
Module 03

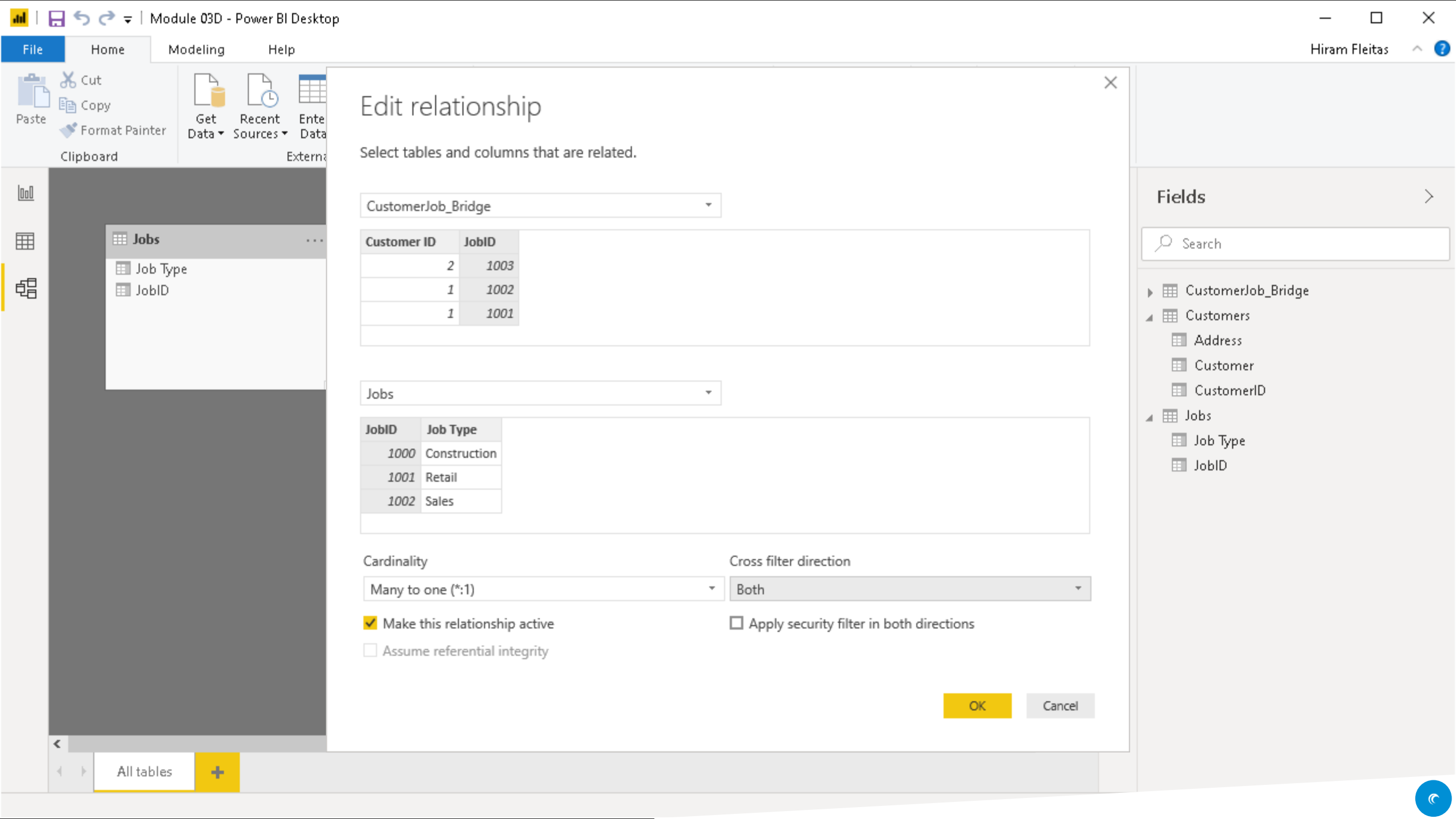
C:\Advanced Power BI\Instructor Notes\Module 03\CustomerJobsBridge.xlsx

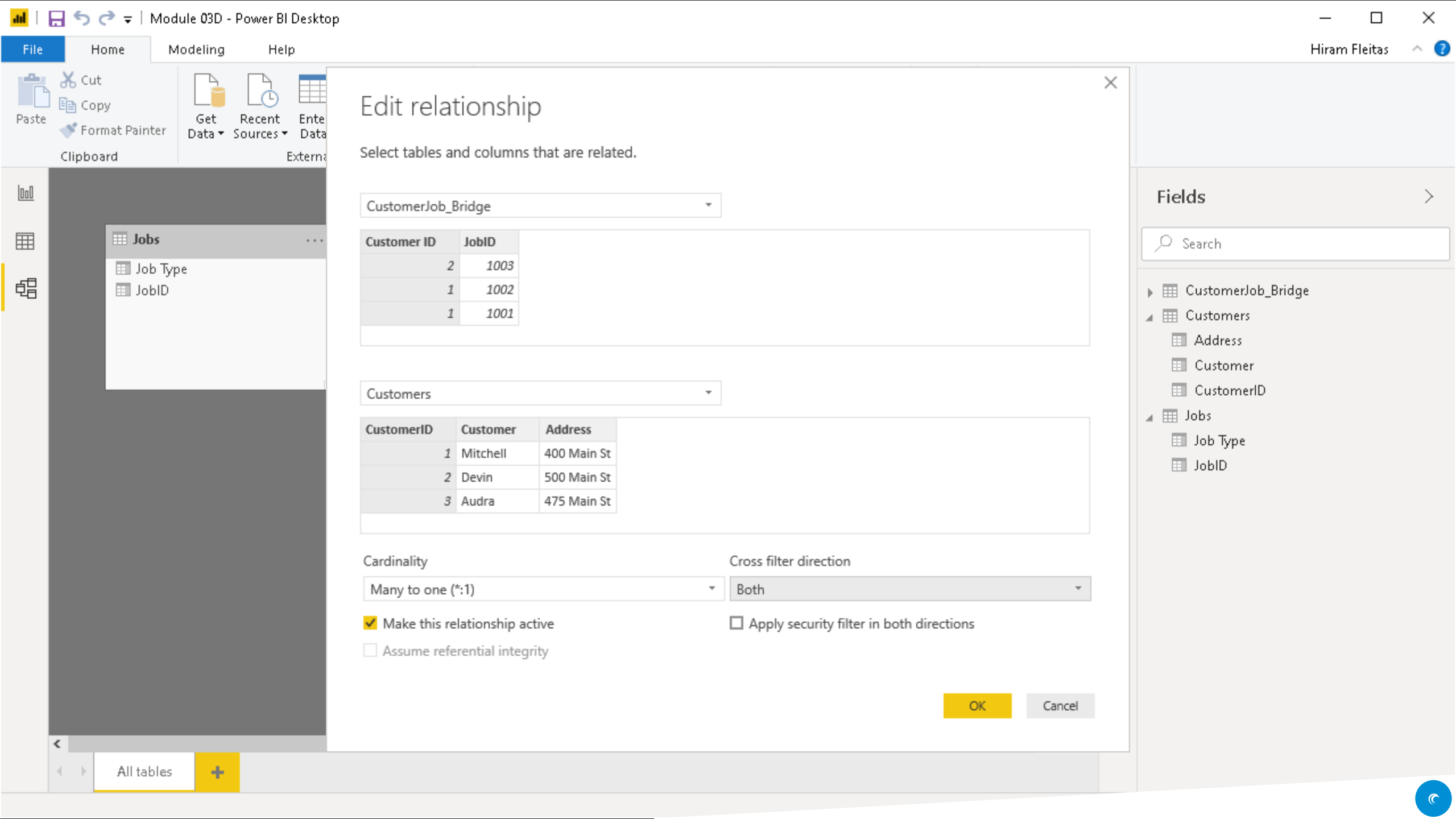

AutoSave Off
CustomerJobsBridge.xlsx - Protected View - Excel
Hiram Fleitas
File Home Insert Page Layout Formulas Data Review View Add-ins Help Team
Tell me what you want to do
Share
Comments
F12
Customer ID
A B C D E F G H I J K L M N O P
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
CustomerID Customer Address
1 Mitchell 400 Main St
2 Devin 500 Main St
3 Audra 475 Main St
4 Manuel 403 Main St
5 Ken 515 Main St
6 Erica 373 Main St
7 Brian 373 Main St
8 Bob 475 Main St
JobID Job Type
1000 Construction
1001 Retail
1002 Sales
1003 Consultant
Customer ID JobID
2 1003
1 1002
1 1001
6 1002
7 1003
7 1000
5 1003
5 1001
5 1002
3 1001
4 1001
Sheet1
Scroll Lock

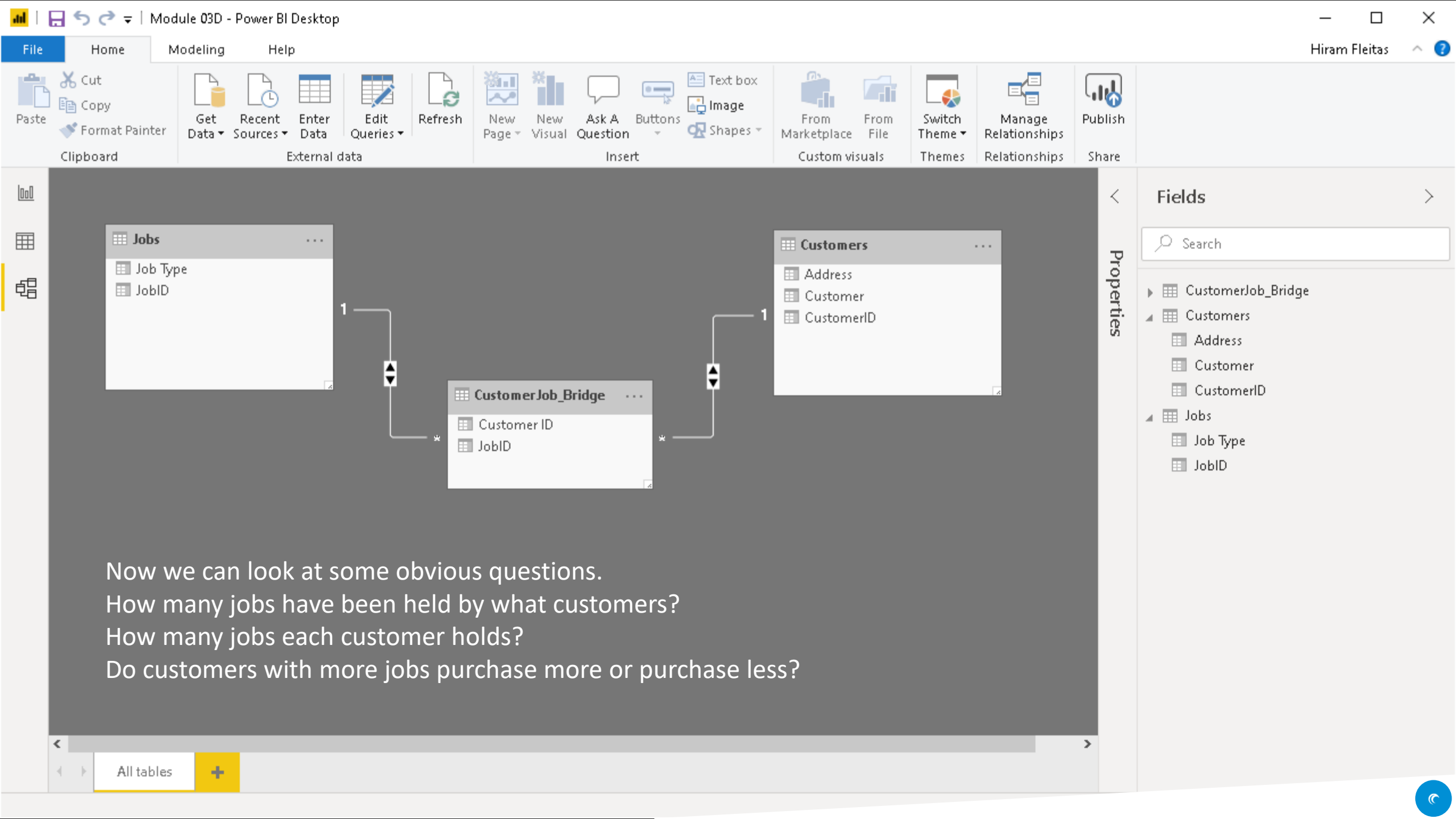

Module 03D - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
External data
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
JobID
Job Type
1000 Construction
1001 Retail
1002 Sales
1003 Consultant
Fields
Search
Customers
Address
Customer
CustomerID
Jobs
Job Type
JobID
Get Data
Search
All
File
Database
Power Platform
Azure
Online Services
Other
All
Excel
Text/CSV
XML
JSON
Folder
PDF
SharePoint folder
SQL Server database
Access database
SQL Server Analysis Services database
Oracle database
IBM Db2 database
IBM Informix database (Beta)
IBM Netezza
MySQL database
PostgreSQL database
Certified Connectors
Connect
Cancel
TABLE: Jobs (4 rows)


Module 03D
File
Home
Modeling
Cut
Copy
Format Painter
Paste
Get Data
Clipboard
Hiram Fleitas
Publish
Share
Navigator
Display Options
CustomerJobsBridge.xlsx [4]
CustomerJob_Bridge
Customers
Jobs
Sheet1
CustomerJob_Bridge
Customer ID
JobID
2 1003
1 1002
1 1001
6 1002
7 1003
7 1000
5 1003
5 1001
5 1002
3 1001
4 1001
Load
Transform Data
Cancel
JobID
Job Type
1000 Construction
1001 Retail
1002 Sales
1003 Consultant
Fields
Search
Customers
Address
Customer
CustomerID
Jobs
Job Type
JobID
TABLE: Jobs (4 rows)


Module 03D - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Jobs
Job Type
JobID
1
*
CustomerJob_Bridge
Customer ID
JobID
*
1
Customers
Address
Customer
CustomerID
Power BI automatically tries to find relationships in our model and stablish those relationships. As you can see here, it has done that and they're all one-sided. So we want to modify this to Both directions.
All tables
Properties
Fields
Search
CustomerJob_Bridge
Customers
Address
Customer
CustomerID
Jobs
Job Type
JobID


Module 03D - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Cut
Copy
Format Painter
Paste
Clipboard
Get Data
Recent Sources
Enter Data
External data
Jobs
Job Type
JobID
Edit relationship
Select tables and columns that are related.
CustomerJob_Bridge
Customer ID
JobID
2
1003
1
1002
1
1001
Jobs
JobID
Job Type
1000
Construction
1001
Retail
1002
Sales
Cardinality
Many to one (*:1)
Cross filter direction
Both
Make this relationship active
Apply security filter in both directions
Assume referential integrity
OK
Cancel
Fields
Search
CustomerJob_Bridge
Customers
Address
Customer
CustomerID
Jobs
Job Type
JobID
All tables


Module 03D - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Cut
Copy
Format Painter
Paste
Clipboard
Get Data
Recent Sources
Enter Data
Edit relationship
Select tables and columns that are related.
CustomerJob_Bridge
Customer ID
JobID
2
1003
1
1002
1
1001
Customers
CustomerID
Customer
Address
1
Mitchell
400 Main St
2
Devin
500 Main St
3
Audra
475 Main St
Cardinality
Many to one (*:1)
Cross filter direction
Both
Make this relationship active
Apply security filter in both directions
Assume referential integrity
OK
Cancel
Jobs
Job Type
JobID
Fields
Search
CustomerJob_Bridge
Customers
Address
Customer
CustomerID
Jobs
Job Type
JobID
All tables


Module 03D - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Jobs
Job Type
JobID
1
*
CustomerJob_Bridge
Customer ID
JobID
*
1
Customers
Address
Customer
CustomerID
Now we can look at some obvious questions.
How many jobs have been held by what customers?
How many jobs each customer holds?
Do customers with more jobs purchase more or purchase less?
All tables
Properties
Fields
Search
CustomerJob_Bridge
Customers
Address
Customer
CustomerID
Jobs
Job Type
JobID

Module 03D - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

```
1 Count of Jobs = Countrows(Jobs)
```

Customer	Count of Jobs
Audra	1
Brian	2
Devin	1
Erica	1
Ken	3
Manuel	1
Mitchell	2
Total	**4**

Created a new measure to get a Count of Jobs cause that is the best practice.

Then added a simple table visual with the two fileds Customer and our new measure Count of Jobs to see how many jobs each customer has held.

Filters

Visualizations

Values

Customer

Count of Jobs

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

Search

CustomerJob_Bridge

Customers

Address

Customer

CustomerID

Jobs

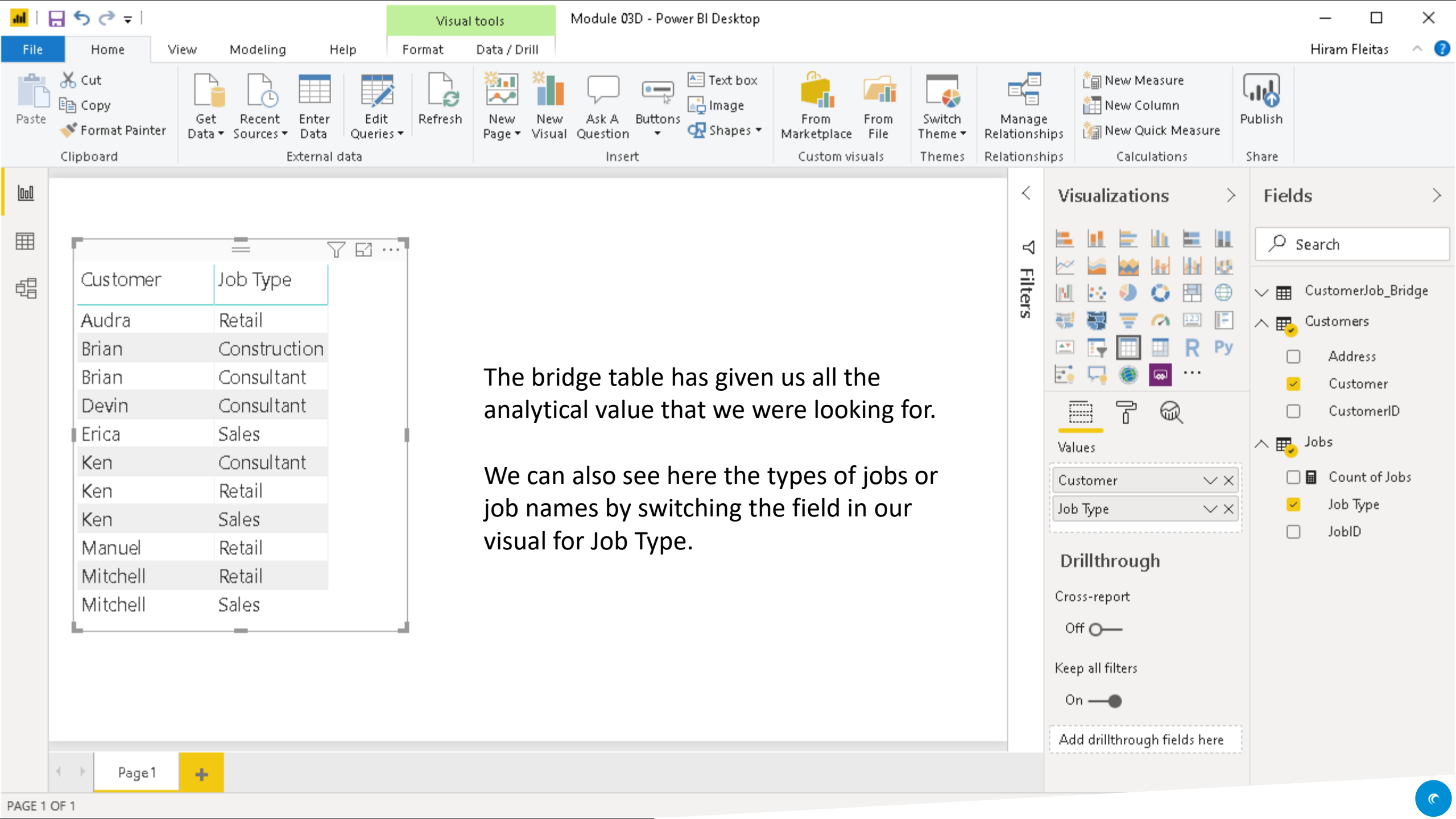
Count of Jobs

Job Type

JobID

Page 1

PAGE 1 OF 1


Visual tools
Module 03D - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Customer
Job Type
Audra
Retail
Brian
Construction
Brian
Consultant
Devin
Consultant
Erica
Sales
Ken
Consultant
Ken
Retail
Ken
Sales
Manuel
Retail
Mitchell
Retail
Mitchell
Sales
The bridge table has given us all the analytical value that we were looking for.
We can also see here the types of jobs or job names by switching the field in our visual for Job Type.
Filters
Visualizations
Values
Customer
Job Type
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
CustomerJob_Bridge
Customers
Address
Customer
CustomerID
Jobs
Count of Jobs
Job Type
JobID
Page 1
PAGE 1 OF 1

Review

Many to Many relationships

User scenarios that try to make it work.
Even try to flatten the table by combining into one that changes the granularity of the table.

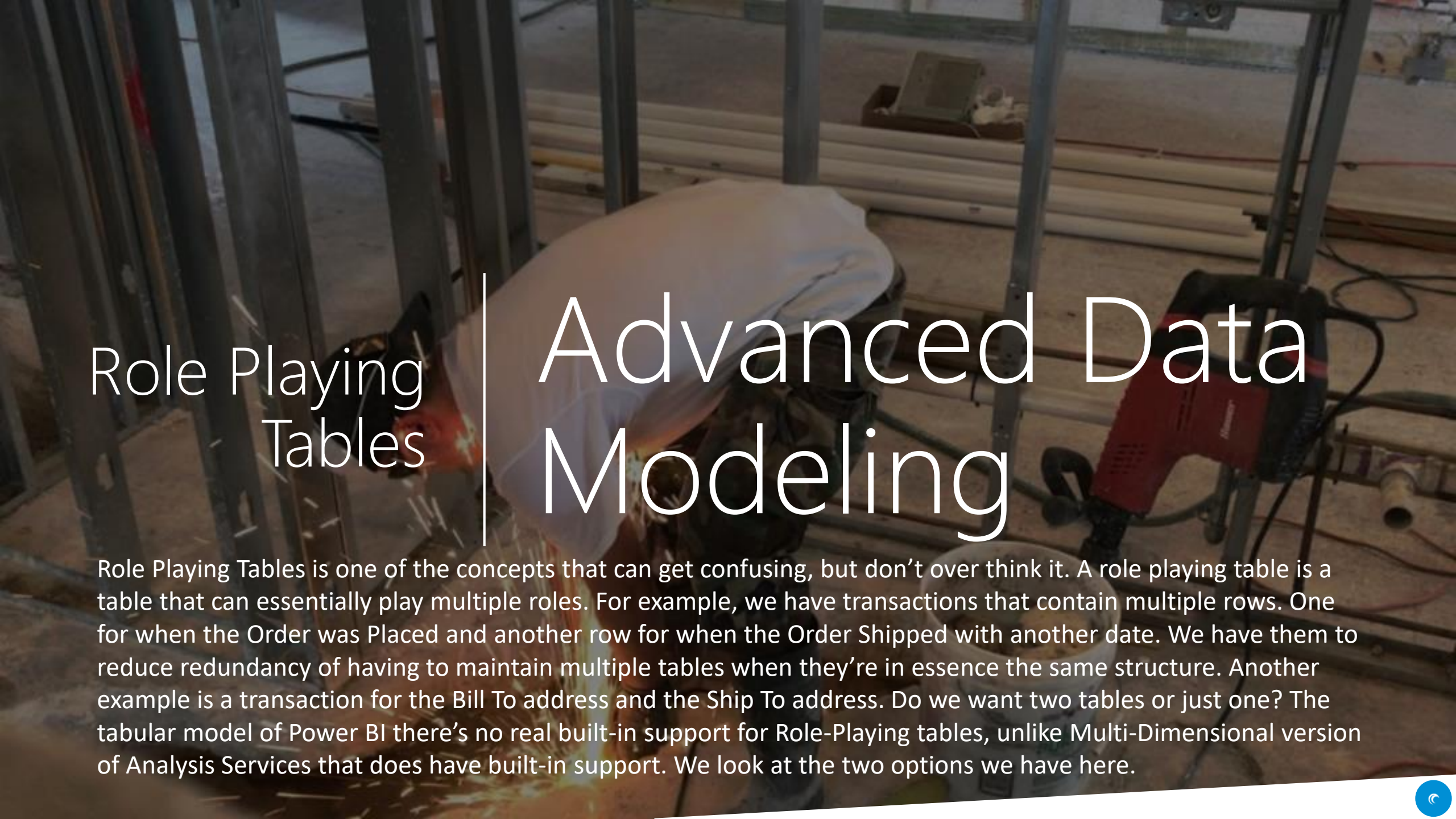
Pop-Up Quiz # 4
bit.ly/pbi18

Bridge table / Factless fact

This will be the better solution for analytical value.

Dimensions explain facts. For example, $1 million in sales is a Fact measure. For what product, country, year? Those attributes are Dimensions.

Factless fact just has the keys for many different tables to store the relationship.



Role Playing Tables

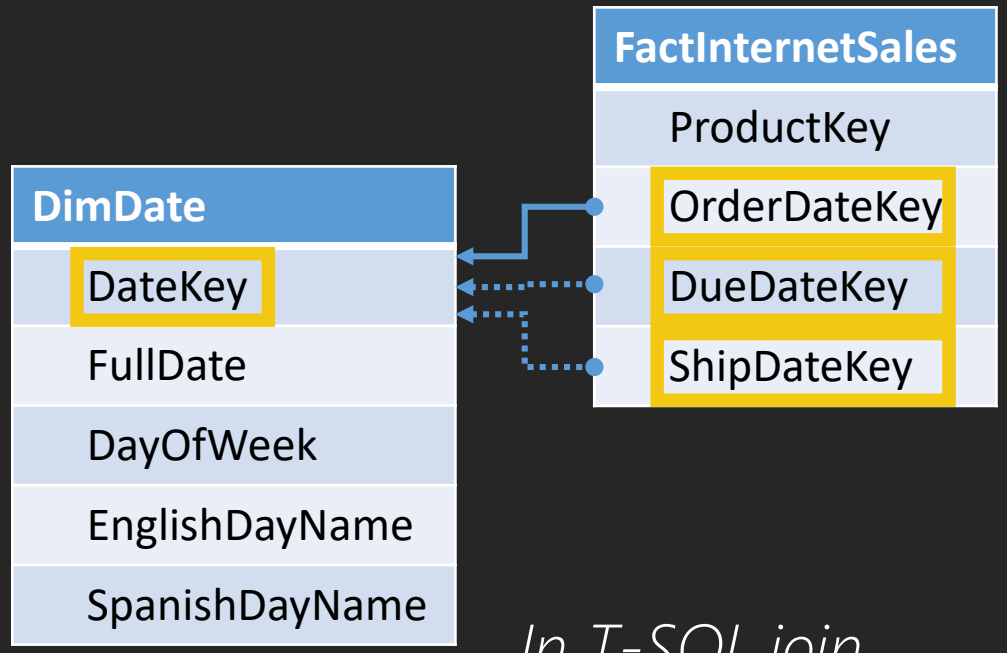
Advanced Data Modeling

Role Playing Tables is one of the concepts that can get confusing, but don't over think it. A role playing table is a table that can essentially play multiple roles. For example, we have transactions that contain multiple rows. One for when the Order was Placed and another row for when the Order Shipped with another date. We have them to reduce redundancy of having to maintain multiple tables when they're in essence the same structure. Another example is a transaction for the Bill To address and the Ship To address. Do we want two tables or just one? The tabular model of Power BI there's no real built-in support for Role-Playing tables, unlike Multi-Dimensional version of Analysis Services that does have built-in support. We look at the two options we have here.

Working with Role Playing Tables

What is a Role Playing Table?

Two tables with multiple relationships to each other.
Reduces redundancy in database.



Role Playing in Power Pivot

Active/Inactive Relationships
You can only have 1 active relationship.
This is why Power BI only has 1 relationship.
Filtering happens based the active relationship.

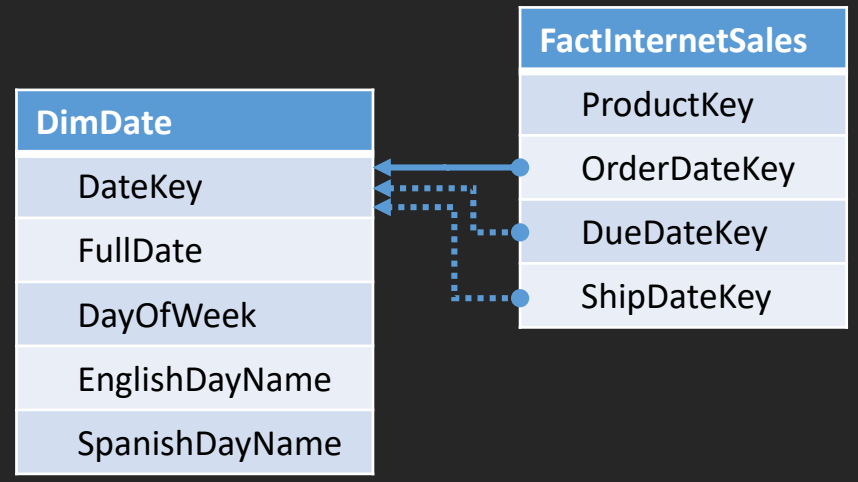
In T-SQL join statement determines which Date to use.

What if, most see it by order date, but someone wants it by ship date?

Working with Role Playing Tables

Navigating Role Playing Tables with DAX

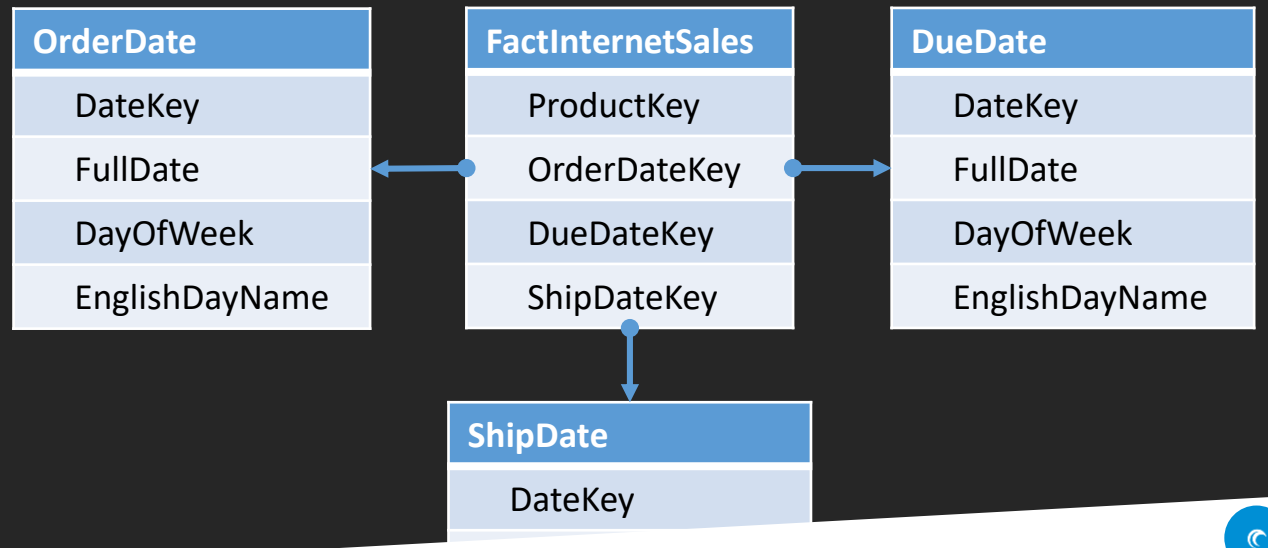
Use DAX USERELATIONSHIP function
Create a Calculated Measure for Every Value you need to use Inactive relationship.

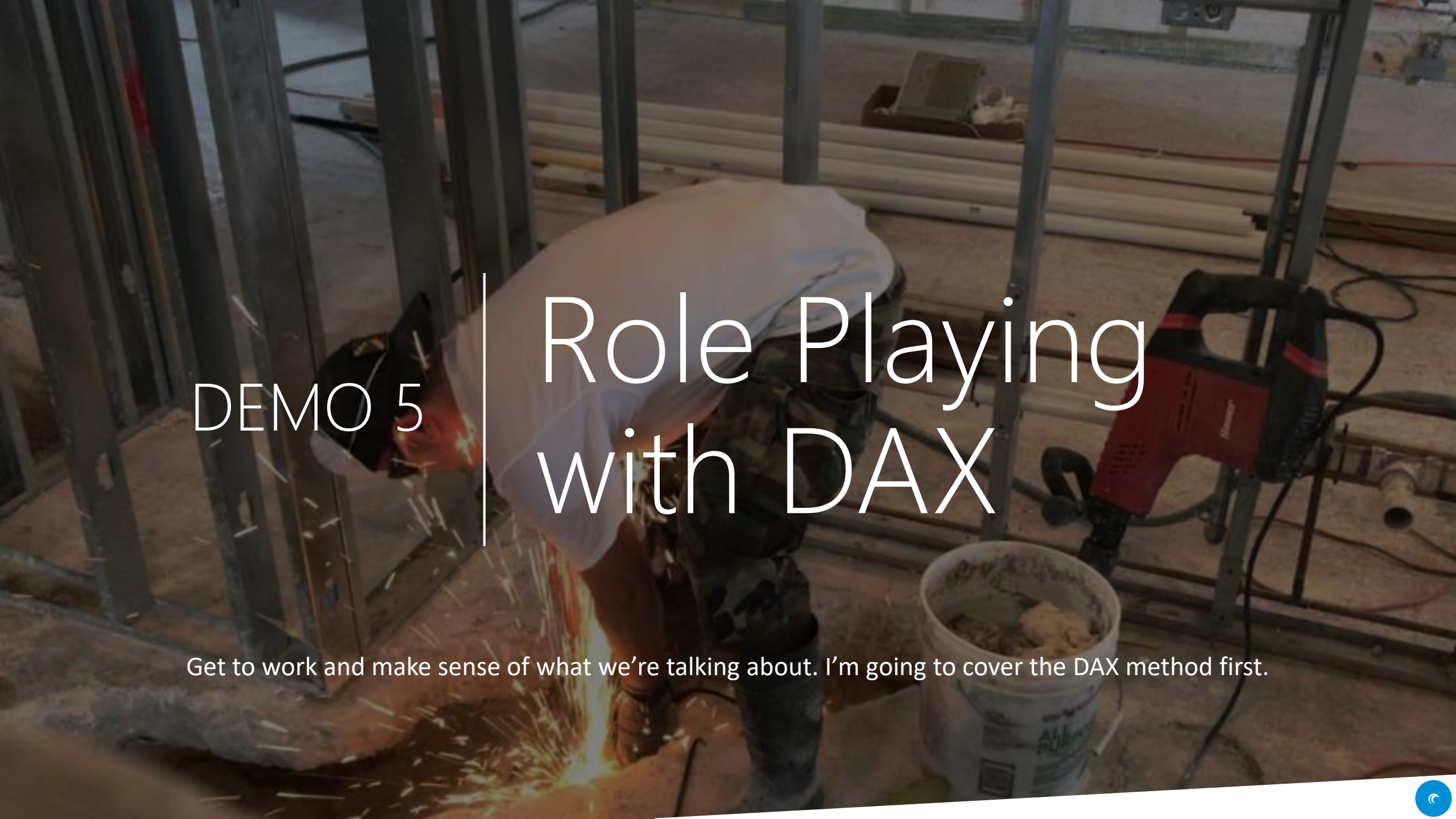



```
=CALCULATE([SalesAmount], USERELATIONSHIP(DimDate[DateKey], FactInternetSales[ShipDate]))
```

Alternate to DAX

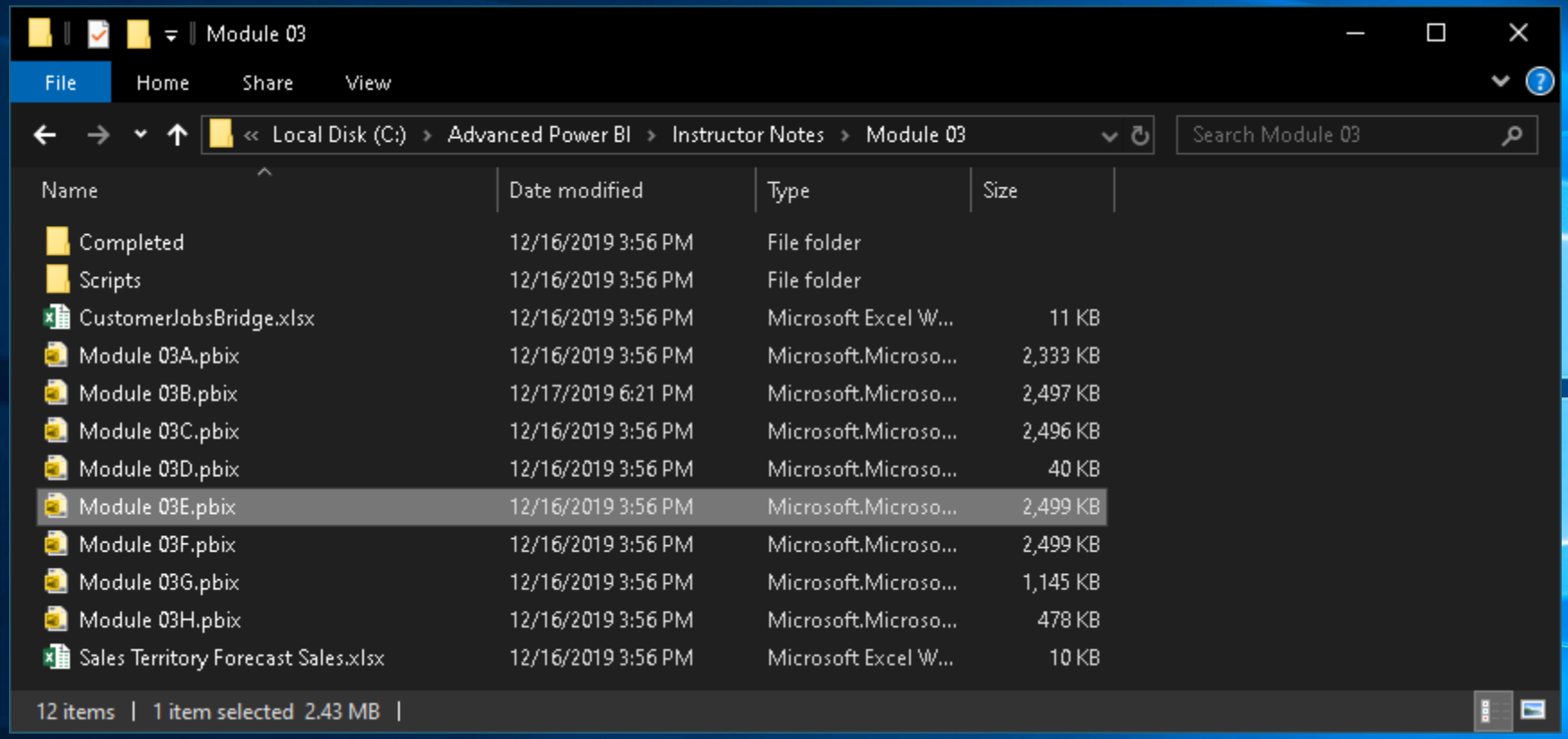
Import same table multiple times.
Rename each table appropriately.
Create a single relationship between tables.





DEMO 5 | Role Playing with DAX

Get to work and make sense of what we're talking about. I'm going to cover the DAX method first.



Module 03

C:\Advanced Power BI\Instructor Notes\Module 03\Module 03E.pbix

Module 03E - Power BI Desktop

File Home View Modeling Help

Hiram Fleitas

Paste Cut Copy Format Painter — Clipboard

Get Data Recent Sources Enter Data — External data

Edit Queries Refresh — External data

New Page New Visual Ask A Question Buttons Text box Image Shapes — Insert

From Marketplace From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure New Column New Quick Measure — Calculations

Publish — Share

```
1 Total Sales = SUM('Internet Sales'[SalesAmount])
```

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Calendar Year	Total Sales
2005	$3,266,373.66
2006	$6,530,343.53
2007	$9,791,060.30
2008	$9,770,899.74
Total	**$29,358,677.22**

Filters

Visualizations

Values

Add data fields here

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

total sales

Internet Sales

Total Sales

Page 1

PAGE 1 OF 1

Module 03E - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Total Sales

$29,358,677.22

Filters

Visualizations

Values

Total Sales

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

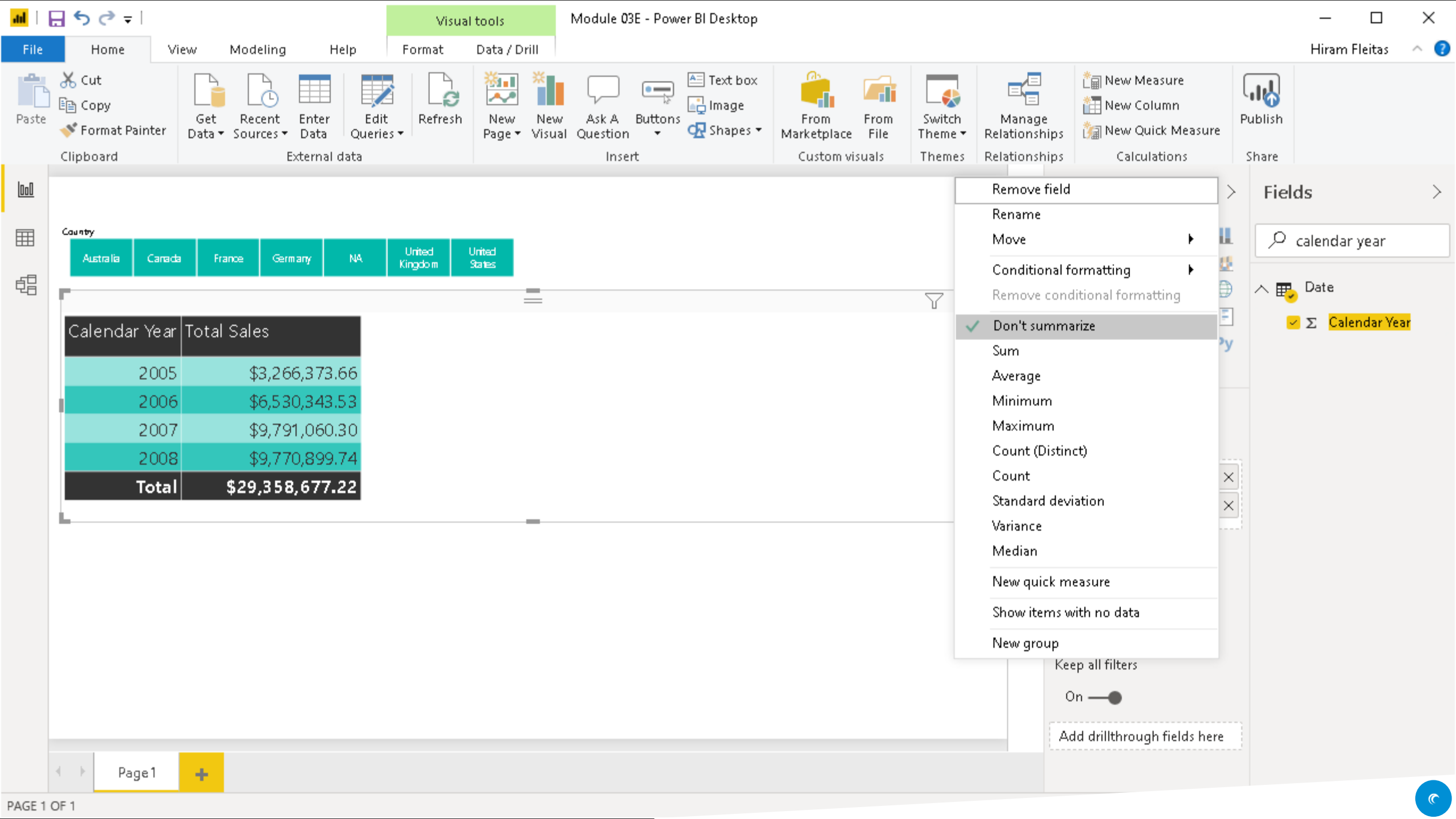
total sales

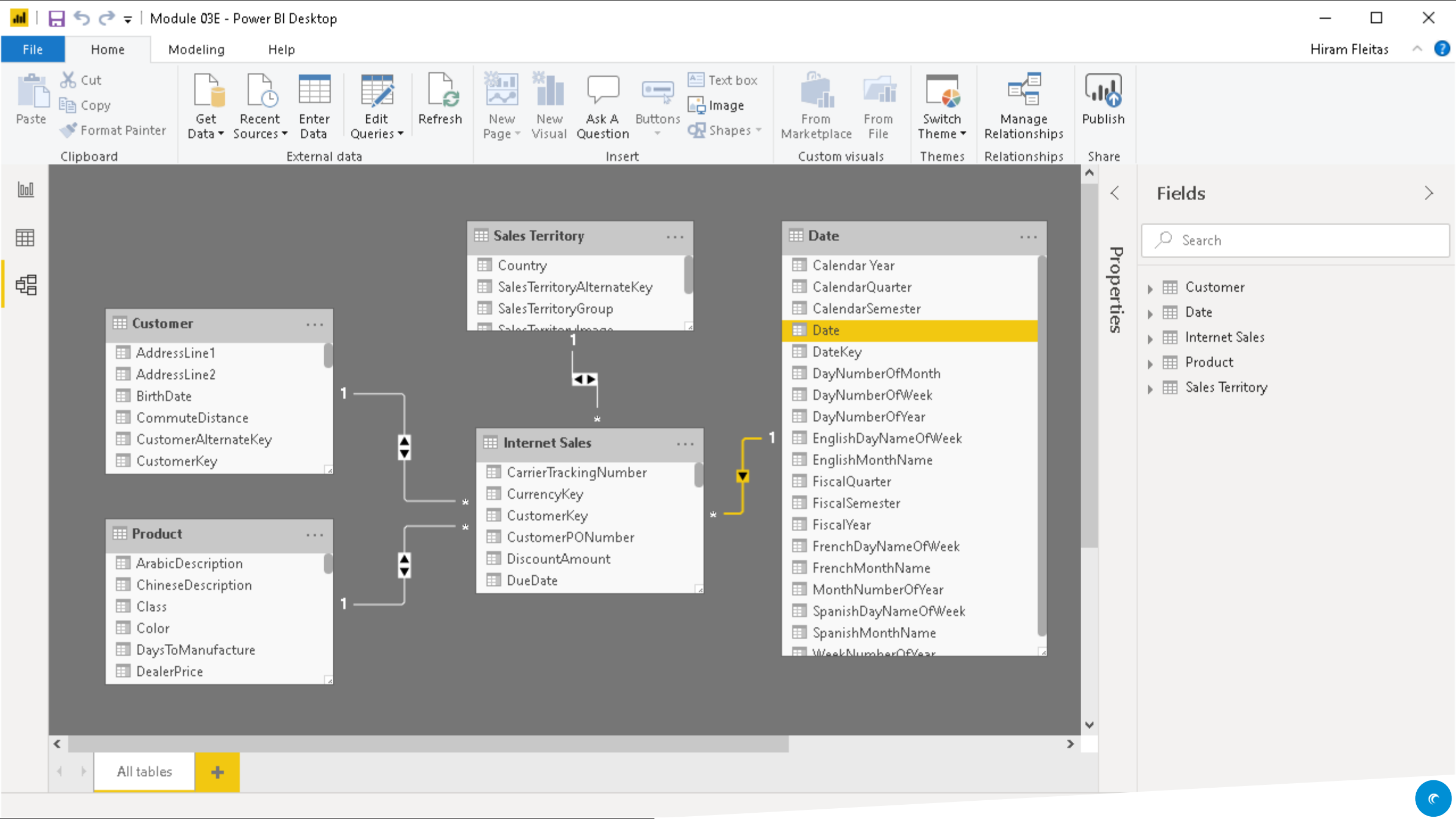
Internet Sales

Total Sales

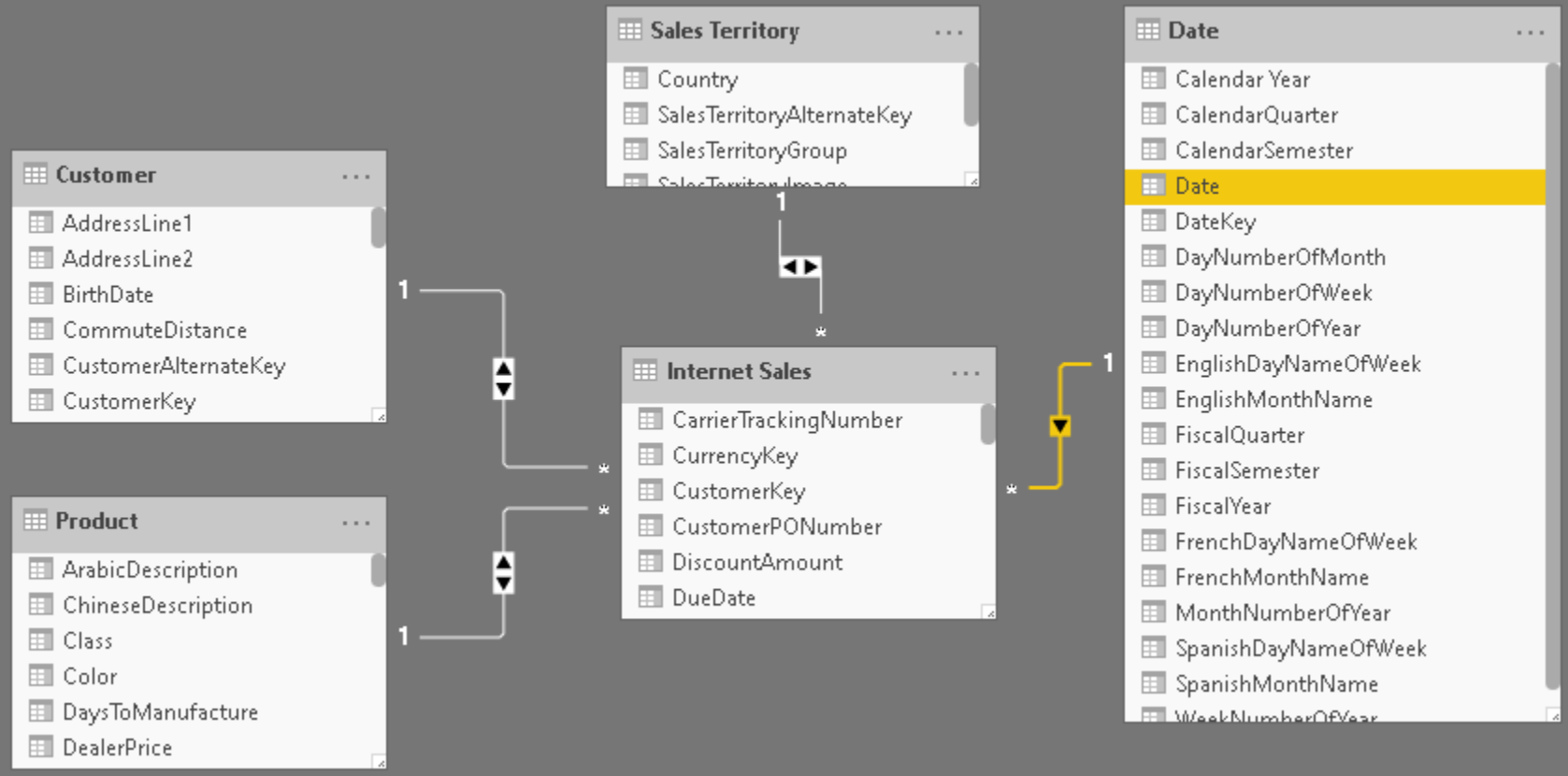
Page 1

PAGE 1 OF 1

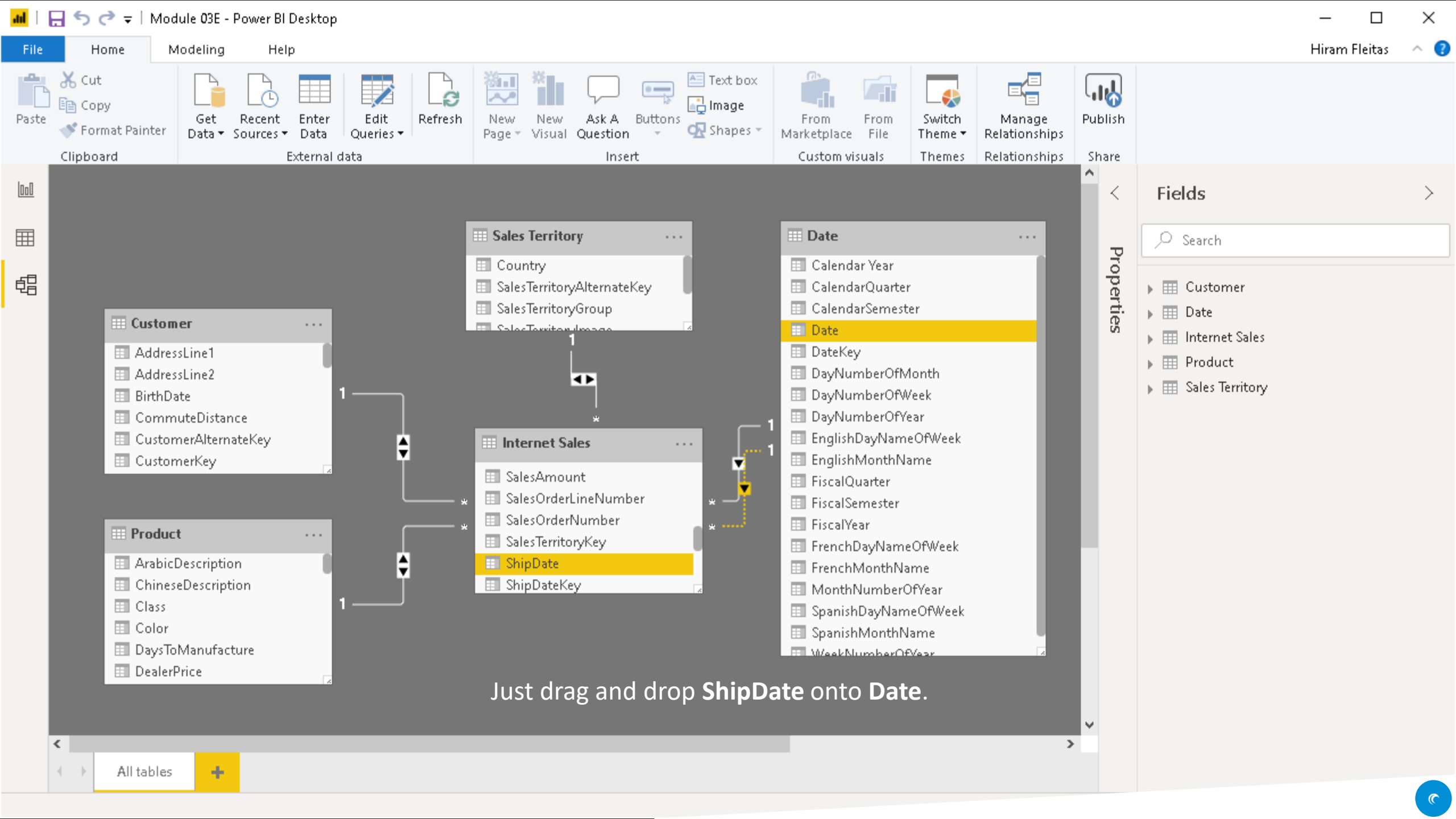

Module 03E - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Country
Australia
Canada
France
Germany
NA
United Kingdom
United States
Calendar Year
Total Sales
2005
$3,266,373.66
2006
$6,530,343.53
2007
$9,791,060.30
2008
$9,770,899.74
Total
$29,358,677.22
Remove field
Rename
Move
Conditional formatting
Remove conditional formatting
Don't summarize
Sum
Average
Minimum
Maximum
Count (Distinct)
Count
Standard deviation
Variance
Median
New quick measure
Show items with no data
New group
Fields
calendar year
Date
Calendar Year
Keep all filters
On
Add drillthrough fields here
Page 1
PAGE 1 OF 1

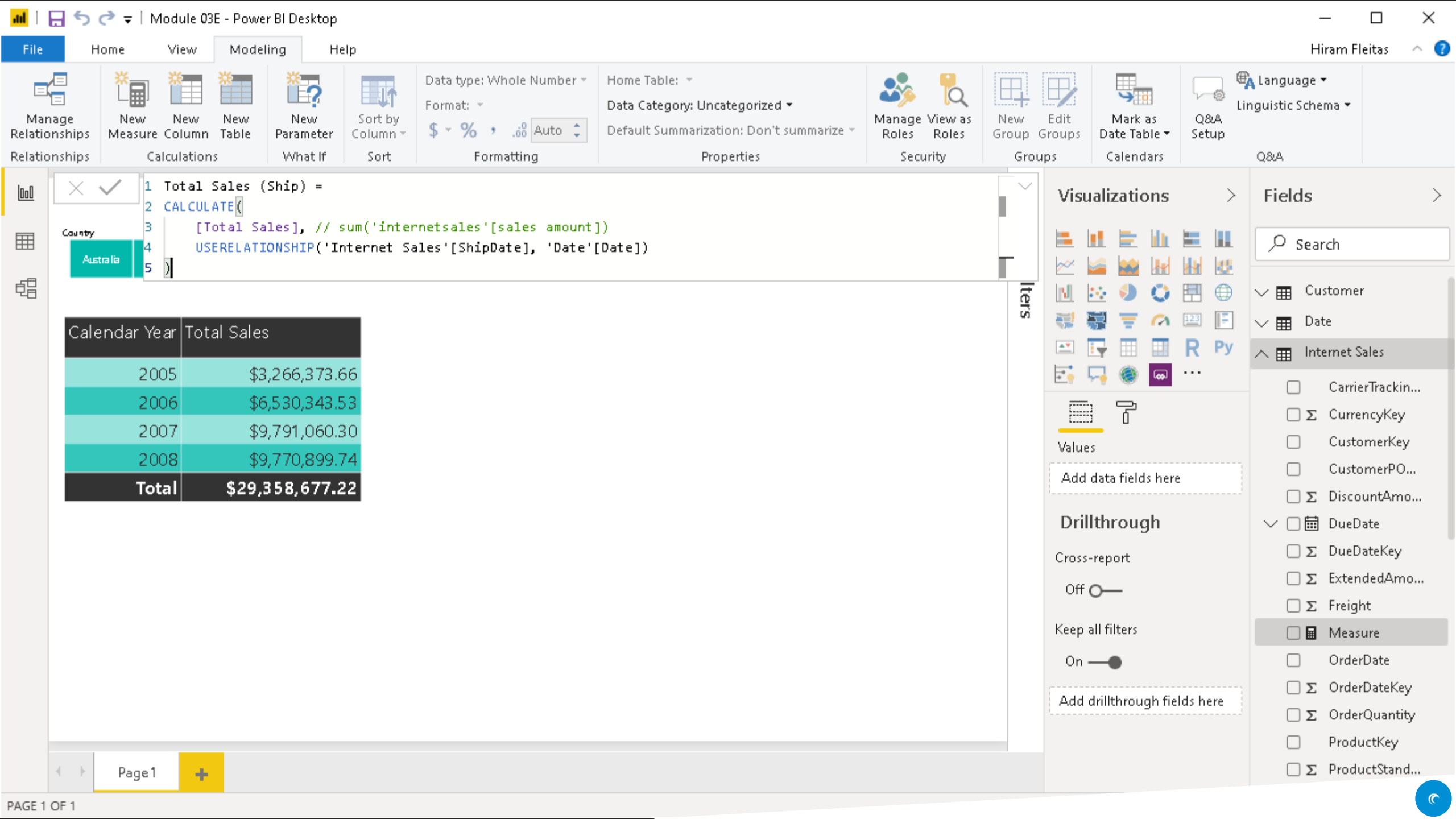

Module 03E - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
Date
Calendar Year
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
MonthNumberOfYear
SpanishDayNameOfWeek
SpanishMonthName
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
1
*
Properties
Fields
Search
Customer
Date
Internet Sales
Product
Sales Territory
All tables

Because of the relationship in this data model, all of the filtering is going to take place on the order Date.



However, you can multiple inactive relationships between two tables. Before you can use the DAX method, you need to build an inactive relationship between the two tables.


Module 03E - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
Date
Calendar Year
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
MonthNumberOfYear
SpanishDayNameOfWeek
SpanishMonthName
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Internet Sales
SalesAmount
SalesOrderLineNumber
SalesOrderNumber
SalesTerritoryKey
ShipDate
ShipDateKey
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Just drag and drop ShipDate onto Date.
Properties
Fields
Search
Customer
Date
Internet Sales
Product
Sales Territory
All tables


Module 03E - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format:
Auto
Home Table:
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Total Sales (Ship) =
2 CALCULATE(
3 [Total Sales], // sum('internetsales'[sales amount])
4 USERELATIONSHIP('Internet Sales'[ShipDate], 'Date'[Date])
5)
Country
Australia
Calendar Year
Total Sales
2005
$3,266,373.66
2006
$6,530,343.53
2007
$9,791,060.30
2008
$9,770,899.74
Total
$29,358,677.22
Visualizations
Values
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
Customer
Date
Internet Sales
CarrierTrackin...
CurrencyKey
CustomerKey
CustomerPO...
DiscountAmo...
DueDate
DueDateKey
ExtendedAmo...
Freight
Measure
OrderDate
OrderDateKey
OrderQuantity
ProductKey
ProductStand...
Page 1
PAGE 1 OF 1

Module 03E - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column

Data type: Decimal Number | Format: $ English (United States) | $ % , .00 2

Home Table: Internet Sales | Data Category: Uncategorized | Default Summarization: Don't summarize

Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Total Sales (Ship) =
```

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Calendar Year	Total Sales	Total Sales (Ship)
2005	$3,266,373.66	$3,105,587.33
2006	$6,530,343.53	$6,576,978.98
2007	$9,791,060.30	$9,517,548.53
2008	$9,770,899.74	$10,158,562.38
Total	**$29,358,677.22**	**$29,358,677.22**

Filters

Visualizations

Values

Calendar Year

Total Sales

Total Sales (Ship)

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

Search

Customer

Date

Internet Sales

CarrierTrackin...

CurrencyKey

CustomerKey

CustomerPO...

DiscountAmo...

DueDate

DueDateKey

ExtendedAmo...

Freight

OrderDate

OrderDateKey

OrderQuantity

ProductKey

ProductStand...

Profit

Page 1

PAGE 1 OF 1

Review

Role Playing Table

Simple a table with multiple roles.
Reduces redundancy

Pop-Up Quiz # 5
bit.ly/pbi18

Active/Inactive Relationship

We can only have a single active relationship in the data model.
All of the filtering occurs on that active relationship.
Create inactive relationships and can use DAX measures.

DAX vs Multiple Date Tables

Alterative is multiple date tables.
Tips around complexity and organizational.

Importing Multiple Date Tables

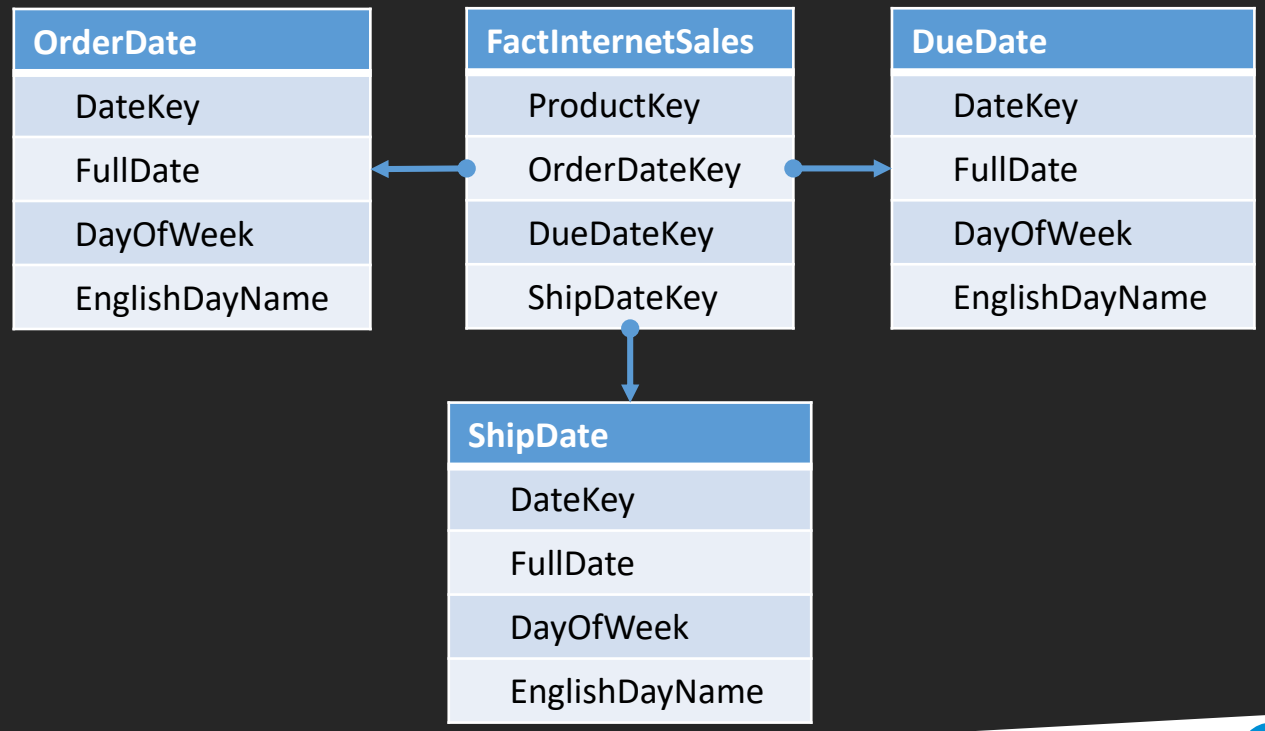
Advanced Data Modeling

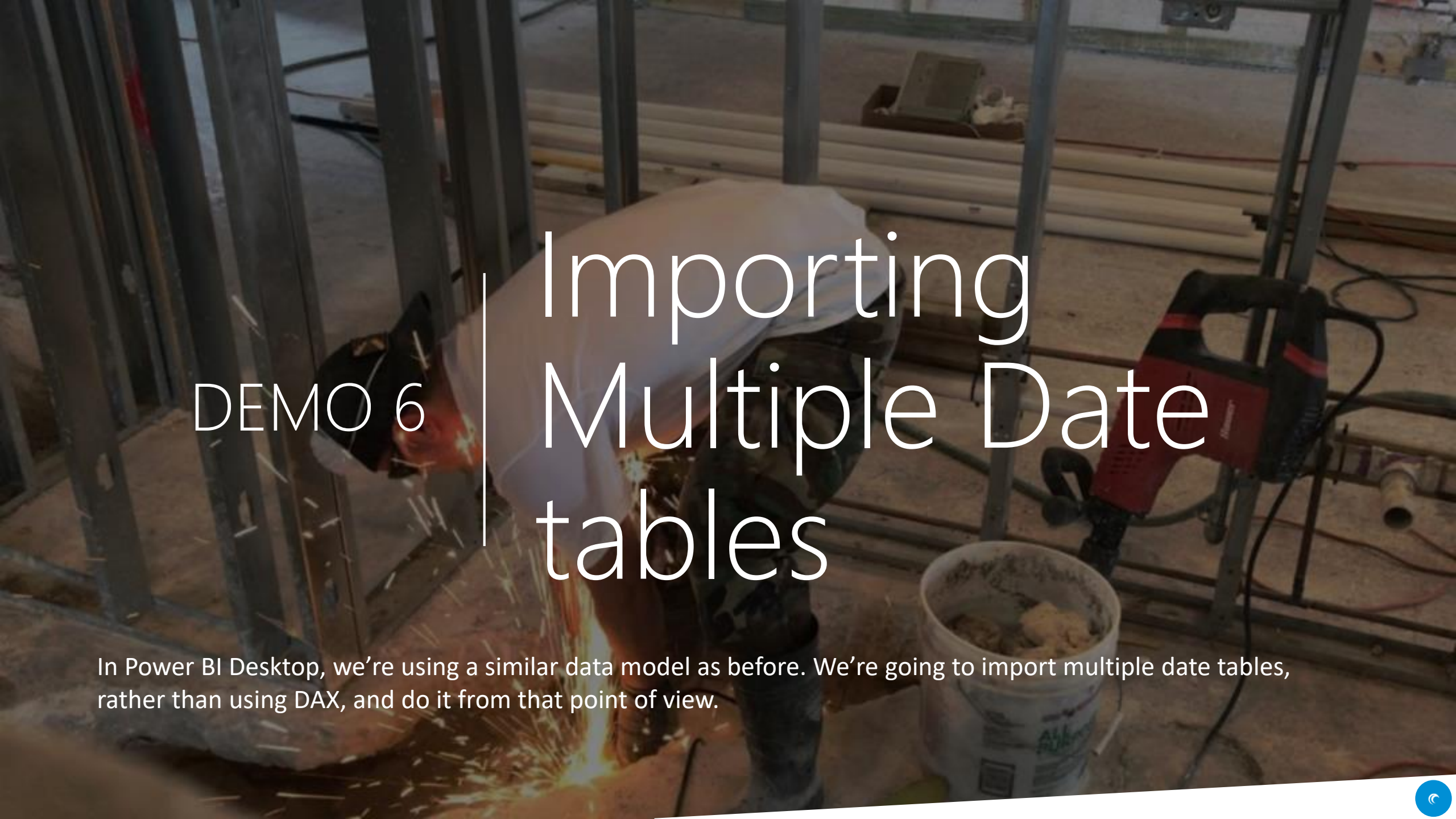
DAX is not the preferred method because there’s some complexity and the difficulty of training the end-users. Now we’re going to go through the process of importing multiple date tables, building those relationships and getting unique analytical insights.

Working with Role Playing Tables

Alternate to DAX

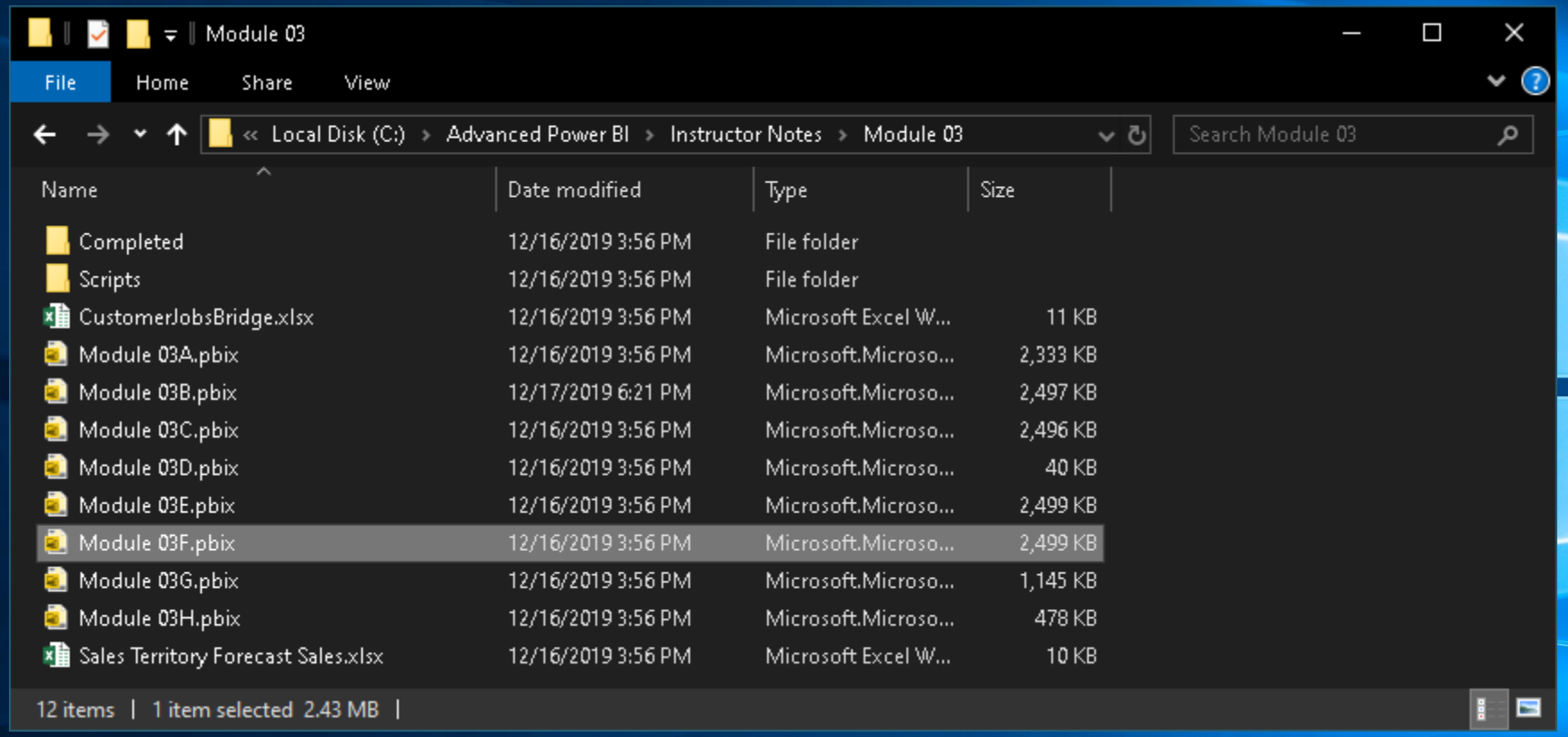
Import same table multiple times.
Rename each table appropriately.
Create a single relationship between tables.
Probably rename some of the columns.
Update the rows within columns.
This is going to be the prefered method.





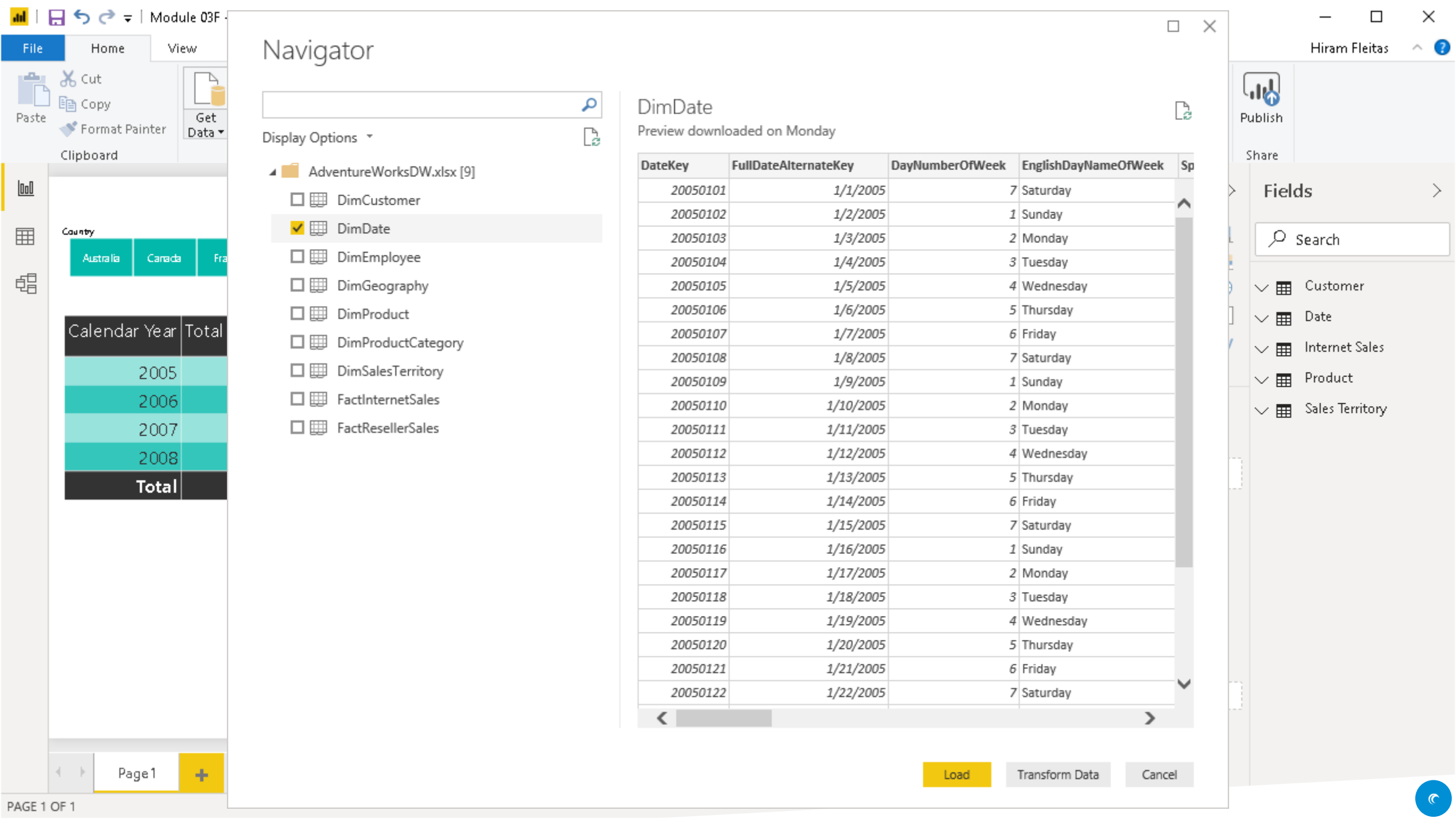
DEMO 6 | Importing Multiple Date tables

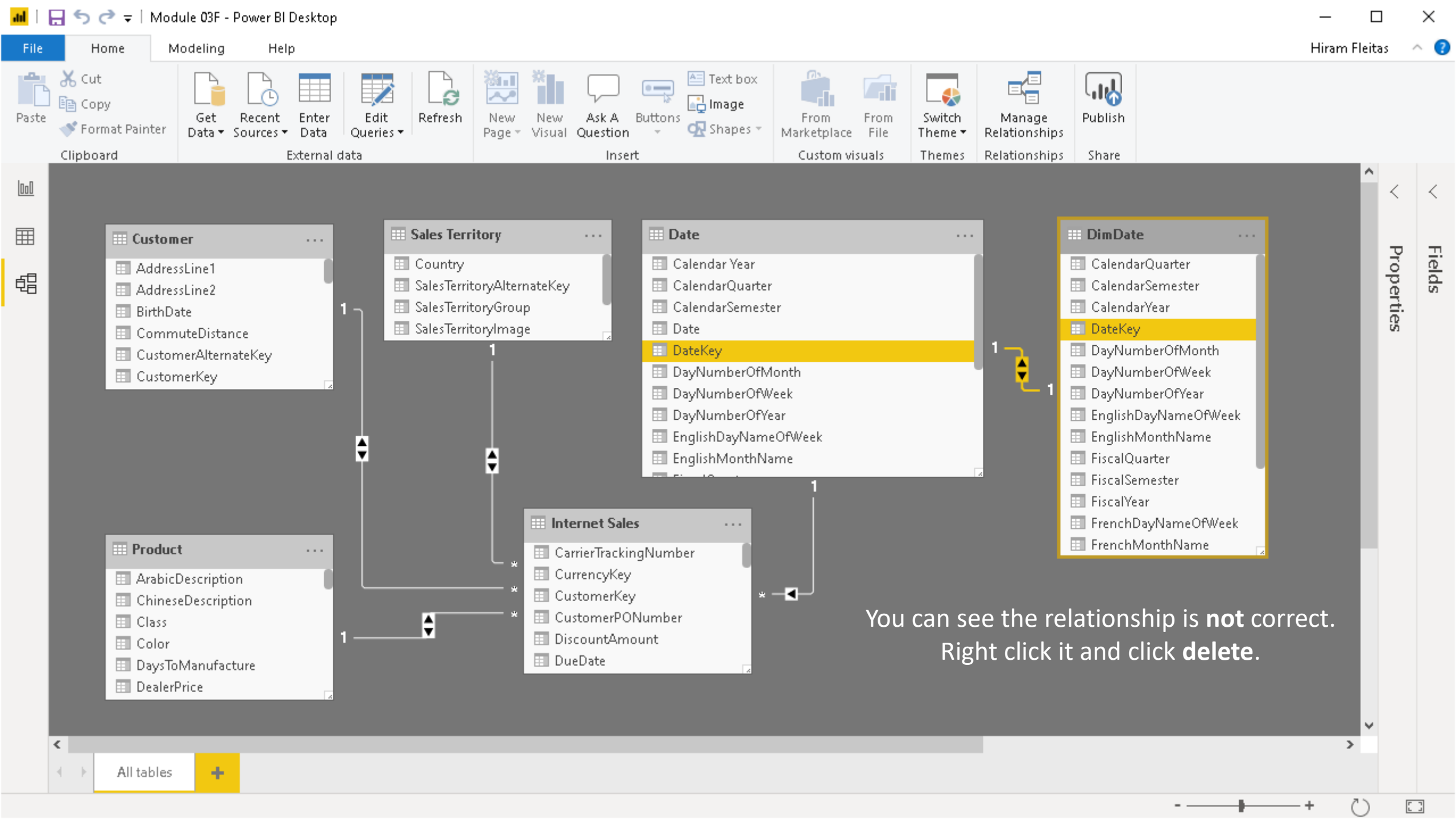
In Power BI Desktop, we're using a similar data model as before. We're going to import multiple date tables, rather than using DAX, and do it from that point of view.

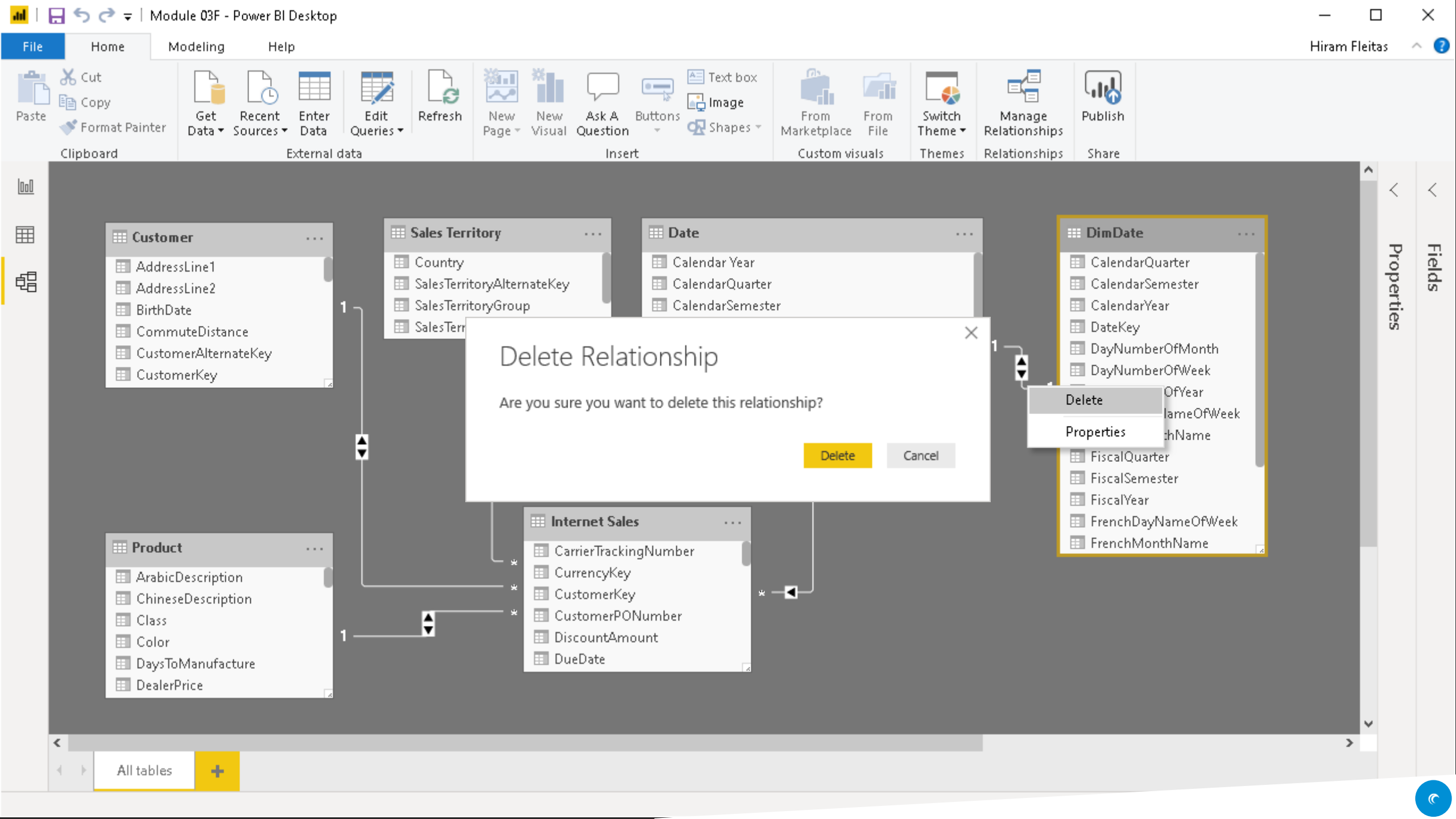


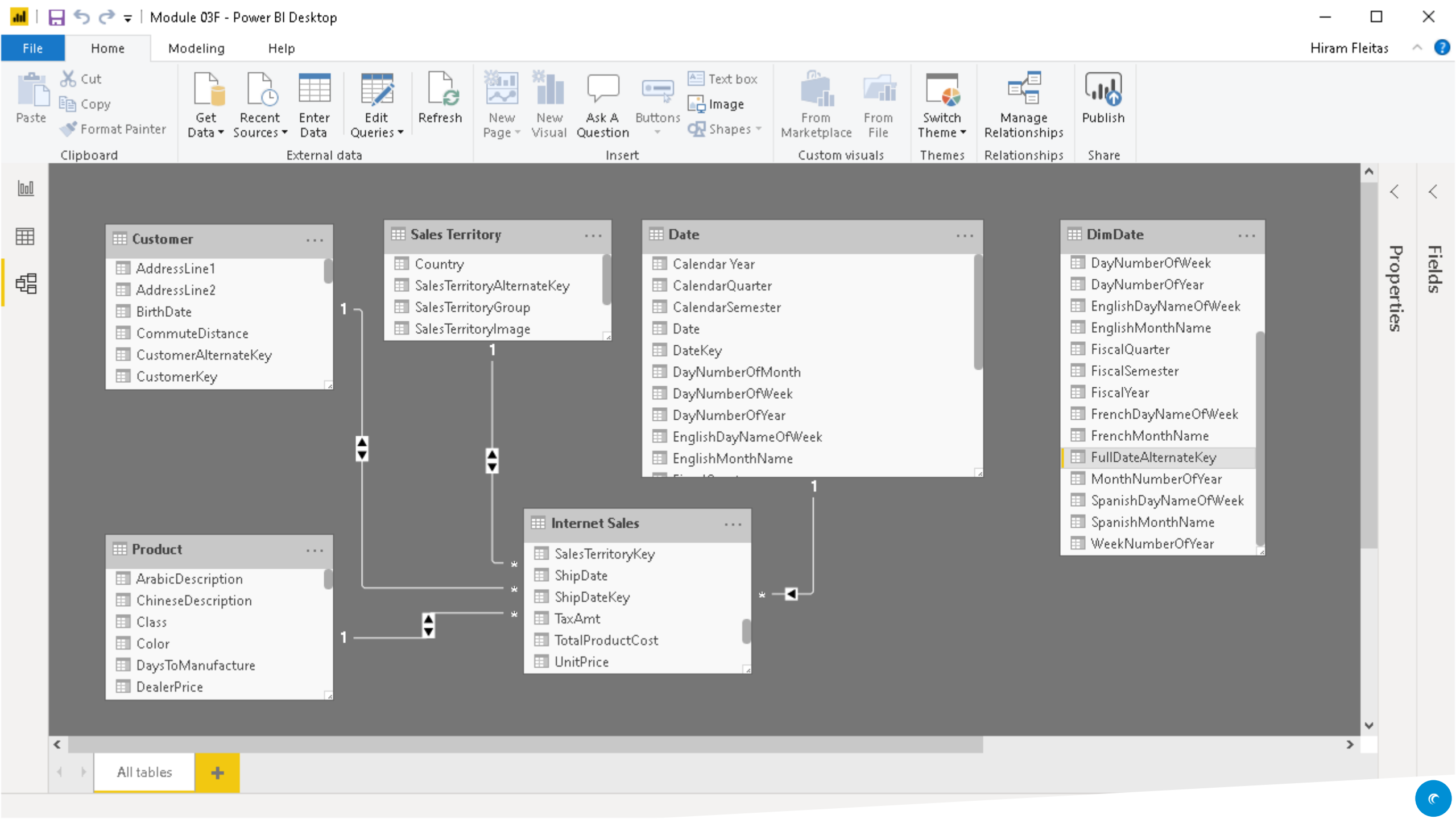
Module 03

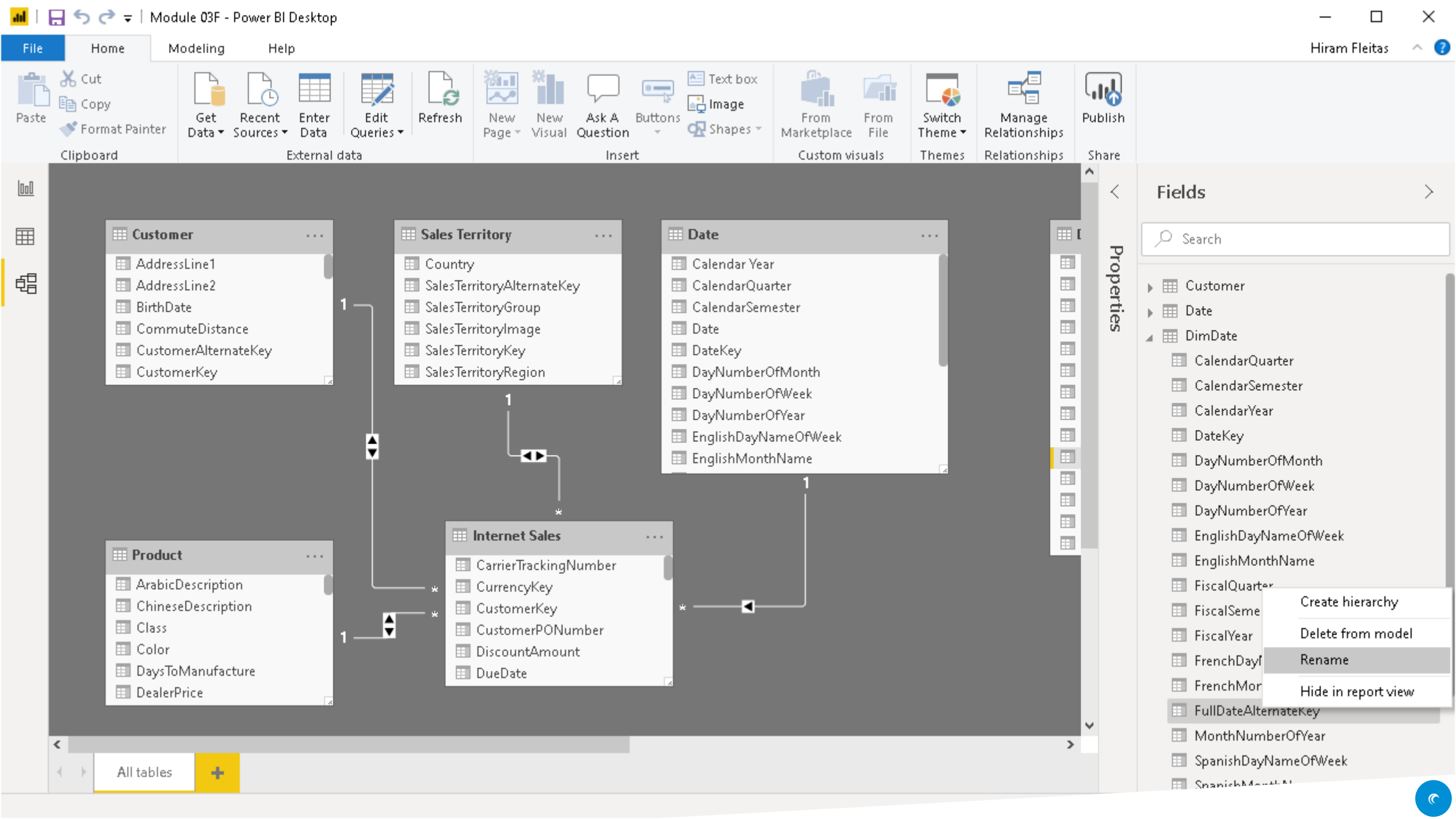
C:\Advanced Power BI\Instructor Notes\Module 03\Module 03F.pbix

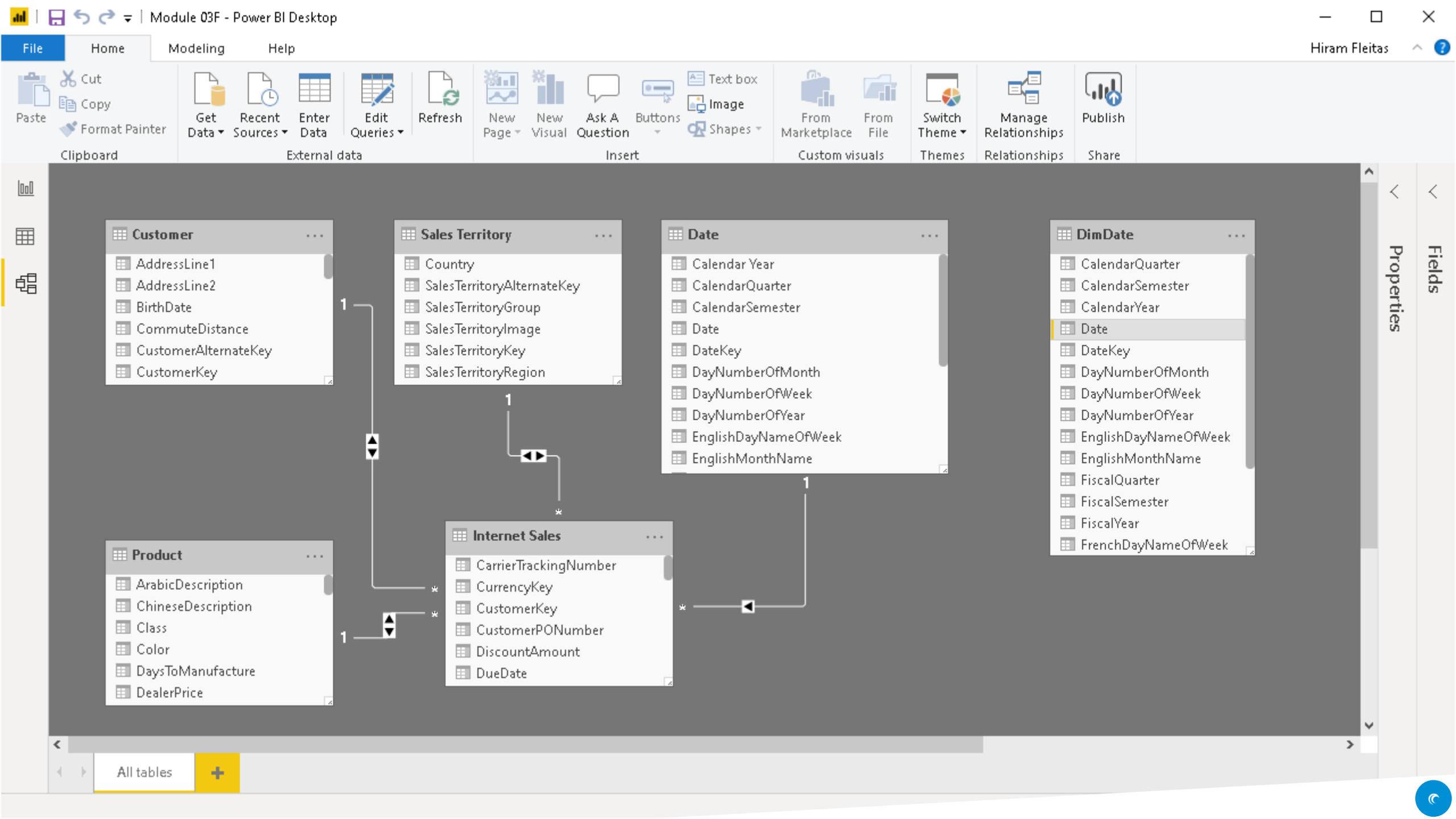

Module 03F
File
Home
View
Cut
Copy
Format Painter
Paste
Get Data
Clipboard
Hiram Fleitas
Publish
Share
Navigator
Display Options
AdventureWorksDW.xlsx [9]
DimCustomer
DimDate
DimEmployee
DimGeography
DimProduct
DimProductCategory
DimSalesTerritory
FactInternetSales
FactResellerSales
DimDate
Preview downloaded on Monday
DateKey | FullDateAlternateKey | DayNumberOfWeek | EnglishDayNameOfWeek | Sp
20050101 | 1/1/2005 | 7 | Saturday
20050102 | 1/2/2005 | 1 | Sunday
20050103 | 1/3/2005 | 2 | Monday
20050104 | 1/4/2005 | 3 | Tuesday
20050105 | 1/5/2005 | 4 | Wednesday
20050106 | 1/6/2005 | 5 | Thursday
20050107 | 1/7/2005 | 6 | Friday
20050108 | 1/8/2005 | 7 | Saturday
20050109 | 1/9/2005 | 1 | Sunday
20050110 | 1/10/2005 | 2 | Monday
20050111 | 1/11/2005 | 3 | Tuesday
20050112 | 1/12/2005 | 4 | Wednesday
20050113 | 1/13/2005 | 5 | Thursday
20050114 | 1/14/2005 | 6 | Friday
20050115 | 1/15/2005 | 7 | Saturday
20050116 | 1/16/2005 | 1 | Sunday
20050117 | 1/17/2005 | 2 | Monday
20050118 | 1/18/2005 | 3 | Tuesday
20050119 | 1/19/2005 | 4 | Wednesday
20050120 | 1/20/2005 | 5 | Thursday
20050121 | 1/21/2005 | 6 | Friday
20050122 | 1/22/2005 | 7 | Saturday
Load
Transform Data
Cancel
Country
Australia
Canada
Calendar Year
Total
2005
2006
2007
2008
Total
Page 1
PAGE 1 OF 1
Fields
Search
Customer
Date
Internet Sales
Product
Sales Territory

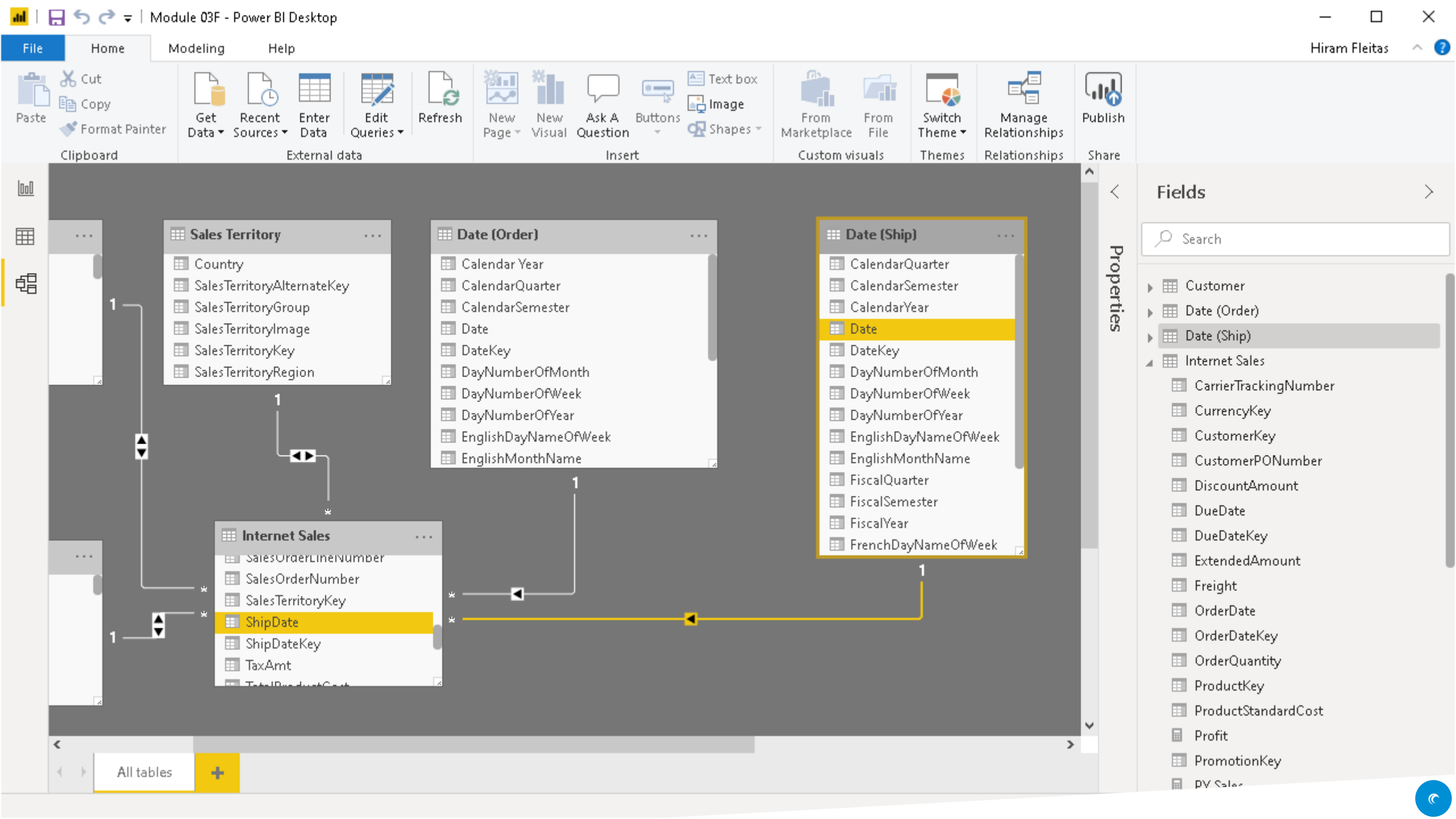

Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
Date
Calendar Year
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
DimDate
CalendarQuarter
CalendarSemester
CalendarYear
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
1
*
You can see the relationship is not correct.
Right click it and click delete.
Properties
Fields
All tables


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
Date
Calendar Year
CalendarQuarter
CalendarSemester
DimDate
CalendarQuarter
CalendarSemester
CalendarYear
DateKey
DayNumberOfMonth
DayNumberOfWeek
Delete
Properties
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
Delete Relationship
Are you sure you want to delete this relationship?
Delete
Cancel
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Properties
Fields
All tables


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
Date
Calendar Year
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
DimDate
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
FrenchMonthName
FullDateAlternateKey
MonthNumberOfYear
SpanishDayNameOfWeek
SpanishMonthName
WeekNumberOfYear
Internet Sales
SalesTerritoryKey
ShipDate
ShipDateKey
TaxAmt
TotalProductCost
UnitPrice
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
1
*
Properties
Fields
All tables


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Date
Calendar Year
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
1
*
All tables
Properties
Fields
Search
Customer
Date
DimDate
CalendarQuarter
CalendarSemester
CalendarYear
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSeme
FiscalYear
FrenchDayI
FrenchMor
FullDateAlternateKey
MonthNumberOfYear
SpanishDayNameOfWeek
Create hierarchy
Delete from model
Rename
Hide in report view


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Customer
AddressLine1
AddressLine2
BirthDate
CommuteDistance
CustomerAlternateKey
CustomerKey
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Date
Calendar Year
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
DimDate
CalendarQuarter
CalendarSemester
CalendarYear
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
Product
ArabicDescription
ChineseDescription
Class
Color
DaysToManufacture
DealerPrice
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
1
*
Properties
Fields
All tables


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
Sales Territory
Country
SalesTerritoryAlternateKey
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
SalesTerritoryRegion
Date (Order)
Calendar Year
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
Date (Ship)
CalendarQuarter
CalendarSemester
CalendarYear
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOfWeek
Internet Sales
SalesOrderNumber
SalesTerritoryKey
ShipDate
ShipDateKey
TaxAmt
1
*
All tables
Properties
Fields
Search
Customer
Date (Order)
Date (Ship)
Internet Sales
CarrierTrackingNumber
CurrencyKey
CustomerKey
CustomerPONumber
DiscountAmount
DueDate
DueDateKey
ExtendedAmount
Freight
OrderDate
OrderDateKey
OrderQuantity
ProductKey
ProductStandardCost
Profit
PromotionKey

Module 03F - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Calendar Year	Total Sales
2005	$3,266,373.66
2006	$6,530,343.53
2007	$9,791,060.30
2008	$9,770,899.74
Total	**$29,358,677.22**

Filters

Filters on this visual

Calendar Year
is (All)

Total Sales
is (All)

Add data fields here

Filters on this page

Add data fields here

Filters on all pages

Add data fields here

Visualizations

Values

Calendar Year

Total Sales

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

calendar year

Date (Order)

Year (Order)

Date (Ship)

Calendar Year

Page 1

PAGE 1 OF 1

Module 03F - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Year (Order)	Total Sales
2005	$3,266,373.66
2006	$6,530,343.53
2007	$9,791,060.30
2008	$9,770,899.74
Total	**$29,358,677.22**

Filters

Filters on this visual

Total Sales
is (All)

Year (Order)
is (All)

Add data fields here

Filters on this page

Add data fields here

Filters on all pages

Add data fields here

Visualizations

Values

Year (Order)

Total Sales

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

calendar year

Date (Order)

Year (Order)

Date (Ship)

Year (Ship)

Page 1

PAGE 1 OF 1

Module 03F - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Paste | Cut | Copy | Format Painter — Clipboard

Get Data | Recent Sources | Enter Data | Edit Queries | Refresh — External data

New Page | New Visual | Ask A Question | Buttons | Text box | Image | Shapes — Insert

From Marketplace | From File — Custom visuals

Switch Theme — Themes

Manage Relationships — Relationships

New Measure | New Column | New Quick Measure — Calculations

Publish — Share

Country

Australia | Canada | France | Germany | NA | United Kingdom | United States

Year (Ship)	Total Sales
2005	$3,105,587.33
2006	$6,576,978.98
2007	$9,517,548.53
2008	$10,158,562.38
Total	**$29,358,677.22**

Filters

Filters on this visual

Total Sales
is (All)

Year (Ship)
is (All)

Add data fields here

Filters on this page

Add data fields here

Filters on all pages

Add data fields here

Visualizations

Values

Year (Ship)

Total Sales

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

calendar year

Date (Order)

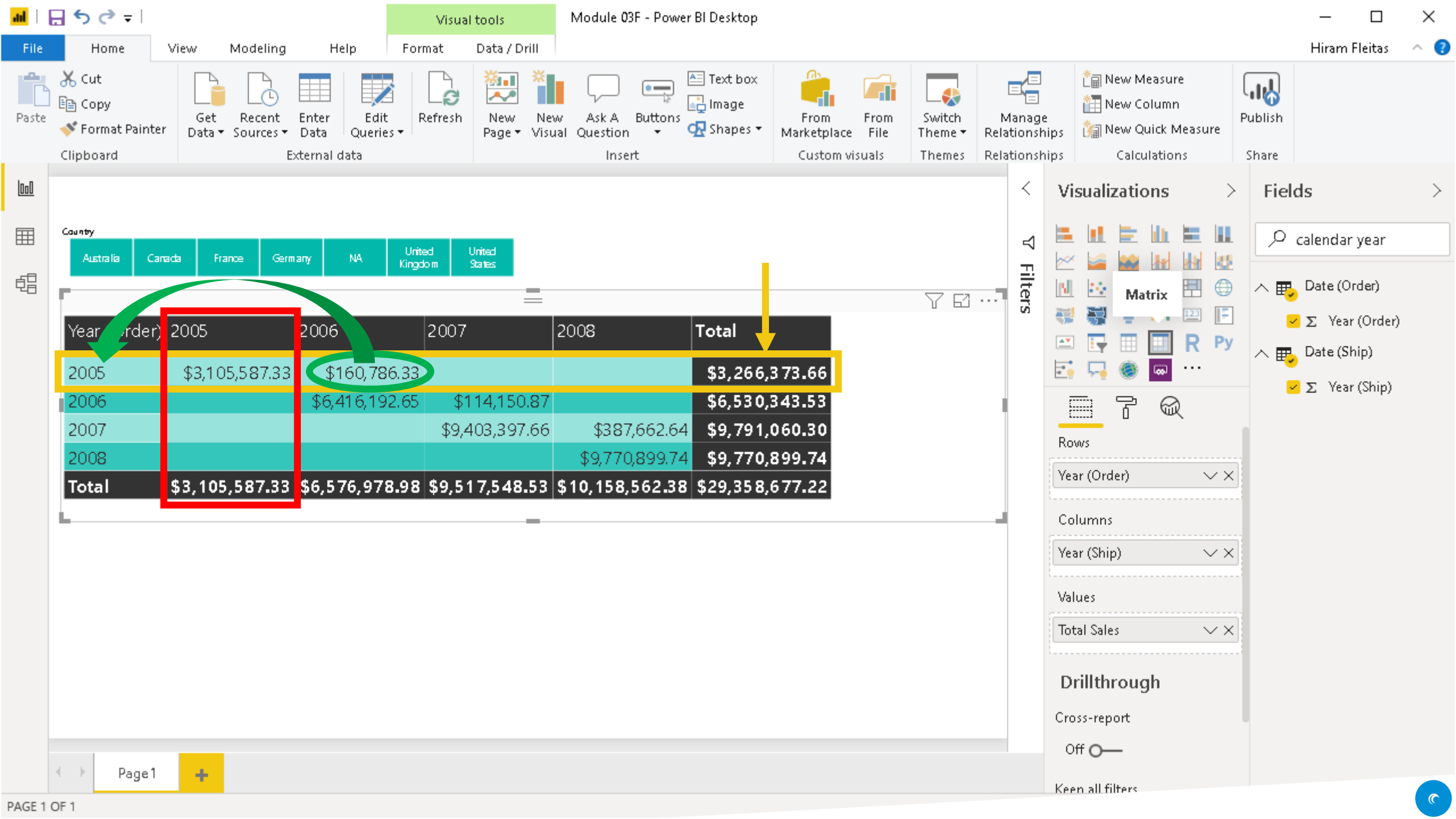
Year (Order)

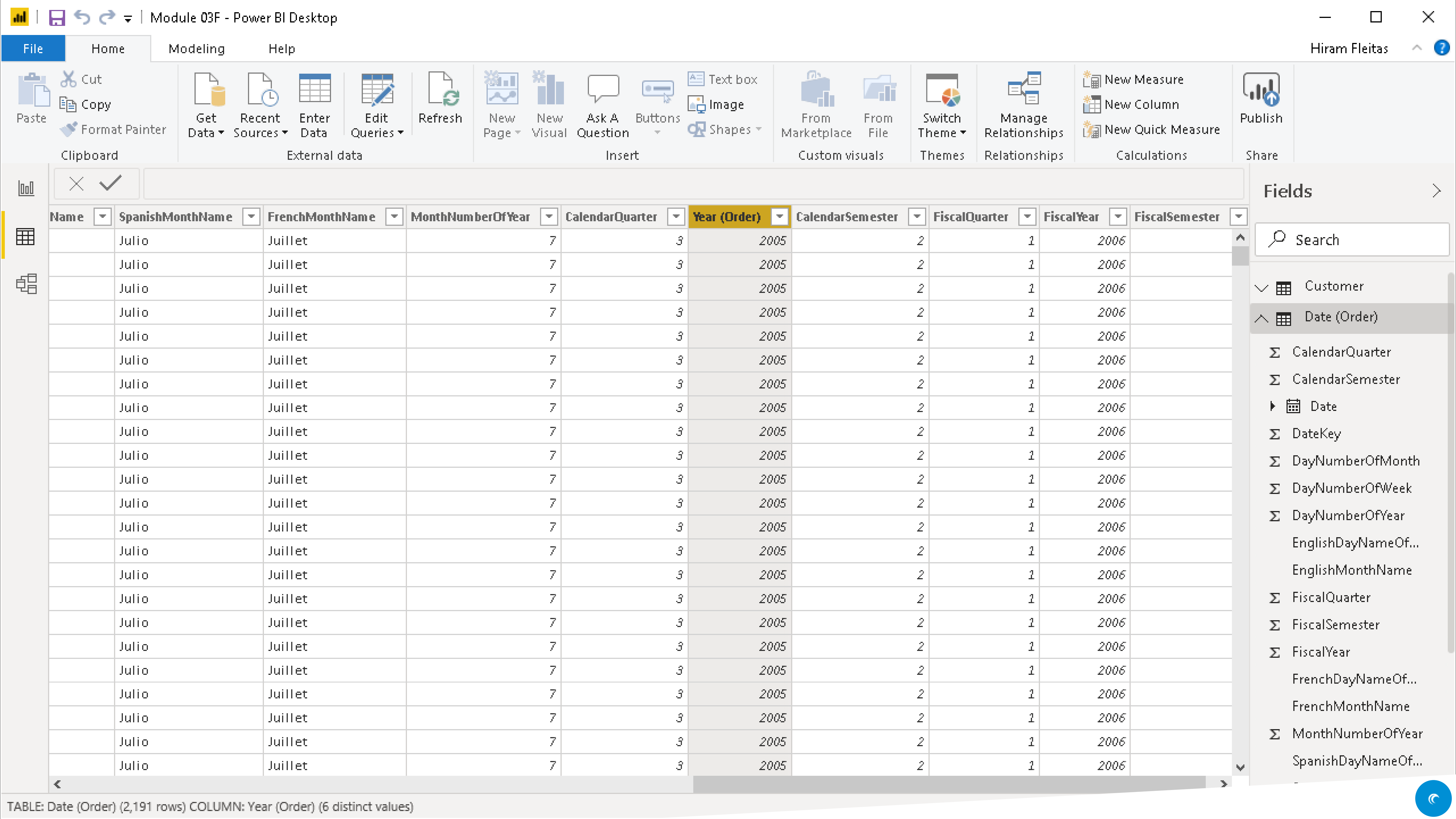
Date (Ship)

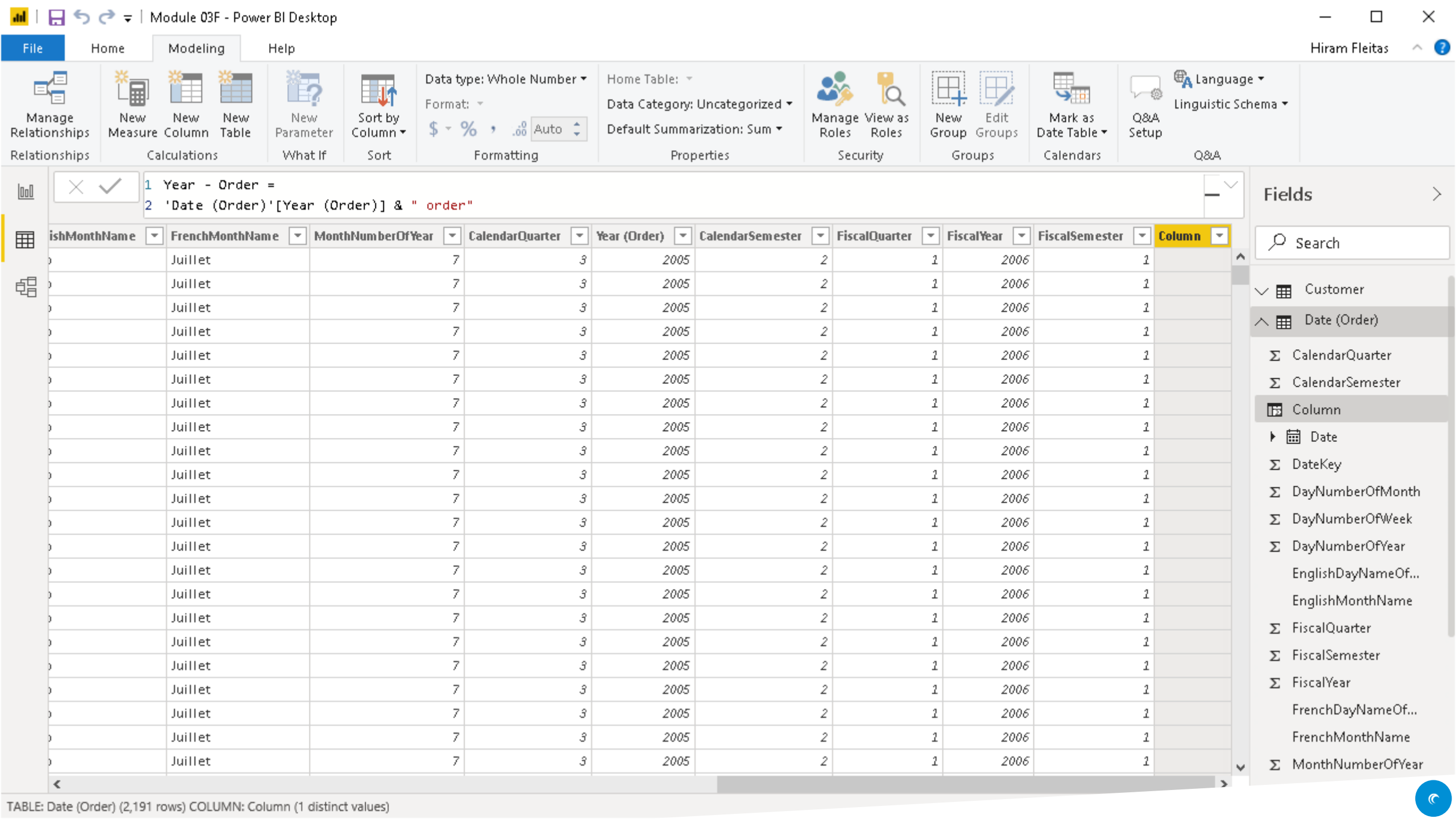
Year (Ship)

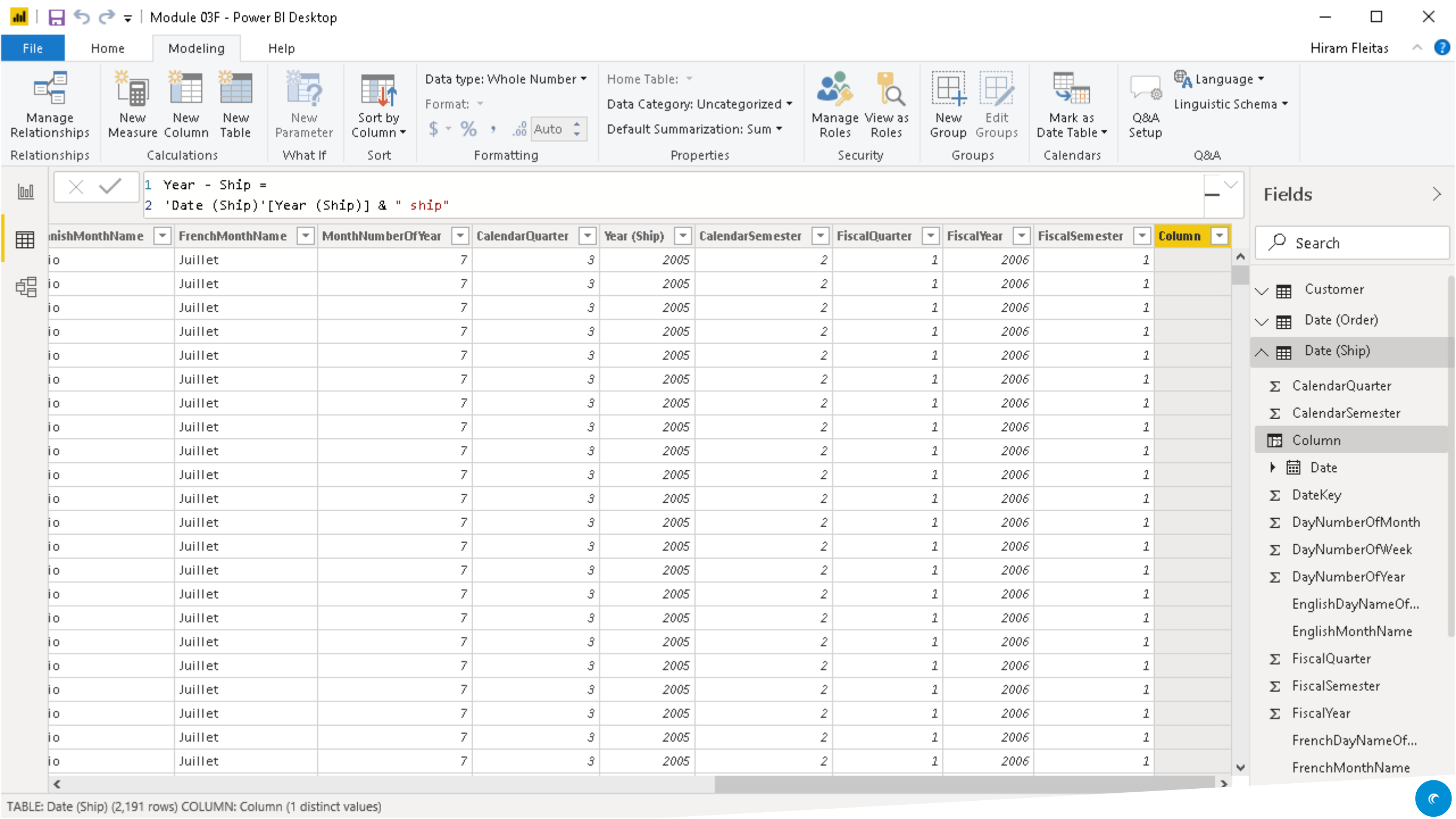
Page 1

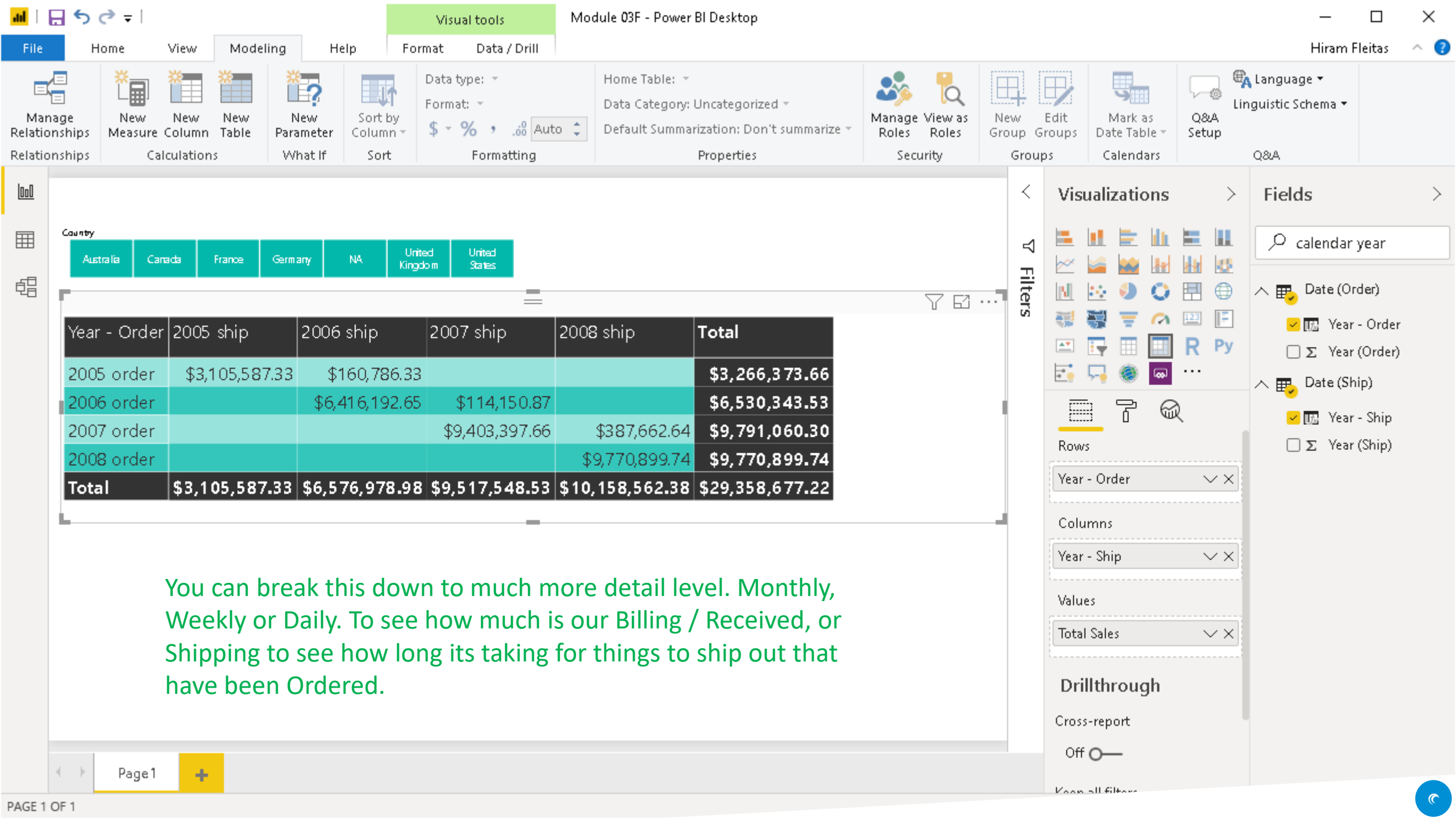
PAGE 1 OF 1


Module 03F - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Country
Australia
Canada
France
Germany
NA
United Kingdom
United States
Year (Order)
2005
2006
2007
2008
Total
2005 $3,105,587.33 $160,786.33 $3,266,373.66
2006 $6,416,192.65 $114,150.87 $6,530,343.53
2007 $9,403,397.66 $387,662.64 $9,791,060.30
2008 $9,770,899.74 $9,770,899.74
Total $3,105,587.33 $6,576,978.98 $9,517,548.53 $10,158,562.38 $29,358,677.22
Filters
Visualizations
Matrix
Rows
Year (Order)
Columns
Year (Ship)
Values
Total Sales
Drillthrough
Cross-report
Off
Keep all filters
Fields
calendar year
Date (Order)
Year (Order)
Date (Ship)
Year (Ship)
Page 1
PAGE 1 OF 1


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
New Measure
New Column
New Quick Measure
Calculations
Publish
Share
Name
SpanishMonthName
FrenchMonthName
MonthNumberOfYear
CalendarQuarter
Year (Order)
CalendarSemester
FiscalQuarter
FiscalYear
FiscalSemester
Julio
Juillet
7
3
2005
2
1
2006
Fields
Search
Customer
Date (Order)
CalendarQuarter
CalendarSemester
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOf...
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOf...
FrenchMonthName
MonthNumberOfYear
SpanishDayNameOf...
TABLE: Date (Order) (2,191 rows) COLUMN: Year (Order) (6 distinct values)


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format:
Auto
Home Table:
Data Category: Uncategorized
Default Summarization: Sum
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Year - Order =
2 'Date (Order)'[Year (Order)] & " order"
ishMonthName
FrenchMonthName
MonthNumberOfYear
CalendarQuarter
Year (Order)
CalendarSemester
FiscalQuarter
FiscalYear
FiscalSemester
Column
Juillet 7 3 2005 2 1 2006 1
Fields
Search
Customer
Date (Order)
CalendarQuarter
CalendarSemester
Column
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOf...
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOf...
FrenchMonthName
MonthNumberOfYear
TABLE: Date (Order) (2,191 rows) COLUMN: Column (1 distinct values)


Module 03F - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format:
Auto
Home Table:
Data Category: Uncategorized
Default Summarization: Sum
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Year - Ship =
2 'Date (Ship)'[Year (Ship)] & " ship"
nishMonthName
FrenchMonthName
MonthNumberOfYear
CalendarQuarter
Year (Ship)
CalendarSemester
FiscalQuarter
FiscalYear
FiscalSemester
Column
io Juillet 7 3 2005 2 1 2006 1
Fields
Search
Customer
Date (Order)
Date (Ship)
CalendarQuarter
CalendarSemester
Column
Date
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOf...
EnglishMonthName
FiscalQuarter
FiscalSemester
FiscalYear
FrenchDayNameOf...
FrenchMonthName
TABLE: Date (Ship) (2,191 rows) COLUMN: Column (1 distinct values)


Module 03F - Power BI Desktop
Visual tools
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type:
Format:
Home Table:
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
Country
Australia
Canada
France
Germany
NA
United Kingdom
United States
Year - Order
2005 ship
2006 ship
2007 ship
2008 ship
Total
2005 order
$3,105,587.33
$160,786.33
$3,266,373.66
2006 order
$6,416,192.65
$114,150.87
$6,530,343.53
2007 order
$9,403,397.66
$387,662.64
$9,791,060.30
2008 order
$9,770,899.74
$9,770,899.74
Total
$3,105,587.33
$6,576,978.98
$9,517,548.53
$10,158,562.38
$29,358,677.22
You can break this down to much more detail level. Monthly, Weekly or Daily. To see how much is our Billing / Received, or Shipping to see how long its taking for things to ship out that have been Ordered.
Filters
Visualizations
Rows
Year - Order
Columns
Year - Ship
Values
Total Sales
Drillthrough
Cross-report
Off
Fields
calendar year
Date (Order)
Year - Order
Year (Order)
Date (Ship)
Year - Ship
Year (Ship)
Page 1
PAGE 1 OF 1

Review

Role Playing Table

Not really built in support in Power BI, Tabular or Power Pivot.

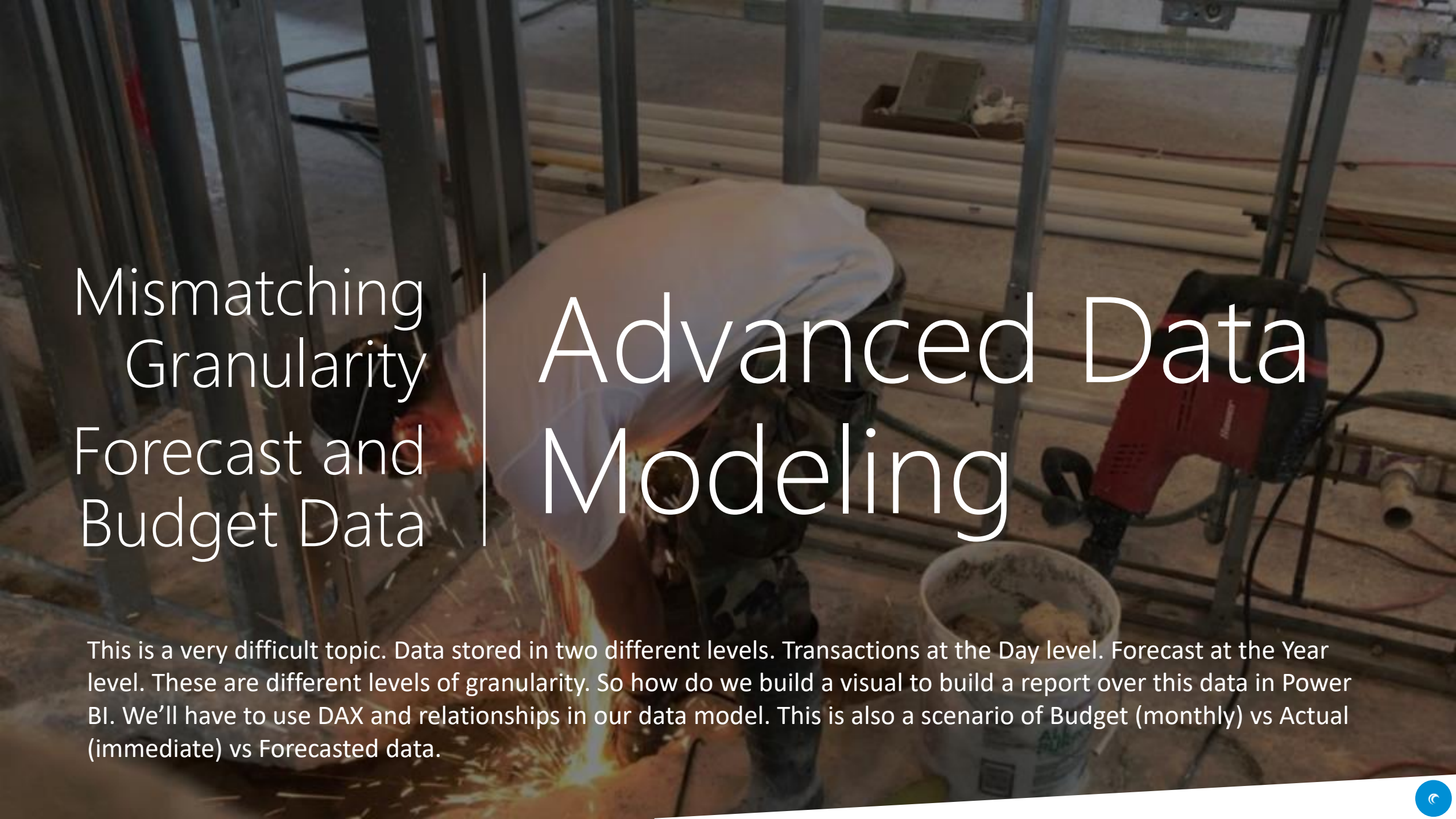
Pop-Up Quiz # 6
bit.ly/pbi18

Active/Inactive Relationship

One active relationship per table.
Inactive relationships don't mean nothing unless you write DAX CALCULATE measure and the USERELATIONSHIP function. Otherwise, they lie dormant.

DAX vs Multiple Date Tables

Two options DAX and Multiple Tables.
DAX is our attempt at multiple measures.
We also looked at the Matrix visual for analytical insight.



Mismatching Granularity Forecast and Budget Data | Advanced Data Modeling

This is a very difficult topic. Data stored in two different levels. Transactions at the Day level. Forecast at the Year level. These are different levels of granularity. So how do we build a visual to build a report over this data in Power BI. We'll have to use DAX and relationships in our data model. This is also a scenario of Budget (monthly) vs Actual (immediate) vs Forecasted data.

Forecast Data

Forecast data create at month / year level.
Sales data stored at day level.
There's a discrepancy here.

Problems
How do we relate our forecast data to our date table?
How do we relate our forecast data to every level (Day, Month, Quarter, Year)?

Forecast Data and Date Table

Forecast

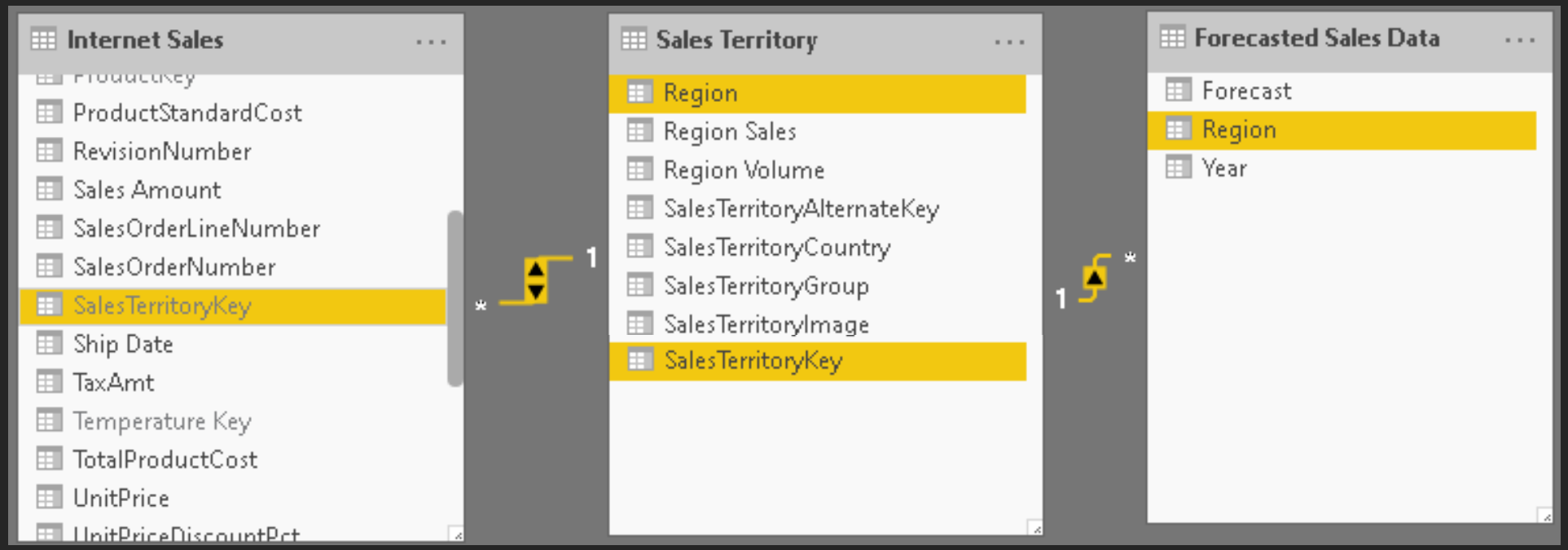
Region	Year	Forecast
Northwest	2005	455000
Northeast	2005	0
Central	2005	0
Southwest	2005	670000
Canada	2005	0

Date

DateKey	Date	Year
20050701	Friday, July 1, 2005	2005
20050702	Saturday, July 2, 2005	2005
20050703	Sunday, July 3, 2005	2005
20050704	Monday, July 4, 2005	2005
20050705	Tuesday, July 5, 2005	2005
20050706	Wednesday, July 6, 2005	2005
20050707	Tuesday, July 7, 2005	2005

We need a bridge table to build a relationship.

The Relationship



How do we write the DAX to build this out?

The calculation

Forecast

When at the year level and viewed at the year level, then simply return the sum of the forecasted sales.
When at the day or month level, we need to use a weighted allocation. How many days are there in a year? 365 so devide by 365… Month 28, 30, 31, depends…

(Number of Days in filter context) / (Number of Days in Year)

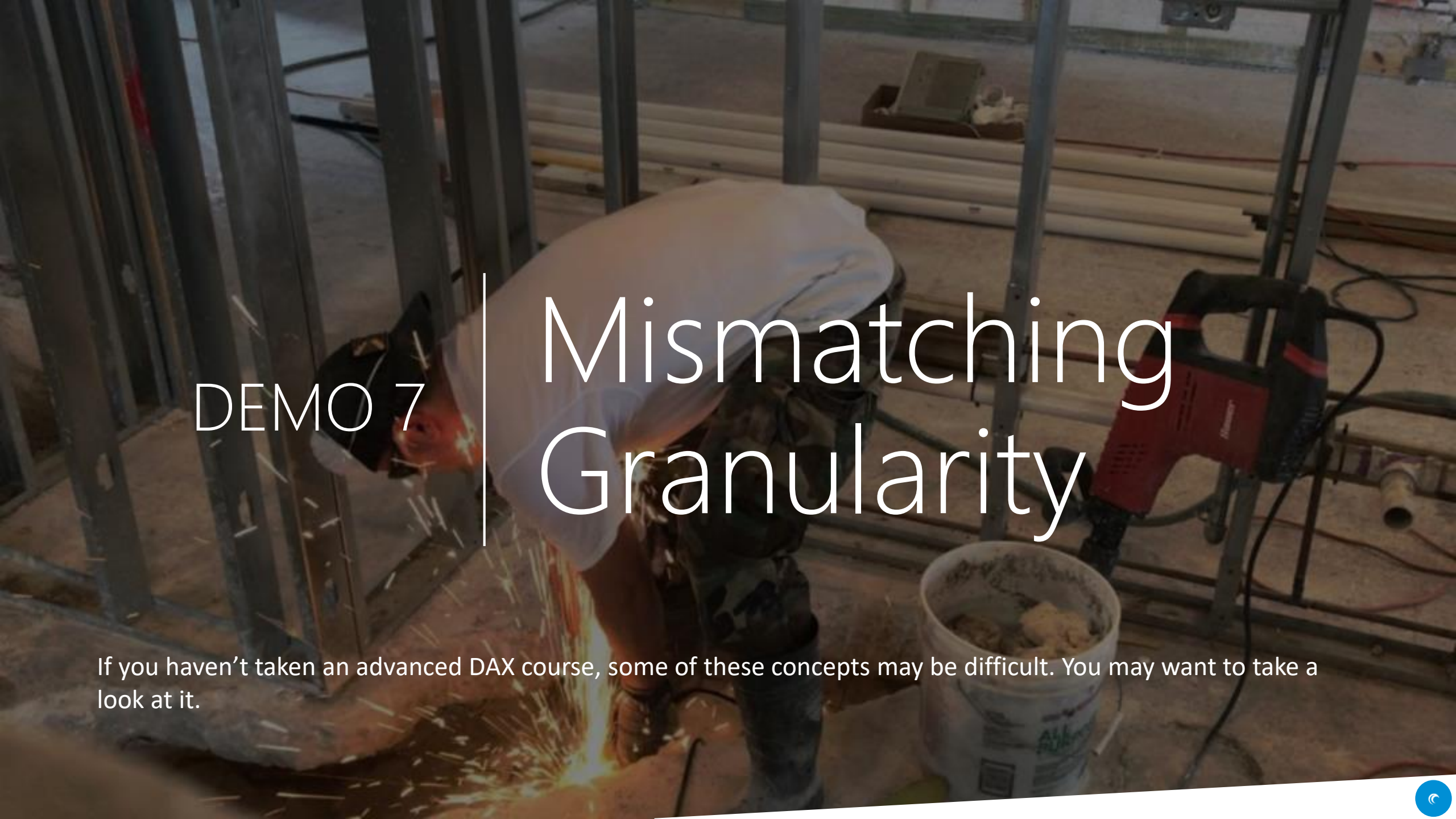
*

SUM ([Forecasted Sales])

Forecasted Sales calculation

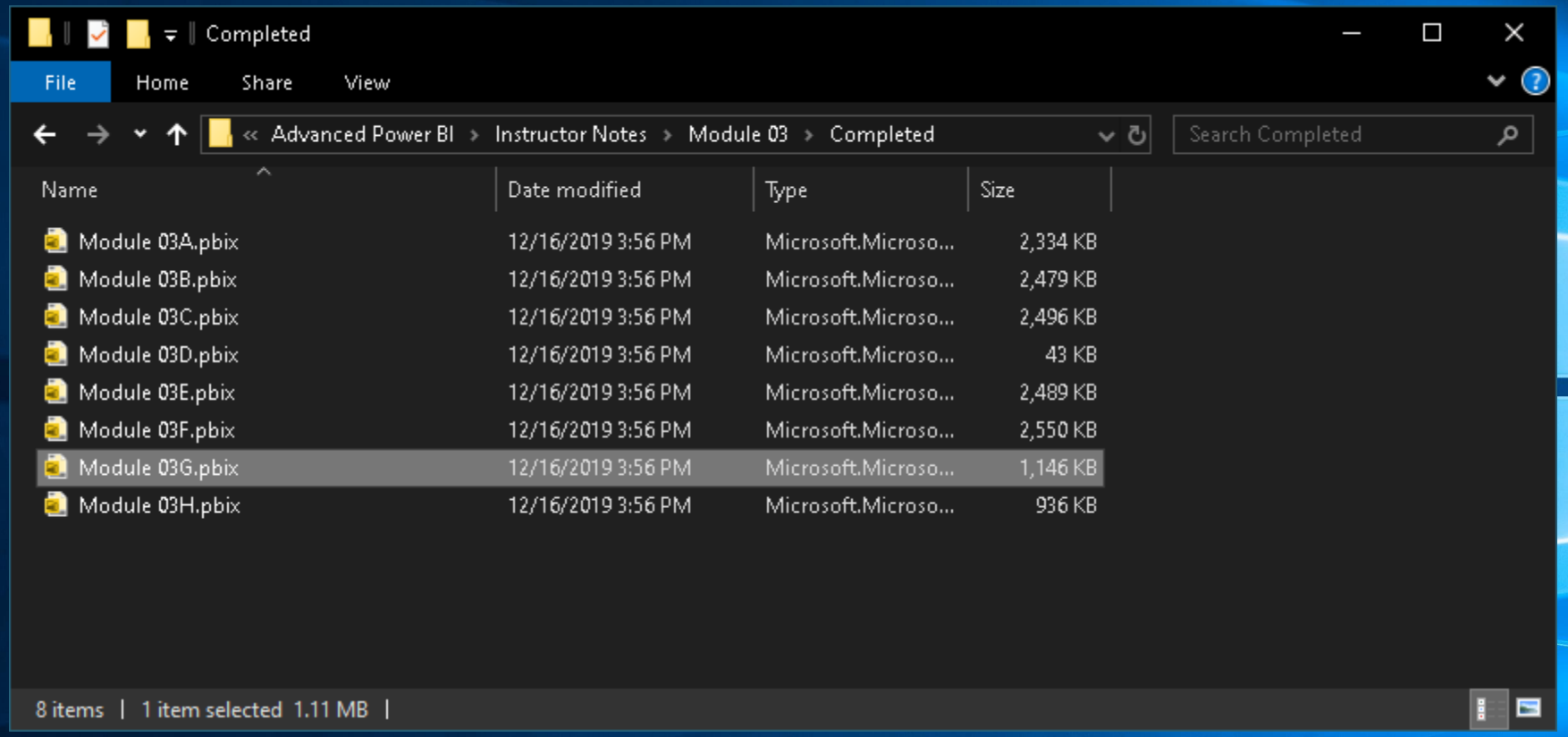
Region	Year	Forecast
Australia	2005	1250000

Year	Month	Region	Days in FC	Days in Year	Weighted Alloc	Total Sales	Forecasted Sales
2005	July	Australia	31	365	0.0849	$209,653	$106,164
2005	August	Australia	31	365	0.0849	$222,538	$106,164
2005	September	Australia	30	365	0.0822	$173,994	$102,740
2005	October	Australia	31	365	0.0849	$217,993	$106,164
2005	November	Australia	30	365	0.0822	$210,684	$102,740
2005	December	Australia	31	365	0.0849	$274,186	$106,164
2006	January	Australia	31	365	0.0849	$223,109	$152,877
2006	February	Australia	28	365	0.0767	$164,161	$138,082
2006	March	Australia	31	365	0.0849	$232,585	$152,877
2006	April	Australia	30	365	0.0822	$224,451	$147,945



DEMO 7 | Mismatching Granularity

If you haven’t taken an advanced DAX course, some of these concepts may be difficult. You may want to take a look at it.



Module 03

C:\Advanced Power BI\Instructor Notes\Module 03\Module 03G.pbix

Paste Cut Copy Format Painter — Clipboard
Get Data Recent Sources Enter Data Edit Queries Refresh — External data
New Page New Visual Ask A Question Buttons Text box Image Shapes — Insert
From Marketplace From File — Custom visuals
Switch Theme — Themes
Manage Relationships — Relationships
New Measure New Column New Quick Measure — Calculations
Publish — Share

Year	Month	Region	Total Sales
2005	July	Australia	$209,653
2005	August	Australia	$222,538
2005	September	Australia	$173,994
2005	October	Australia	$217,993
2005	November	Australia	$210,684
2005	December	Australia	$274,186
2006	January	Australia	$223,109
2006	February	Australia	$164,161
2006	March	Australia	$232,585
2006	April	Australia	$224,451
2006	May	Australia	$205,689
2006	June	Australia	$209,659
2006	July	Australia	$130,990
2006	August	Australia	$149,740
2006	September	Australia	$116,251
2006	October	Australia	$188,257
2006	November	Australia	$103,439
2006	December	Australia	$205,953
Total			$9,061,001

Filters
Visualizations
Fields
Search
Measure
Date
Forecasted Sales Data
Internet Sales
Product
Sales Territory
Temperature

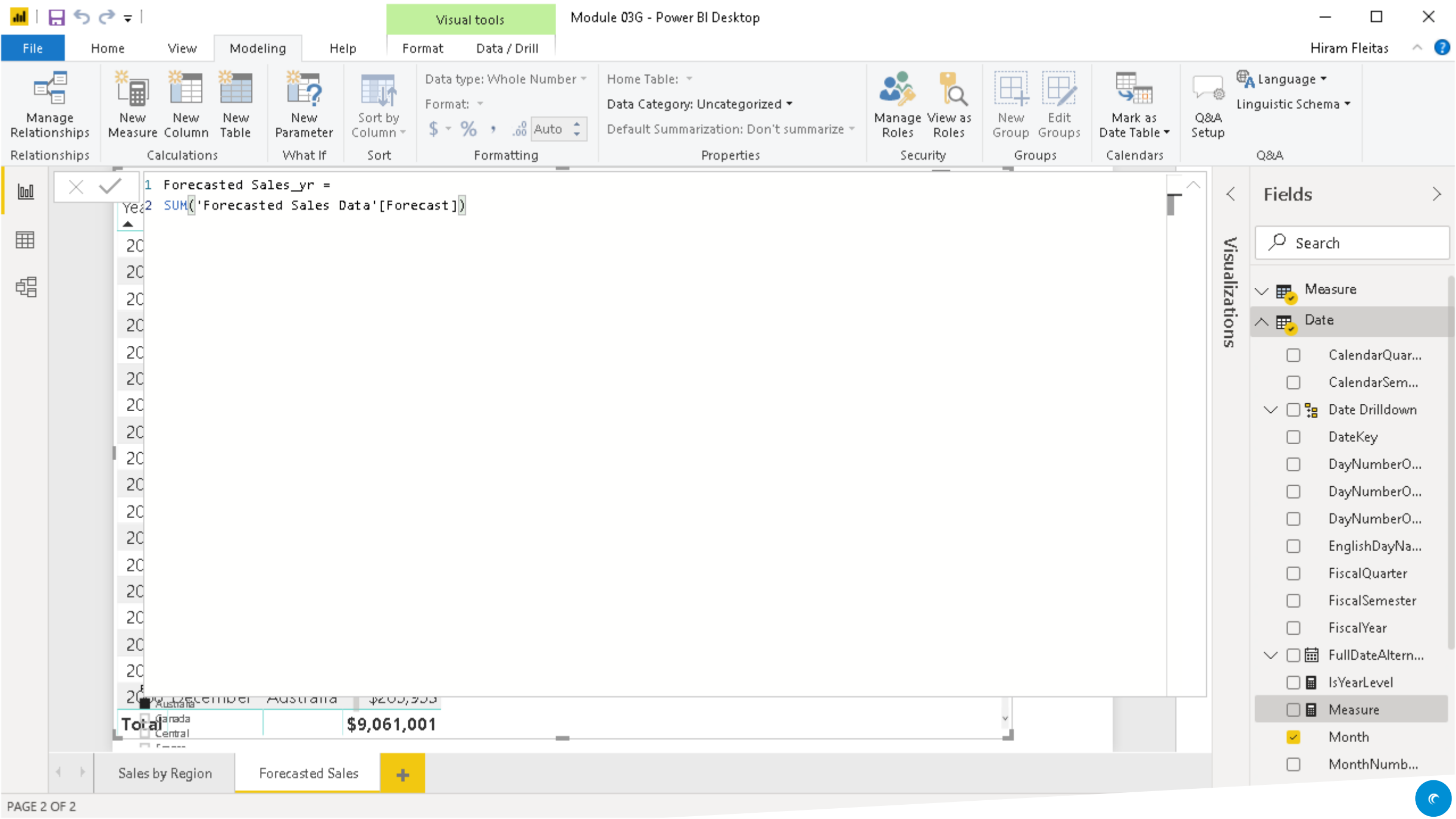
Sales by Region | Forecasted Sales | +

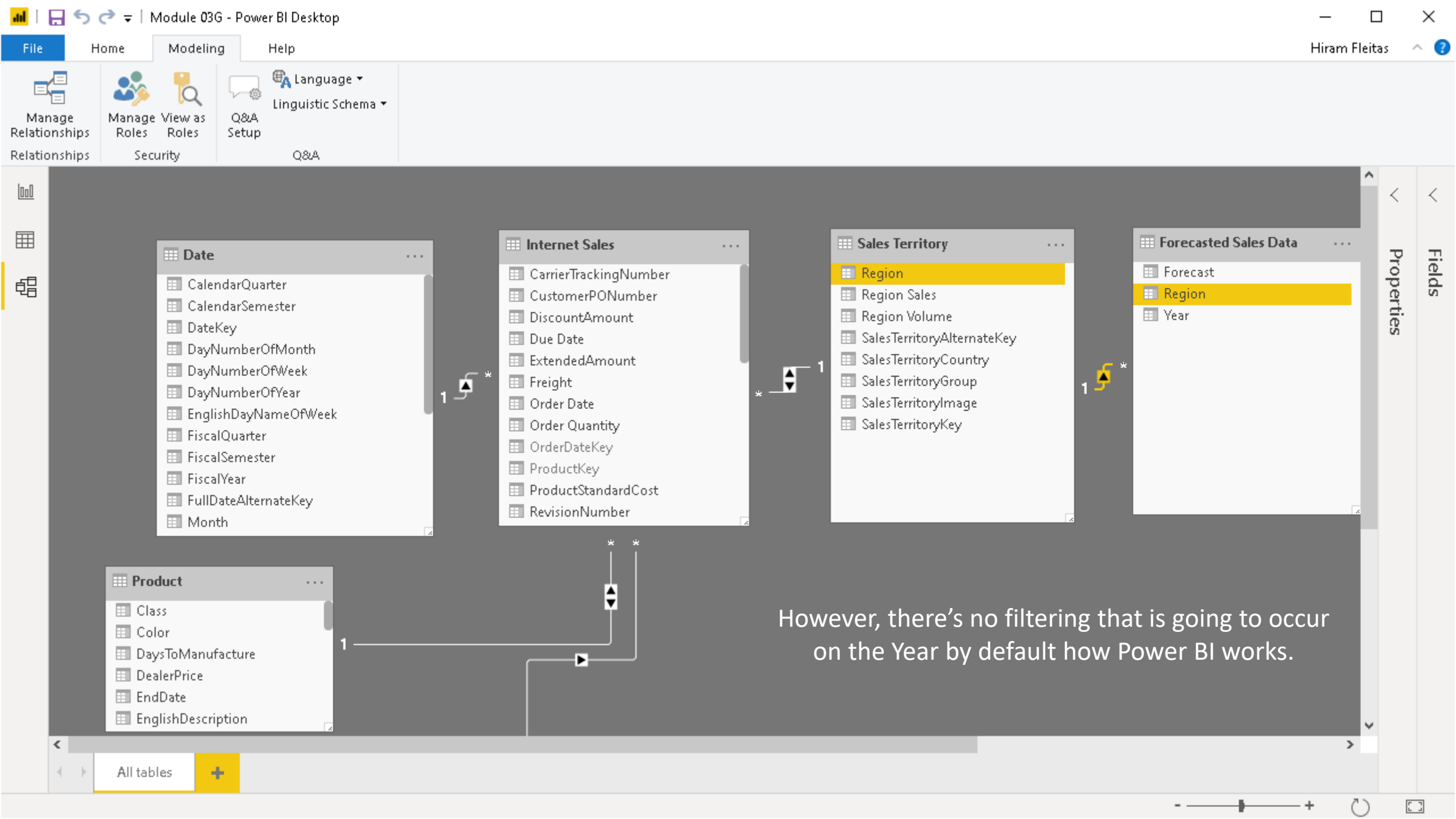
Region	Year	Forecast
Northwest	2005	455000
Northeast	2005	0
Central	2005	0
Southwest	2005	670000
Southeast	2005	0
Canada	2005	150000
France	2005	175000
Germany	2005	250000
Australia	2005	1250000
United Kingdom	2005	300000
Australia	2006	1800000
Canada	2006	650000
Central	2006	0
France	2006	500000
Germany	2006	550000
Northeast	2006	0
Northwest	2006	825000
Southeast	2006	500
Southwest	2006	950000
United Kingdom	2006	575000
Australia	2007	2750000
Canada	2007	750000
Central	2007	2000
France	2007	950000

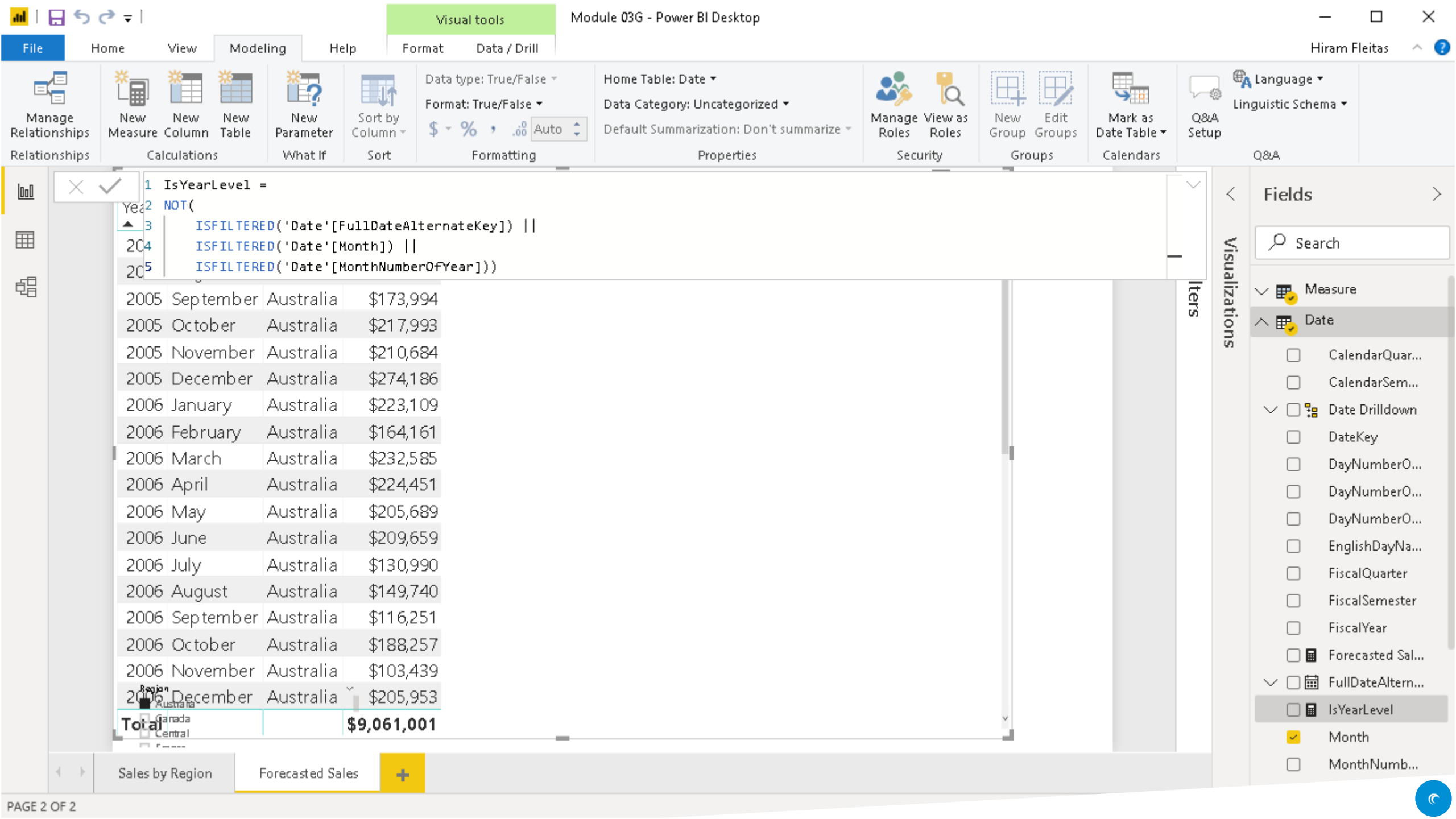
Fields

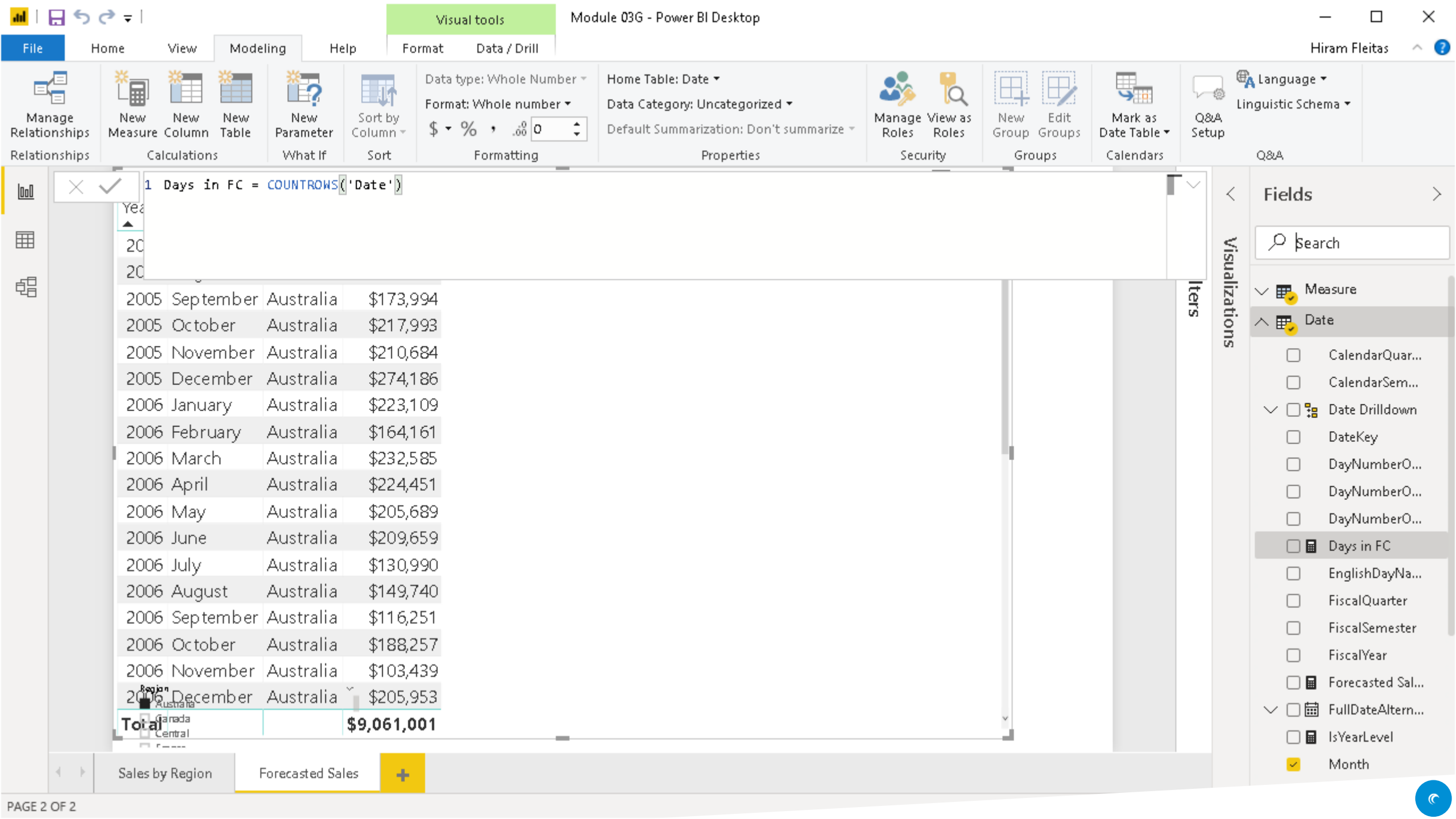
Search

- Measure
- Date
- Forecasted Sales Data
  - Forecast
  - Region
  - Year
- Internet Sales
- Product
- Sales Territory
- Temperature


Visual tools
Module 03G - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format:
Auto
Home Table:
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Forecasted Sales_yr =
2 SUM('Forecasted Sales Data'[Forecast])
Total
$9,061,001
Visualizations
Fields
Search
Measure
Date
CalendarQuar...
CalendarSem...
Date Drilldown
DateKey
DayNumberO...
DayNumberO...
DayNumberO...
EnglishDayNa...
FiscalQuarter
FiscalSemester
FiscalYear
FullDateAltern...
IsYearLevel
Measure
Month
MonthNumb...
Sales by Region
Forecasted Sales
PAGE 2 OF 2


Module 03G - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Manage Relationships
Relationships
Manage Roles
View as Roles
Security
Q&A Setup
Language
Linguistic Schema
Q&A
Date
CalendarQuarter
CalendarSemester
DateKey
DayNumberOfMonth
DayNumberOfWeek
DayNumberOfYear
EnglishDayNameOfWeek
FiscalQuarter
FiscalSemester
FiscalYear
FullDateAlternateKey
Month
Internet Sales
CarrierTrackingNumber
CustomerPONumber
DiscountAmount
Due Date
ExtendedAmount
Freight
Order Date
Order Quantity
OrderDateKey
ProductKey
ProductStandardCost
RevisionNumber
Sales Territory
Region
Region Sales
Region Volume
SalesTerritoryAlternateKey
SalesTerritoryCountry
SalesTerritoryGroup
SalesTerritoryImage
SalesTerritoryKey
Forecasted Sales Data
Forecast
Region
Year
Product
Class
Color
DaysToManufacture
DealerPrice
EndDate
EnglishDescription
1
*
1
*
1
*
1
*
1
*
However, there's no filtering that is going to occur on the Year by default how Power BI works.
Properties
Fields
All tables


Visual tools
Module 03G - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: True/False
Format: True/False
Auto
Home Table: Date
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 IsYearLevel =
2 NOT(
3 ISFILTERED('Date'[FullDateAlternateKey]) ||
4 ISFILTERED('Date'[Month]) ||
5 ISFILTERED('Date'[MonthNumberOfYear]))
2005 September Australia $173,994
2005 October Australia $217,993
2005 November Australia $210,684
2005 December Australia $274,186
2006 January Australia $223,109
2006 February Australia $164,161
2006 March Australia $232,585
2006 April Australia $224,451
2006 May Australia $205,689
2006 June Australia $209,659
2006 July Australia $130,990
2006 August Australia $149,740
2006 September Australia $116,251
2006 October Australia $188,257
2006 November Australia $103,439
2006 December Australia $205,953
Total $9,061,001
Region
Australia
Canada
Central
Visualizations
Fields
Search
Measure
Date
CalendarQuar...
CalendarSem...
Date Drilldown
DateKey
DayNumberO...
DayNumberO...
DayNumberO...
EnglishDayNa...
FiscalQuarter
FiscalSemester
FiscalYear
Forecasted Sal...
FullDateAltern...
IsYearLevel
Month
MonthNumb...
Sales by Region
Forecasted Sales
PAGE 2 OF 2


Visual tools
Module 03G - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Whole Number
Format: Whole number
Home Table: Date
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Days in FC = COUNTROWS('Date')
2005 September Australia $173,994
2005 October Australia $217,993
2005 November Australia $210,684
2005 December Australia $274,186
2006 January Australia $223,109
2006 February Australia $164,161
2006 March Australia $232,585
2006 April Australia $224,451
2006 May Australia $205,689
2006 June Australia $209,659
2006 July Australia $130,990
2006 August Australia $149,740
2006 September Australia $116,251
2006 October Australia $188,257
2006 November Australia $103,439
2006 December Australia $205,953
Total $9,061,001
Visualizations
Fields
Search
Measure
Date
CalendarQuar...
CalendarSem...
Date Drilldown
DateKey
DayNumberO...
DayNumberO...
DayNumberO...
Days in FC
EnglishDayNa...
FiscalQuarter
FiscalSemester
FiscalYear
Forecasted Sal...
FullDateAltern...
IsYearLevel
Month
Sales by Region
Forecasted Sales
PAGE 2 OF 2

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: | Home Table: | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Days in YR =
2 CALCULATE(
3     COUNTROWS('Date'),
4     ALLEXCEPT('Date','Date'[Year]))
```

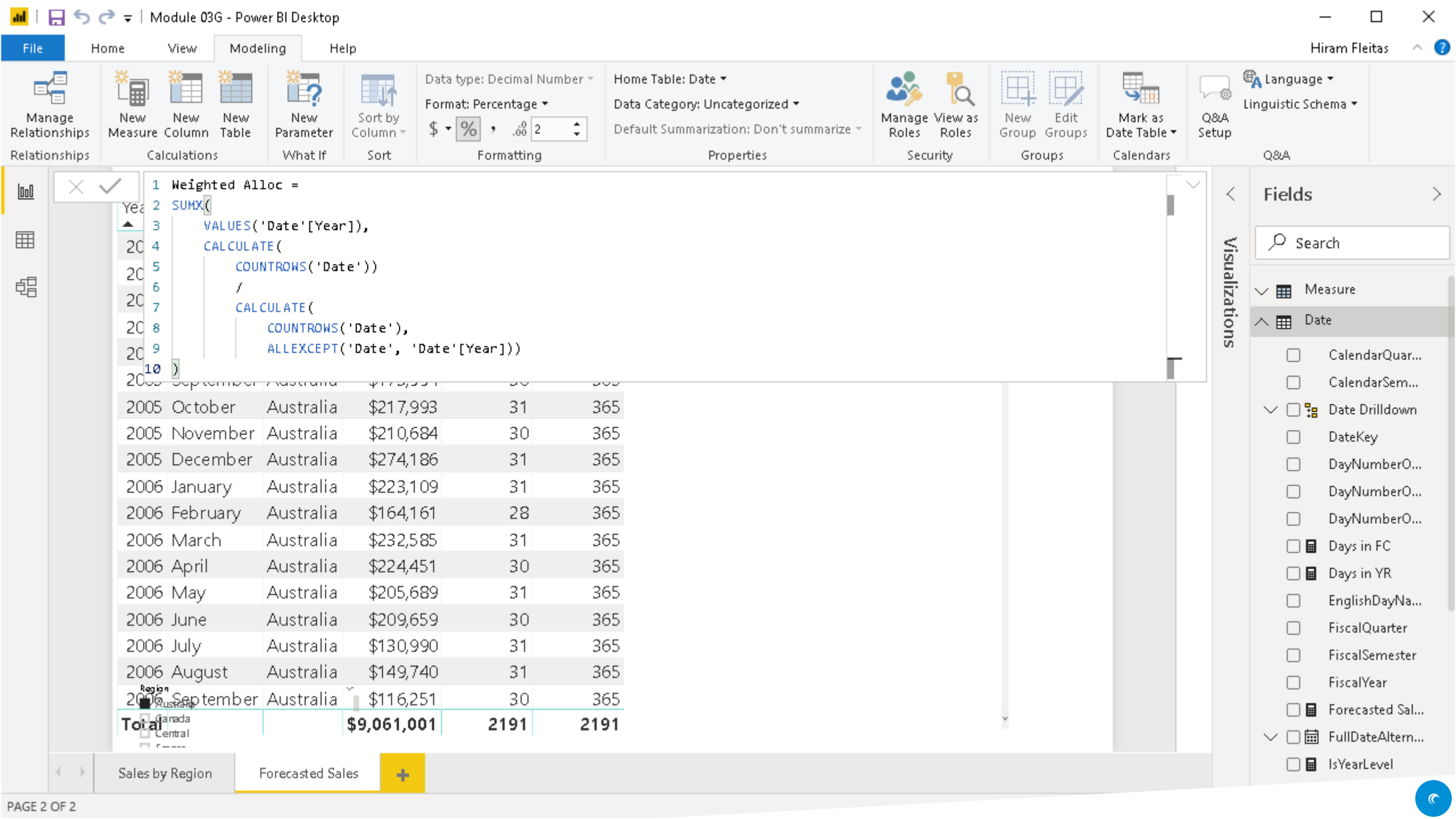
2005	May	Australia		31
2005	June	Australia		30
2005	July	Australia	$209,653	31
2005	August	Australia	$222,538	31
2005	September	Australia	$173,994	30
2005	October	Australia	$217,993	31
2005	November	Australia	$210,684	30
2005	December	Australia	$274,186	31
2006	January	Australia	$223,109	31
2006	February	Australia	$164,161	28
2006	March	Australia	$232,585	31
2006	April	Australia	$224,451	30
2006	May	Australia	$205,689	31
2006	June	Australia	$209,659	30
2006	July	Australia	$130,990	31
2006	August	Australia	$149,740	31
2006	September	Australia	$116,251	30
Total			**$9,061,001**	**2191**

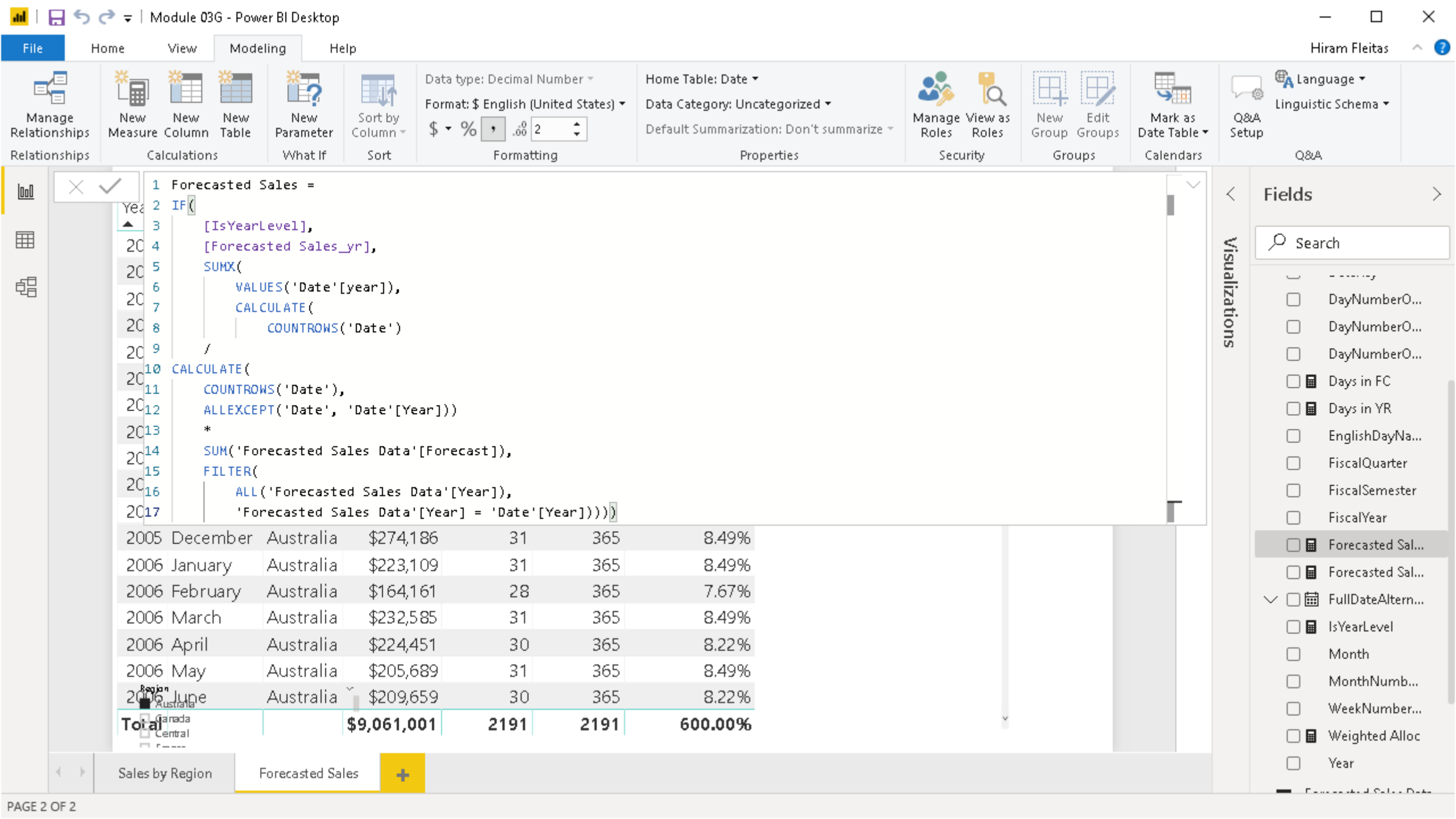
Region
Australia
Canada
Central

Filters | Visualizations

Fields
Search
Measure
Date
CalendarQuar...
CalendarSem...
Date Drilldown
DateKey
DayNumberO...
DayNumberO...
DayNumberO...
Days in FC
EnglishDayNa...
FiscalQuarter
FiscalSemester
FiscalYear
Forecasted Sal...
FullDateAltern...
IsYearLevel
Measure

Sales by Region | Forecasted Sales | +


Module 03G - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Decimal Number
Format: Percentage
Home Table: Date
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Weighted Alloc =
2 SUMX(
3 VALUES('Date'[Year]),
4 CALCULATE(
5 COUNTROWS('Date'))
6 /
7 CALCULATE(
8 COUNTROWS('Date'),
9 ALLEXCEPT('Date', 'Date'[Year]))
10)
2005 October Australia $217,993 31 365
2005 November Australia $210,684 30 365
2005 December Australia $274,186 31 365
2006 January Australia $223,109 31 365
2006 February Australia $164,161 28 365
2006 March Australia $232,585 31 365
2006 April Australia $224,451 30 365
2006 May Australia $205,689 31 365
2006 June Australia $209,659 30 365
2006 July Australia $130,990 31 365
2006 August Australia $149,740 31 365
2006 September Australia $116,251 30 365
Total $9,061,001 2191 2191
Region
Australia
Canada
Central
Visualizations
Fields
Search
Measure
Date
CalendarQuar...
CalendarSem...
Date Drilldown
DateKey
DayNumberO...
DayNumberO...
DayNumberO...
Days in FC
Days in YR
EnglishDayNa...
FiscalQuarter
FiscalSemester
FiscalYear
Forecasted Sal...
FullDateAltern...
IsYearLevel
Sales by Region
Forecasted Sales
PAGE 2 OF 2


Module 03G - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Decimal Number
Format: $ English (United States)
Home Table: Date
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
Forecasted Sales =
IF(
[IsYearLevel],
[Forecasted Sales_yr],
SUMX(
VALUES('Date'[year]),
CALCULATE(
COUNTROWS('Date')
)
/
CALCULATE(
COUNTROWS('Date'),
ALLEXCEPT('Date', 'Date'[Year]))
*
SUM('Forecasted Sales Data'[Forecast]),
FILTER(
ALL('Forecasted Sales Data'[Year]),
'Forecasted Sales Data'[Year] = 'Date'[Year])))
2005 December Australia $274,186 31 365 8.49%
2006 January Australia $223,109 31 365 8.49%
2006 February Australia $164,161 28 365 7.67%
2006 March Australia $232,585 31 365 8.49%
2006 April Australia $224,451 30 365 8.22%
2006 May Australia $205,689 31 365 8.49%
2006 June Australia $209,659 30 365 8.22%
Total $9,061,001 2191 2191 600.00%
Region
Australia
Canada
Central
Visualizations
Fields
Search
DayNumberO...
DayNumberO...
DayNumberO...
Days in FC
Days in YR
EnglishDayNa...
FiscalQuarter
FiscalSemester
FiscalYear
Forecasted Sal...
Forecasted Sal...
FullDateAltern...
IsYearLevel
Month
MonthNumb...
WeekNumber...
Weighted Alloc
Year
Sales by Region
Forecasted Sales
PAGE 2 OF 2

Module 03G - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: | Format: | Home Table: | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

Year	Month	Region	Total Sales	Forecasted Sales	Days in FC	Days in YR	Weighted Alloc
2005	October	Australia	$217,993	$106,164.38	31	365	8.49%
2005	November	Australia	$210,684	$102,739.73	30	365	8.22%
2005	December	Australia	$274,186	$106,164.38	31	365	8.49%
2006	January	Australia	$223,109	$152,876.71	31	365	8.49%
2006	February	Australia	$164,161	$138,082.19	28	365	7.67%
2006	March	Australia	$232,585	$152,876.71	31	365	8.49%
2006	April	Australia	$224,451	$147,945.21	30	365	8.22%
2006	May	Australia	$205,689	$152,876.71	31	365	8.49%
2006	June	Australia	$209,659	$147,945.21	30	365	8.22%
2006	July	Australia	$130,990	$152,876.71	31	365	8.49%
2006	August	Australia	$149,740	$152,876.71	31	365	8.49%
2006	September	Australia	$116,251	$147,945.21	30	365	8.22%
2006	October	Australia	$188,257	$152,876.71	31	365	8.49%
2006	November	Australia	$103,439	$147,945.21	30	365	8.22%
2006	December	Australia	$205,953	$152,876.71	31	365	8.49%
2007	January	Australia	$186,238	$233,561.64	31	365	8.49%
2007	February	Australia	$207,782	$210,958.90	28	365	7.67%
2007	March	Australia	$198,788	$233,561.64	31	365	8.49%
Total			**$9,061,001**	**$9,237,500.00**	**2191**	**2191**	**600.00%**

Filters

Visualizations

Values

Year | Month | Region | Total Sales | Forecasted Sales | Days in FC | Days in YR | Weighted Alloc

Drillthrough

Cross-report

Fields

fore

Date

Forecasted Sal...

Forecasted Sal...

Forecasted Sales Data

Forecast

Region

Year

Sales by Region | Forecasted Sales

PAGE 2 OF 2

Review

Mismatched Granularities

Data stored at different levels. Actuals vs Budget.

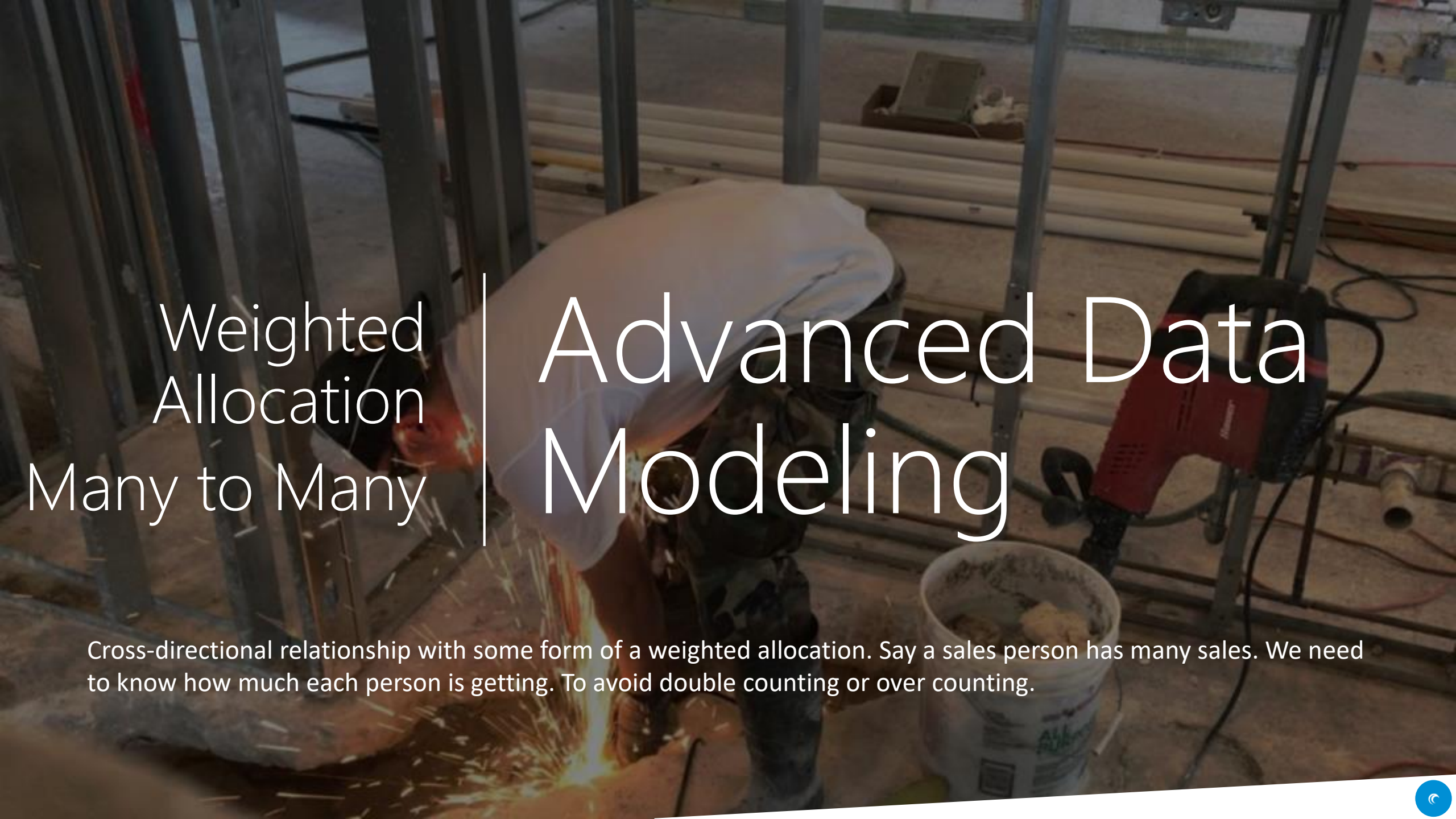
Pop-Up Quiz # 7
bit.ly/pbi18

Budget / Forecasted Data

We used a weighted allocation to come up with the forecasted sales through the filtered context and provide the measure.

Relationship / DAX

This isn't covered a lot in this section, but it is a common problem for most organizations. This is a great example of how you can solve it.



Weighted Allocation Many to Many

Advanced Data Modeling

Cross-directional relationship with some form of a weighted allocation. Say a sales person has many sales. We need to know how much each person is getting. To avoid double counting or over counting.

Weighted Allocation

Many to Many

- Double counting
- Over counting
- Inaccurate reports
- Very difficult to catch after the fact.

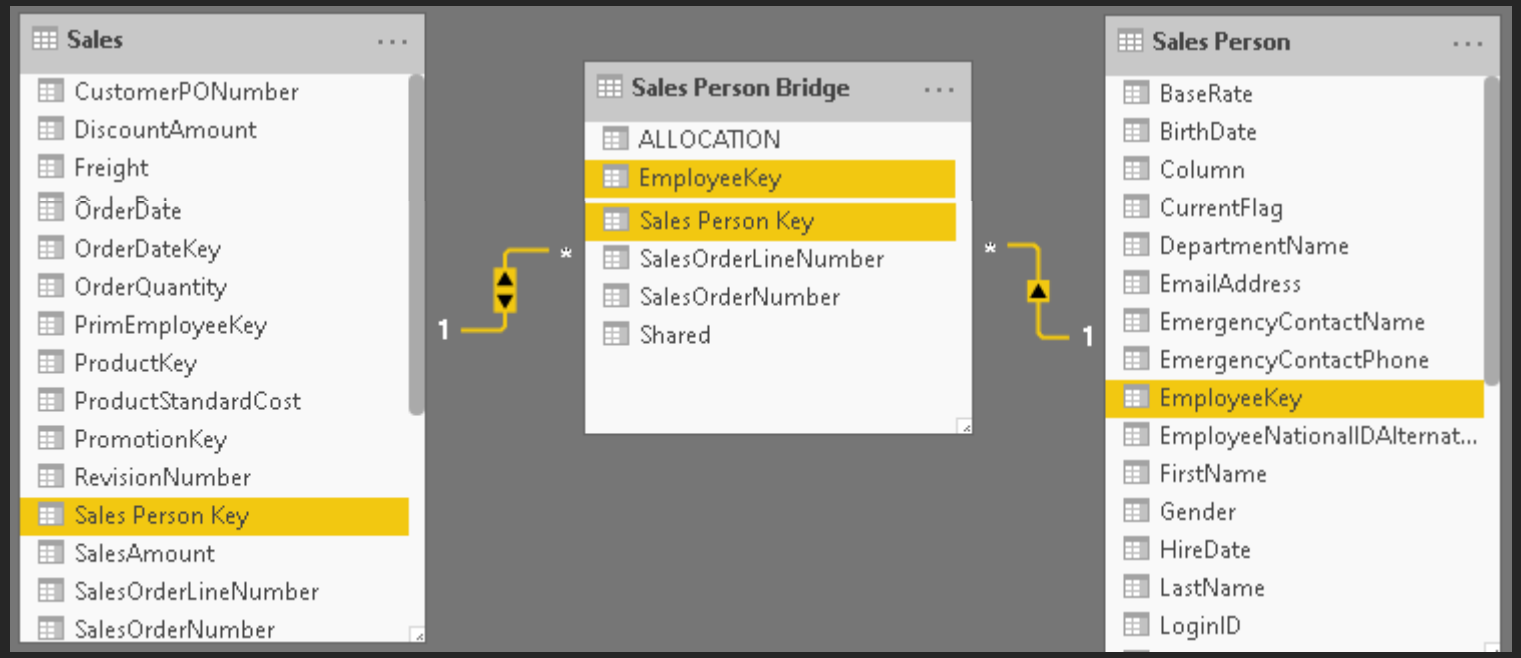
Bridge Table

Between Sales and Sales Person

Here's the sales for each person.
The bridge table is at a higher or lower level of details.
It should have more rows.

EmployeeKey	SalesOrderNumber	SalesOrderLineNumber	ALLOCATION	Shared
283	SO43667	3	1	0
283	SO43865	3	1	0
283	SO43884	3	1	0
283	SO43896	3	1	0
283	SO44105	3	1	0
283	SO44287	3	1	0
283	SO44314	3	1	0
283	SO44509	3	1	0
283	SO44528	3	1	0
283	SO44742	3	1	0

Relationship



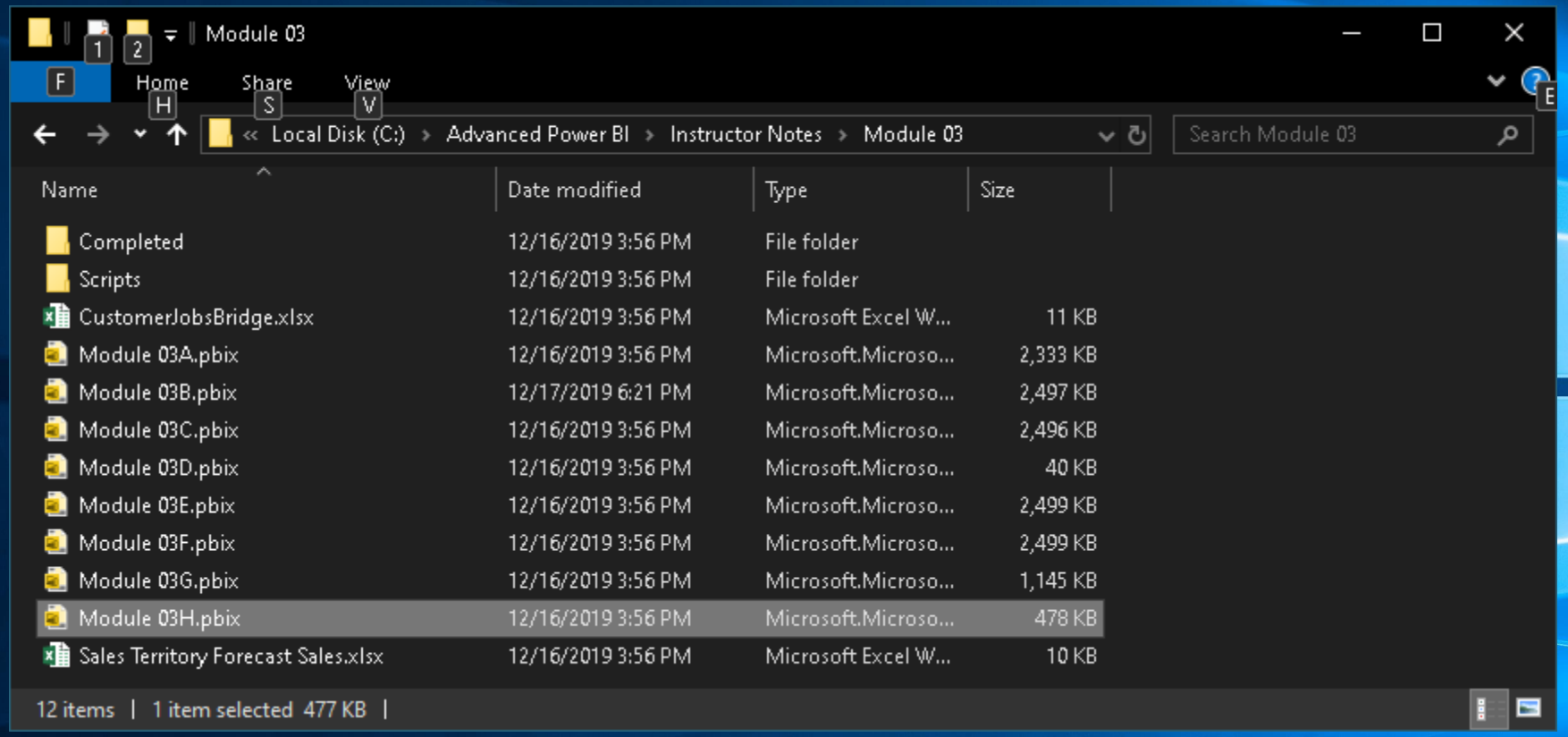
DAX Calculation

```
SUMX(
    'Sales Person Bridge',
    'Sales'[Total Sales] *
    'Sales Person Bridge'[Allocation])
```

You have to multiply each row column at a time to get the total.
SUMX is an iterator and will do it row by row.
When it has all the multiplications done, then it will add all the totals to get the sum.

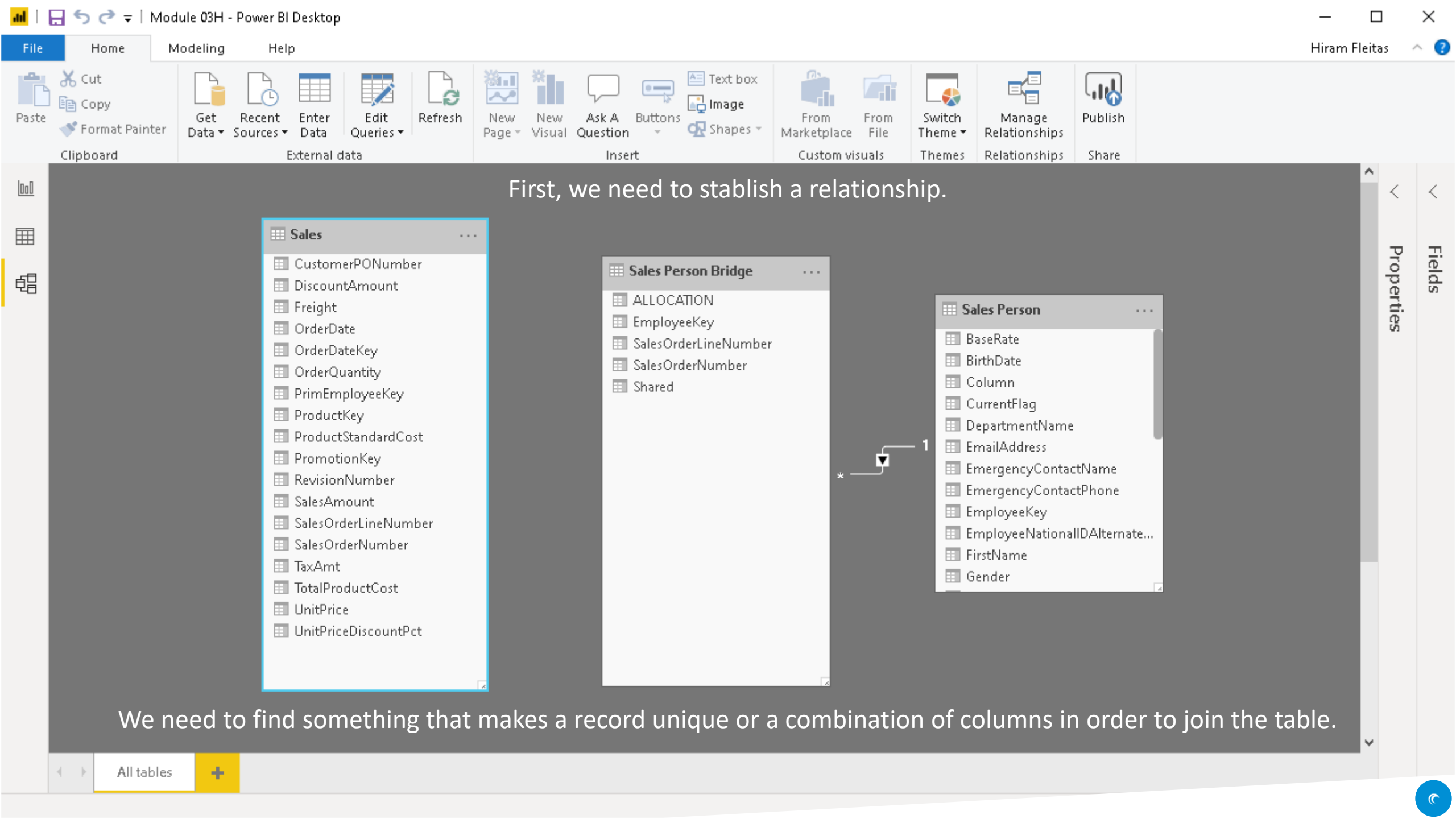
DEMO 8 | Weighted Allocation

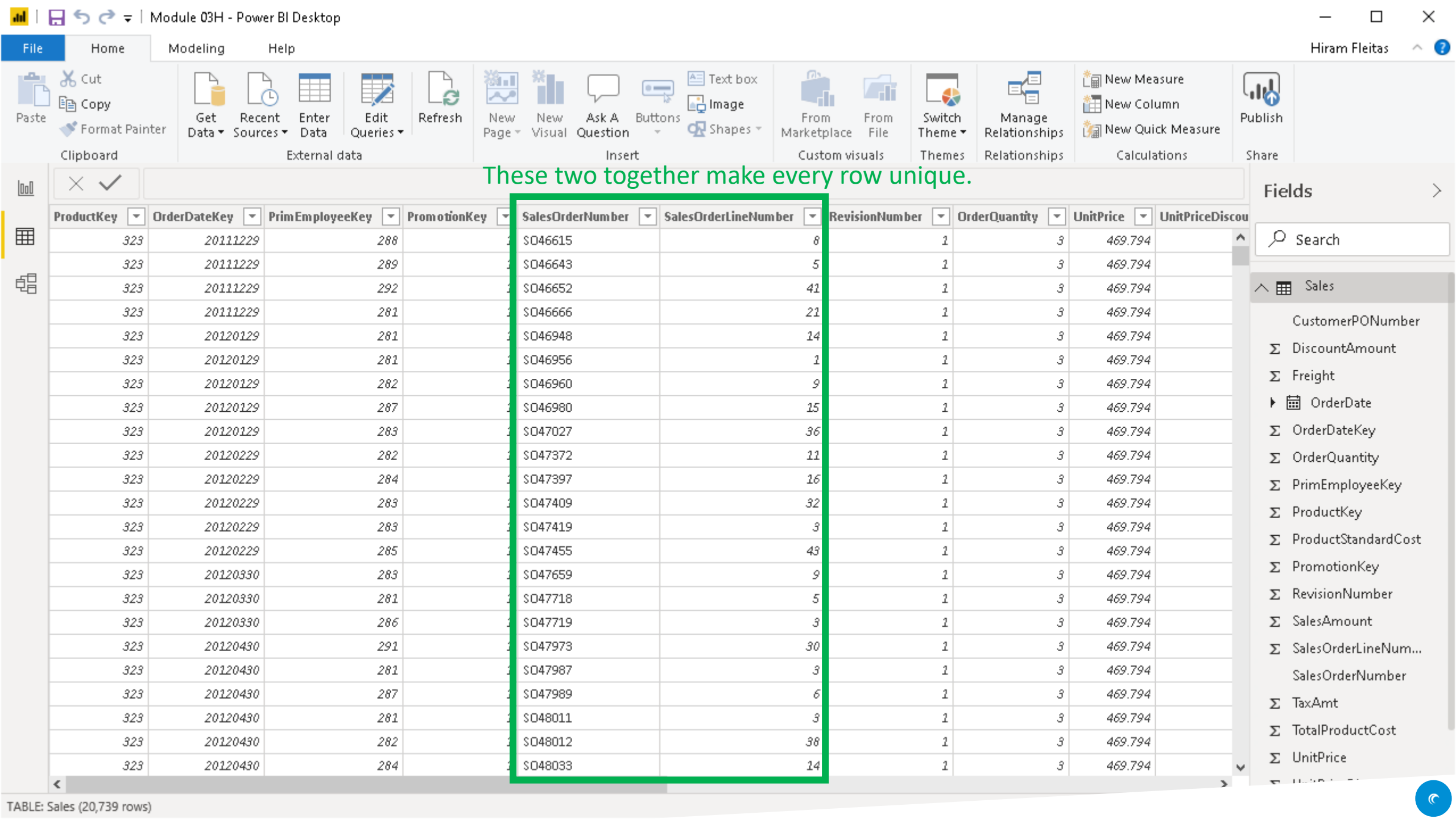
pending



Module 03

C:\Advanced Power BI\Instructor Notes\Module 03\Module 03H.pbix


Module 03H - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Paste
Cut
Copy
Format Painter
Clipboard
Get Data
Recent Sources
Enter Data
Edit Queries
Refresh
External data
New Page
New Visual
Ask A Question
Buttons
Text box
Image
Shapes
Insert
From Marketplace
From File
Custom visuals
Switch Theme
Themes
Manage Relationships
Relationships
Publish
Share
First, we need to stablish a relationship.
Sales
CustomerPONumber
DiscountAmount
Freight
OrderDate
OrderDateKey
OrderQuantity
PrimEmployeeKey
ProductKey
ProductStandardCost
PromotionKey
RevisionNumber
SalesAmount
SalesOrderLineNumber
SalesOrderNumber
TaxAmt
TotalProductCost
UnitPrice
UnitPriceDiscountPct
Sales Person Bridge
ALLOCATION
EmployeeKey
SalesOrderLineNumber
SalesOrderNumber
Shared
*
1
Sales Person
BaseRate
BirthDate
Column
CurrentFlag
DepartmentName
EmailAddress
EmergencyContactName
EmergencyContactPhone
EmployeeKey
EmployeeNationalIDAlternate...
FirstName
Gender
Properties
Fields
We need to find something that makes a record unique or a combination of columns in order to join the table.
All tables



ProductKey	OrderDateKey	PrimEmployeeKey	PromotionKey	SalesOrderNumber	SalesOrderLineNumber	RevisionNumber	OrderQuantity	UnitPrice	UnitPriceDiscou
323	20111229	288	1	SO46615	8	1	3	469.794	
323	20111229	289	1	SO46643	5	1	3	469.794	
323	20111229	292	1	SO46652	41	1	3	469.794	
323	20111229	281	1	SO46666	21	1	3	469.794	
323	20120129	281	1	SO46948	14	1	3	469.794	
323	20120129	281	1	SO46956	1	1	3	469.794	
323	20120129	282	1	SO46960	9	1	3	469.794	
323	20120129	287	1	SO46980	15	1	3	469.794	
323	20120129	283	1	SO47027	36	1	3	469.794	
323	20120229	282	1	SO47372	11	1	3	469.794	
323	20120229	284	1	SO47397	16	1	3	469.794	
323	20120229	283	1	SO47409	32	1	3	469.794	
323	20120229	283	1	SO47419	3	1	3	469.794	
323	20120229	285	1	SO47455	43	1	3	469.794	
323	20120330	283	1	SO47659	9	1	3	469.794	
323	20120330	281	1	SO47718	5	1	3	469.794	
323	20120330	286	1	SO47719	3	1	3	469.794	
323	20120430	291	1	SO47973	30	1	3	469.794	
323	20120430	281	1	SO47987	3	1	3	469.794	
323	20120430	287	1	SO47989	6	1	3	469.794	
323	20120430	281	1	SO48011	3	1	3	469.794	
323	20120430	282	1	SO48012	38	1	3	469.794	
323	20120430	284	1	SO48033	14	1	3	469.794	

Module 03H - Power BI Desktop

File | Home | Modeling | Help | Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: | Auto | Home Table: | Data Category: Uncategorized | Default Summarization: Sum | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Sales Order Key =
2 Sales[SalesOrderNumber] & Sales[SalesOrderLineNumber]
```

eDiscountPct	DiscountAmount	ProductStandardCost	TotalProductCost	SalesAmount	TaxAmt	Freight	CustomerPONumber	OrderDate	Column
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO14355186739	Thursday, December 29, 2011	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO899110603	Thursday, December 29, 2011	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO3509195138	Thursday, December 29, 2011	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO6699130779	Thursday, December 29, 2011	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO18386128096	Sunday, January 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO16849143827	Sunday, January 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO16762181648	Sunday, January 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO13572170679	Sunday, January 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO3480112515	Sunday, January 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO16124198007	Wednesday, February 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO11107130091	Wednesday, February 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO1624119173	Wednesday, February 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO3103122578	Wednesday, February 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO9599169586	Wednesday, February 29, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO19314173599	Friday, March 30, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO6699137967	Friday, March 30, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO7105121606	Friday, March 30, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO18705118148	Monday, April 30, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO16849126895	Monday, April 30, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO15921198782	Monday, April 30, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO12383131476	Monday, April 30, 2012	
0	0	486.7066	1460.1198	1409.382	112.7506	35.2346	PO12499156458	Monday, April 30, 2012	

Fields

Search

- Sales
  - Column
  - CustomerPONumber
  - DiscountAmount
  - Freight
  - OrderDate
  - OrderDateKey
  - OrderQuantity
  - PrimEmployeeKey
  - ProductKey
  - ProductStandardCost
  - PromotionKey
  - RevisionNumber
  - SalesAmount
  - SalesOrderLineNum...
  - SalesOrderNumber
  - TaxAmt
  - TotalProductCost

TABLE: Sales (20,739 rows) COLUMN: Column (1 distinct values)

Module 03H - Power BI Desktop

File | Home | Modeling | Help | Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: | Auto | Home Table: | Data Category: Uncategorized | Default Summarization: Sum | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Sales Order Key =
2 'Sales Person Bridge'[SalesOrderNumber] & 'Sales Person Bridge'[SalesOrderLineNumber]
```

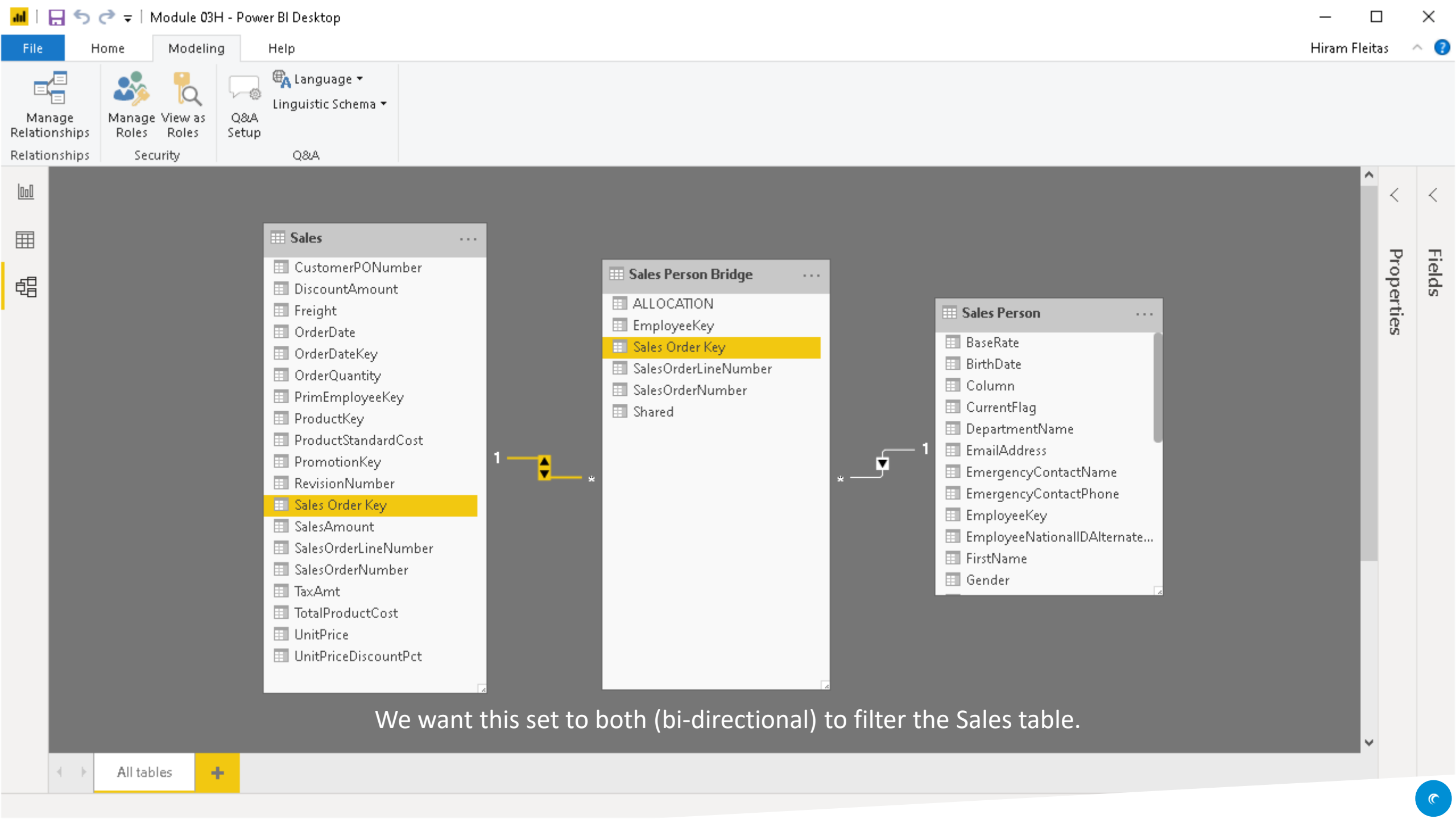
EmployeeKey	SalesOrderNumber	SalesOrderLineNumber	ALLOCATION	Shared	Column
283	SO43667	3	1	0	
283	SO43865	3	1	0	
283	SO43884	3	1	0	
283	SO43896	3	1	0	
283	SO44105	3	1	0	
283	SO44287	3	1	0	
283	SO44314	3	1	0	
283	SO44509	3	1	0	
283	SO44528	3	1	0	
283	SO44742	3	1	0	
283	SO44772	3	1	0	
283	SO44787	3	1	0	
283	SO45045	3	1	0	
283	SO45070	3	1	0	
283	SO45291	3	1	0	
283	SO45307	3	1	0	
283	SO45322	3	1	0	
283	SO45332	3	1	0	
283	SO45334	3	1	0	
283	SO45535	3	1	0	
283	SO45538	3	1	0	
283	SO45547	3	1	0	
283	SO45565	3	1	0	

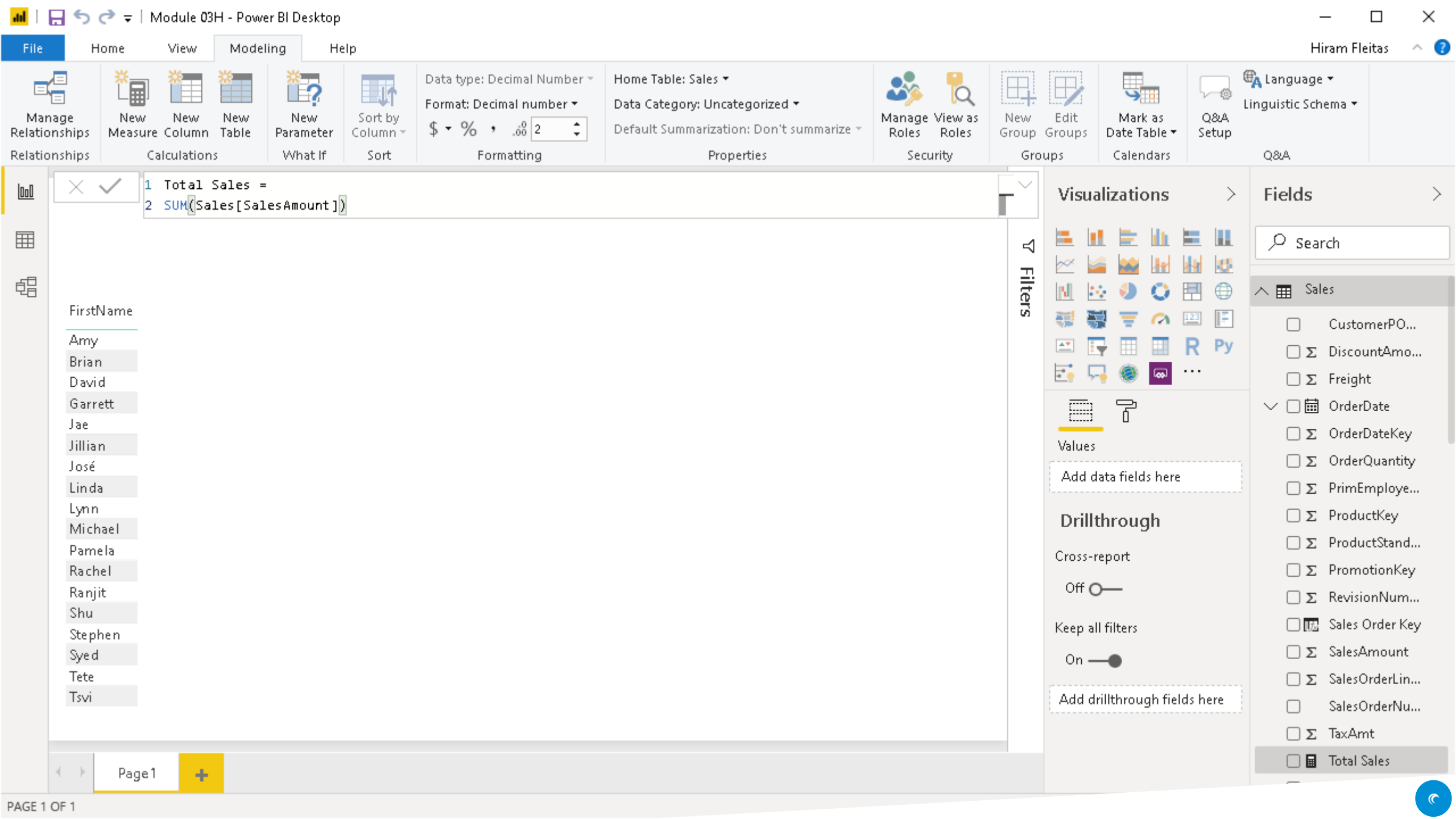
Fields

Search

- Sales
- Sales Person
- Sales Person Bridge
  - ALLOCATION
  - Column
  - EmployeeKey
  - SalesOrderLineNum...
  - SalesOrderNumber
  - Shared

TABLE: Sales Person Bridge (21,667 rows) COLUMN: Column (1 distinct values)


Module 03H - Power BI Desktop
File
Home
Modeling
Help
Hiram Fleitas
Manage Relationships
Relationships
Manage Roles
View as Roles
Security
Q&A Setup
Language
Linguistic Schema
Q&A
Sales
CustomerPONumber
DiscountAmount
Freight
OrderDate
OrderDateKey
OrderQuantity
PrimEmployeeKey
ProductKey
ProductStandardCost
PromotionKey
RevisionNumber
Sales Order Key
SalesAmount
SalesOrderLineNumber
SalesOrderNumber
TaxAmt
TotalProductCost
UnitPrice
UnitPriceDiscountPct
1
*
Sales Person Bridge
ALLOCATION
EmployeeKey
Sales Order Key
SalesOrderLineNumber
SalesOrderNumber
Shared
*
1
Sales Person
BaseRate
BirthDate
Column
CurrentFlag
DepartmentName
EmailAddress
EmergencyContactName
EmergencyContactPhone
EmployeeKey
EmployeeNationalIDAlternate...
FirstName
Gender
Properties
Fields
We want this set to both (bi-directional) to filter the Sales table.
All tables


Module 03H - Power BI Desktop
File
Home
View
Modeling
Help
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type: Decimal Number
Format: Decimal number
Home Table: Sales
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
1 Total Sales =
2 SUM(Sales[SalesAmount])
FirstName
Amy
Brian
David
Garrett
Jae
Jillian
José
Linda
Lynn
Michael
Pamela
Rachel
Ranjit
Shu
Stephen
Syed
Tete
Tsvi
Filters
Visualizations
Values
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
Sales
CustomerPO...
DiscountAmo...
Freight
OrderDate
OrderDateKey
OrderQuantity
PrimEmploye...
ProductKey
ProductStand...
PromotionKey
RevisionNum...
Sales Order Key
SalesAmount
SalesOrderLin...
SalesOrderNu...
TaxAmt
Total Sales
Page 1
PAGE 1 OF 1

Module 03H - Power BI Desktop

File | Home | View | Modeling | Help | Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: | Format: | Auto | Home Table: | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

$68.48M

Total Sales

FirstName	Total Sales
Amy	$10,339,601.46
David	$3,326,710.59
Garrett	$2,936,192.74
Jae	$7,214,129.66
Jillian	$8,479,749.21
José	$5,063,011.07
Linda	$8,949,917.45
Lynn	$1,104,882.87
Michael	$7,861,564.09
Pamela	$2,926,307.15
Rachel	$1,470,152.64
Ranjit	$3,889,601.48
Shu	$5,535,555.67
Stephen	$1,661,748.63
Syed	$893,559.35
Tete	$1,946,768.32
Tsvi	$6,088,846.83
Total	**$68,484,208.85**

Filters

Visualizations

Values

Add data fields here

Drillthrough

Cross-report

Off

Keep all filters

On

Add drillthrough fields here

Fields

Search

Sales

- CustomerPO...
- DiscountAmo...
- Freight
- OrderDate
- OrderDateKey
- OrderQuantity
- PrimEmploye...
- ProductKey
- ProductStand...
- PromotionKey
- RevisionNum...
- Sales Order Key
- SalesAmount
- SalesOrderLin...
- SalesOrderNu...
- TaxAmt
- Total Sales

Page 1

PAGE 1 OF 1

Module 03H - Power BI Desktop

Visual tools

File | Home | View | Modeling | Help | Format | Data / Drill

Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: | Format: | Auto | Home Table: | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

$68.48M

FirstName	Total Sales
Amy	$10,339,601.46
Jillian	$8,479,749.21
Linda	$8,949,917.45
Total	**$24,736,995.35**

10.3
8.4
8.9
27.3

Filters

Filters on this visual

FirstName
top 3 by Total Sales

Filter type
Top N

Show items:
Top 3

By value
Total Sales

Apply filter

Total Sales
is (All)

Add data fields here

Filters on this page

Add data fields here

Visualizations

Values
FirstName
Total Sales

Drillthrough

Cross-report
Off

Keep all filters
On

Add drillthrough fields here

Fields

total sales

Sales
Total Sales

Page 1

PAGE 1 OF 1

Module 03H - Power BI Desktop

File | Home | View | Modeling | Help | Hiram Fleitas

Manage Relationships | New Measure | New Column | New Table | New Parameter | Sort by Column | Data type: Whole Number | Format: | Auto | Home Table: | Data Category: Uncategorized | Default Summarization: Don't summarize | Manage Roles | View as Roles | New Group | Edit Groups | Mark as Date Table | Q&A Setup | Language | Linguistic Schema

Relationships | Calculations | What If | Sort | Formatting | Properties | Security | Groups | Calendars | Q&A

```
1 Total Sales w Allocation =
2 SUMX(
3     'Sales Person Bridge',
4     'Sales'[Total Sales] * 'Sales Person Bridge'[ALLOCATION])
```

FirstName	Total Sales
Amy	$10,339,601.46
Jillian	$8,479,749.21
Linda	$8,949,917.45
Total	**$24,736,995.35**

Filters | Visualizations | Fields

total sales

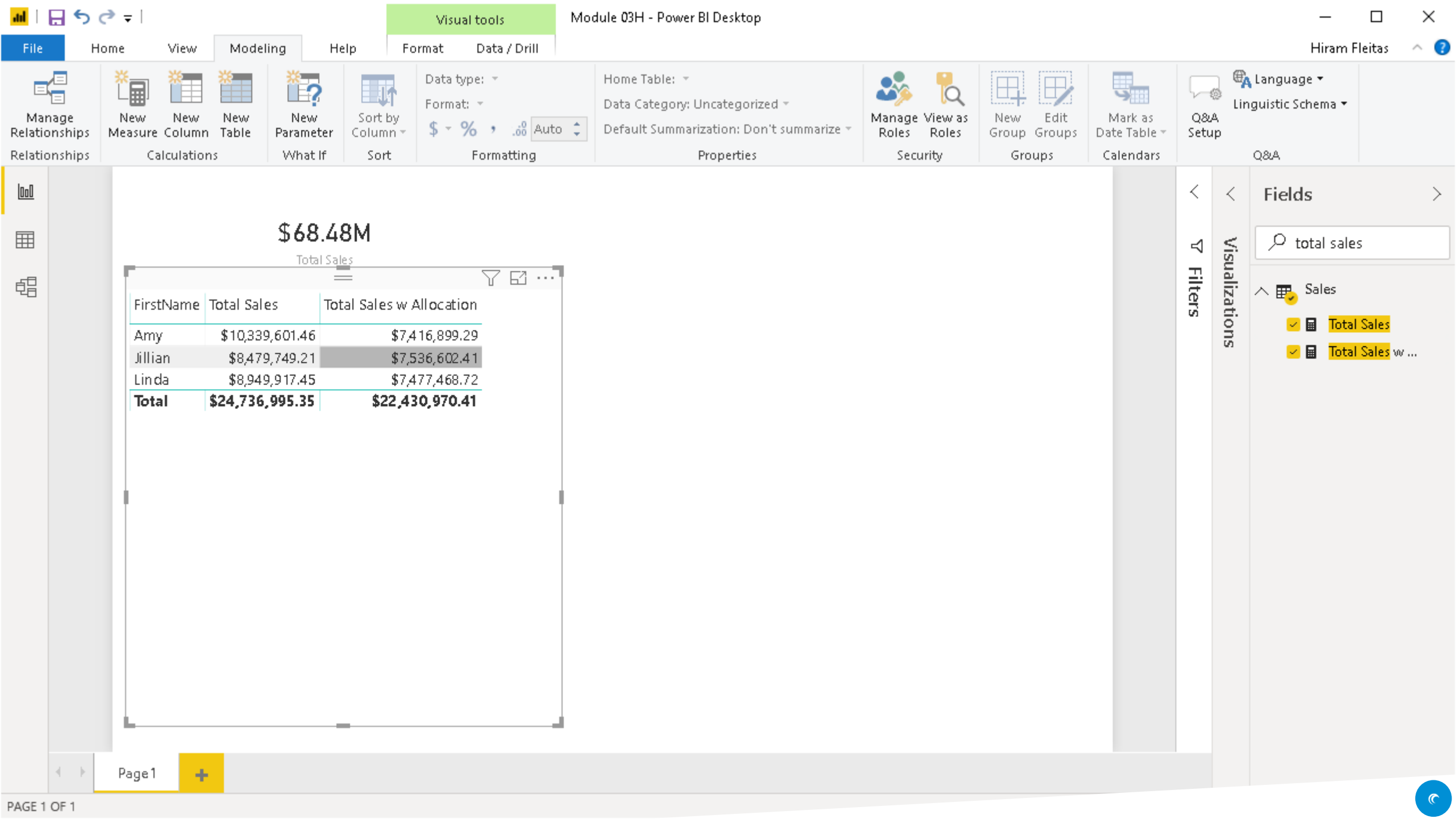
Sales

Measure

Total Sales

Page 1

PAGE 1 OF 1


Visual tools
Module 03H - Power BI Desktop
File
Home
View
Modeling
Help
Format
Data / Drill
Hiram Fleitas
Manage Relationships
New Measure
New Column
New Table
New Parameter
Sort by Column
Data type:
Format:
Auto
Home Table:
Data Category: Uncategorized
Default Summarization: Don't summarize
Manage Roles
View as Roles
New Group
Edit Groups
Mark as Date Table
Q&A Setup
Language
Linguistic Schema
Relationships
Calculations
What If
Sort
Formatting
Properties
Security
Groups
Calendars
Q&A
$68.48M
Total Sales
FirstName
Total Sales
Total Sales w Allocation
Amy
$10,339,601.46
$7,416,899.29
Jillian
$8,479,749.21
$7,536,602.41
Linda
$8,949,917.45
$7,477,468.72
Total
$24,736,995.35
$22,430,970.41
Filters
Visualizations
Fields
total sales
Sales
Total Sales
Total Sales w ...
Page 1
PAGE 1 OF 1

Review

Many to Many

Over Counting

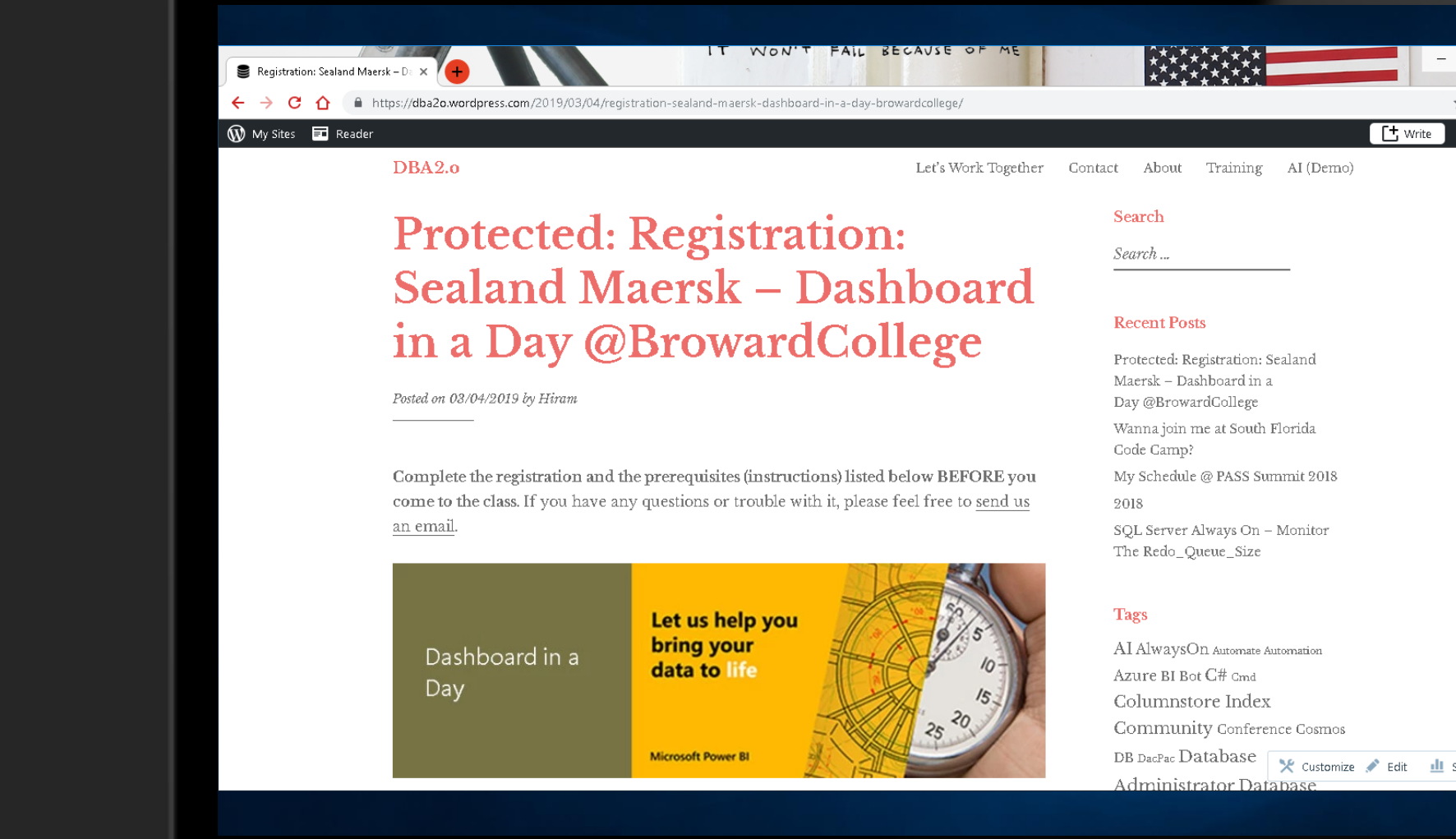
SUMX

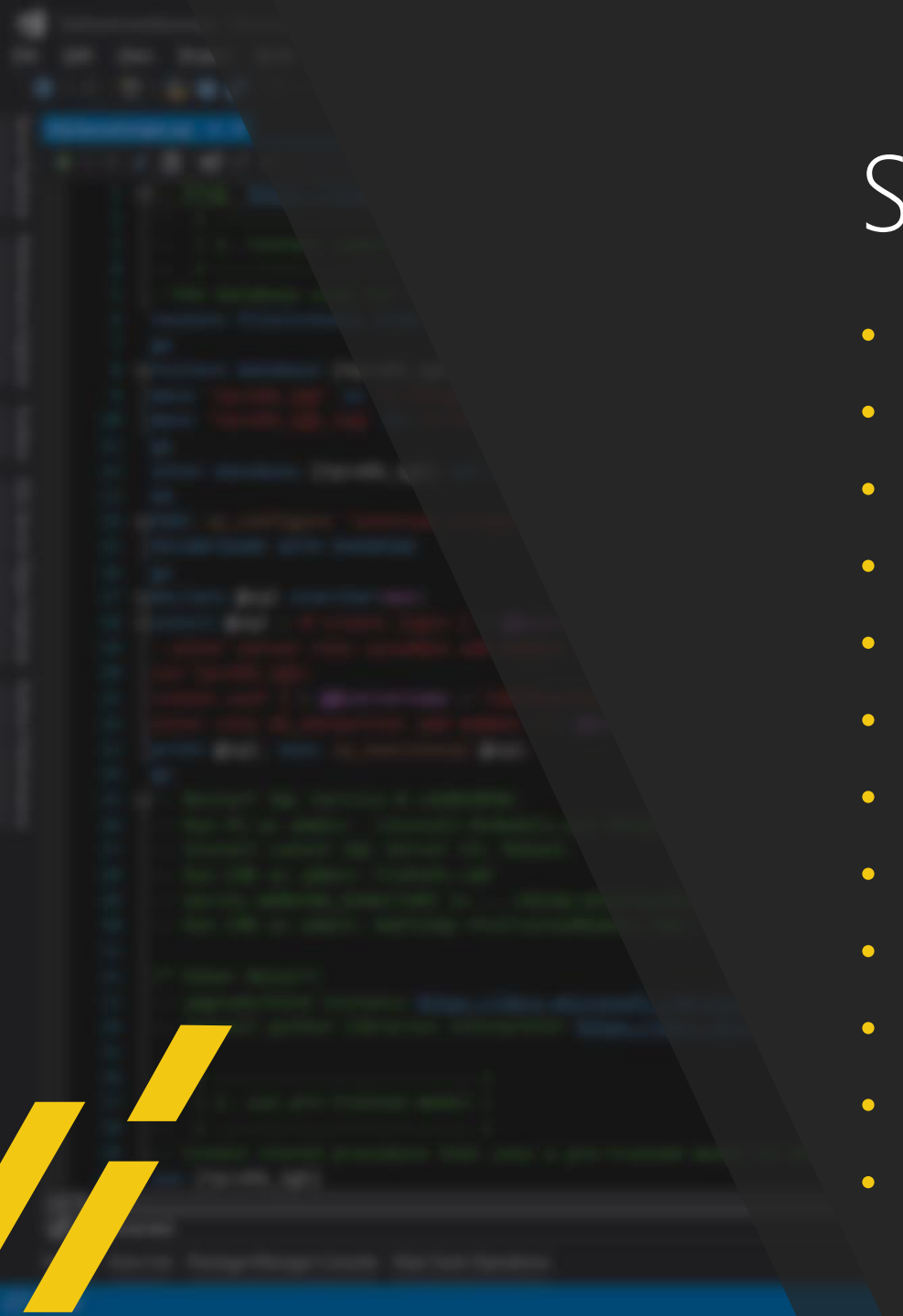
Really good use cases for this iterator function.

Pop-Up Quiz # 8

bit.ly/pbi18

End


Registration: Sealand Maersk – D
https://dba2o.wordpress.com/2019/03/04/registration-sealand-maersk-dashboard-in-a-day-browardcollege/
My Sites
Reader
Write
DBA2.o
Let's Work Together
Contact
About
Training
AI (Demo)
Protected: Registration: Sealand Maersk – Dashboard in a Day @BrowardCollege
Posted on 03/04/2019 by Hiram
Complete the registration and the prerequisites (instructions) listed below BEFORE you come to the class. If you have any questions or trouble with it, please feel free to send us an email.
Dashboard in a Day
Let us help you bring your data to life
Microsoft Power BI
Search
Search ...
Recent Posts
Protected: Registration: Sealand Maersk – Dashboard in a Day @BrowardCollege
Wanna join me at South Florida Code Camp?
My Schedule @ PASS Summit 2018
2018
SQL Server Always On – Monitor The Redo_Queue_Size
Tags
AI AlwaysOn Automate Automation Azure BI Bot C# Cmd Columnstore Index Community Conference Cosmos DB DacPac Database Administrator Database
Customize
Edit



Summary

- Filtering
- Cross-Filtering and Time Intelligence
- Many to Many with DAX
- Creating a Bridge Table
- Role Playing Tables with DAX
- Role Playing Tables without DAX
- Mismatched Granularities
- Weighted Allocation
- Data Refresh Overview
- Scheduling Data Refresh
- Implementing Row Level Security
- Implementing Dynamic Security

Session evaluations

Your feedback is very important.

This is the link:

bit.ly/pbi18

Submit your feedback by the end of this presentation.

Hiram Fleitas

Wednesday, Dec 18th, 2019
9 am - 1 pm
Power BI Advanced

Resources

- URL: https://bit.ly/pbi18

FLEITAS ARTS

Hiram Fleitas

Instructor

/HiramFleitas

/hfleitas

@HiramFleitas

hiram@fleitasarts.com

HiramFleitas

fleitasarts.com

Thank You

FLEITAS ARTS

Get Started Now at PowerBI.com

Microsoft | Power BI Products Solutions Partners Learn Sign in Sign up free

Business intelligence like never before

Go from data to insights in minutes.
Any data, any way, anywhere. And all in one view.

START FREE >