

***Rotman***

**Master of  
Management  
Analytics**

# INTRO TO JMP – PART 2

Bootcamp

August 3, 2022 Prepared by Jay / [TDMDAL](#)



Rotman School of Management  
UNIVERSITY OF TORONTO

# Plan

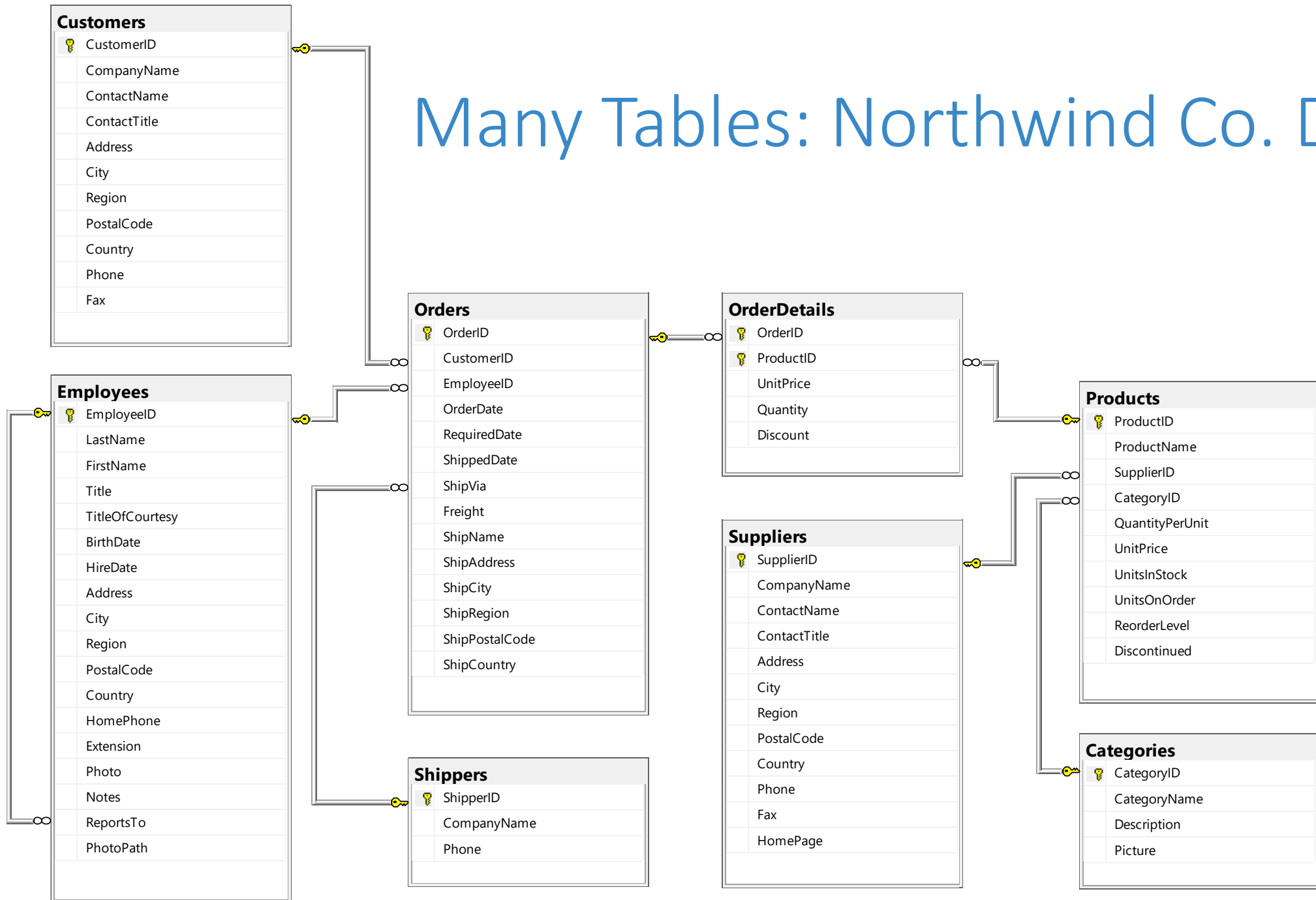
- Session 1
  - Workflow overview
  - Basic data manipulation
- Session 2
  - **Join data tables**
  - JMP graphing
- Session 3
  - Modelling
  - JMP Journal
  - JMP Scripting Language

# Join Data Tables

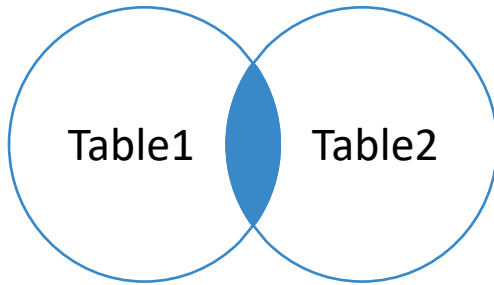
- Relationship between data tables
  - one-to-one
  - one-to-many
  - many-to-many
- Database terminology
  - **primary key**: uniquely identifies an observation in its own table
  - **foreign key**: uniquely identifies an observation in another table



# Many Tables: Northwind Co. DB



# Join – Inner Join



| Table1 |      | Table2 |      |
|--------|------|--------|------|
| pk     | t1c1 | fk     | t2c1 |
| 1      | a    | 1      | c    |
| 2      | b    | 1      | d    |
|        |      | 3      | e    |

| pk | t1c1 | fk | t2c1 |
|----|------|----|------|
| 1  | a    | 1  | c    |
| 1  | a    | 1  | d    |

Join - JMP Pro

Join rows from several sources by matching value.

Join 'Table1' with

- Table2
- Table1

Options

- Preserve main table order
- Update main table with data from second table
- Merge same name columns
- Match Flag

Main Table

- Copy formula
- Suppress formula evaluation

Second Table

- Copy formula
- Suppress formula evaluation

Source Columns

Table1

- pk
- t1c1

Table2

- fk
- t2c1

Matching Specification

By Matching Columns

Match Columns

Match pk=fk

Drop multiples  Main Table  With Table

Include non-matches  Main Table  With Table

Inner Join

Output Columns

- Select columns for joined table

Action

OK

Cancel

Remove

Recall

Help

Output table name:

Keep dialog open

Save Script to Source Table

# Join – Left (Outer) Join

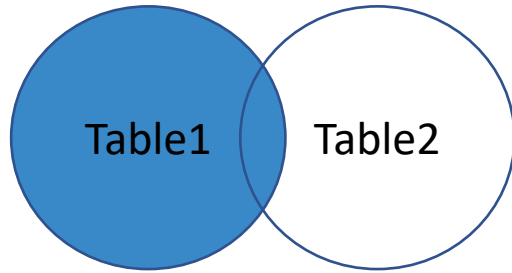


Table1

| pk | t1c1 |
|----|------|
| 1  | a    |
| 2  | b    |

Table2

| fk | t2c1 |
|----|------|
| 1  | c    |
| 1  | d    |
| 3  | e    |

| pk | t1c1 | fk | t2c1 |
|----|------|----|------|
| 1  | a    | 1  | c    |
| 1  | a    | 1  | d    |
| 2  | b    |    |      |

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Main Table

- Copy formula
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Second Table

- Copy formula
- Suppress formula evaluation

Source Columns

- Table1**
  - pk
  - t1c1
- Table2**
  - fk
  - t2c1

Matching Specification

By Matching Columns

Match Columns

Match pk=fk

Drop multiples  Main Table  With Table

Include non-matches  Main Table  With Table

Left Outer Join

Output Columns

- Select columns for joined table

Action

OK

Cancel

Remove

Recall

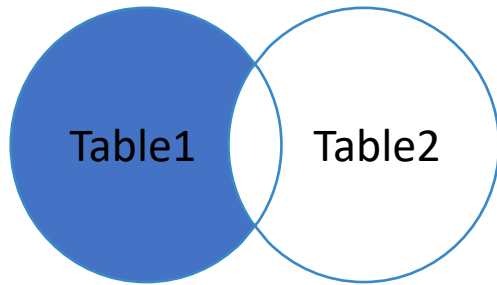
Help

Output table name:

Keep dialog open

Save Script to Source Table

# Join - Left (Outer) Join With Exclusion (Demo)



| Table1 |      | Table2 |      |
|--------|------|--------|------|
| pk     | t1c1 | fk     | t2c1 |
| 1      | a    | 1      | c    |
| 2      | b    | 1      | d    |
|        |      | 3      | e    |

| pk | t1c1 | fk | t2c1 |
|----|------|----|------|
| 2  | b    |    |      |

- step 1: left (outer) join
- step 2: filter rows (row selection)
  - fk is missing
- step 3: subset table according to filtering result

# Join – Right Outer Join\*

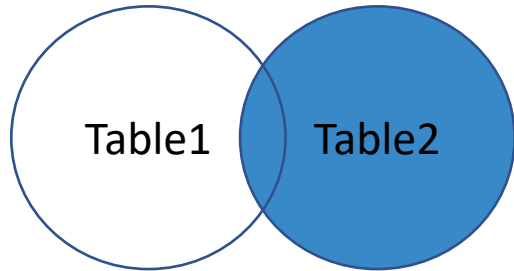


Table1

| pk | t1c1 |
|----|------|
| 1  | a    |
| 2  | b    |

Table2

| fk | t2c1 |
|----|------|
| 1  | c    |
| 1  | d    |
| 3  | e    |

| pk | t1c1 | fk | t2c1 |
|----|------|----|------|
| 1  | a    | 1  | c    |
| 1  | a    | 1  | d    |
|    |      | 3  | e    |

Join - JMP Pro

Join rows from several sources by matching value.

Join 'Table1' with

- Table2
- Table1

Options

- Preserve main table order
- Update main table with data from second table
- Merge same name columns
- Match Flag

Main Table

- Copy formula
- Suppress formula evaluation

Second Table

- Copy formula
- Suppress formula evaluation

Source Columns

- Table1**
  - pk
  - t1c1
- Table2**
  - fk
  - t2c1

Matching Specification

By Matching Columns

Match Columns

Match pk=fk

Drop multiples  Main Table  With Table

Include non-matches

Right Outer Join

Output Columns

- Select columns for joined table

Action

OK

Cancel

Remove

Recall

Help

Output table name:

Keep dialog open

Save Script to Source Table



# Join - Right Outer Join With Exclusion\*

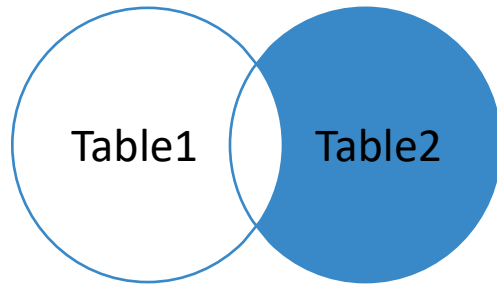


Table1

| pk | t1c1 |
|----|------|
| 1  | a    |
| 2  | b    |

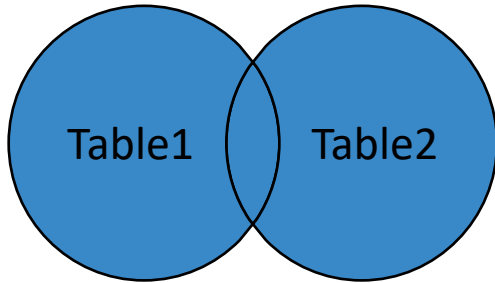
Table2

| fk | t2c1 |
|----|------|
| 1  | c    |
| 1  | d    |
| 3  | e    |

| pk | t1c1 | fk | t2c1 |
|----|------|----|------|
|    |      | 3  | e    |

- step 1: right (outer) join
- step 2: filter rows (row selection)
  - pk is missing
- step 3: subset table according to filtering result

# Join – Full Outer Join



| Table1 |      | Table2 |      |
|--------|------|--------|------|
| pk     | t1c1 | fk     | t2c1 |
| 1      | a    | 1      | c    |
| 2      | b    | 1      | d    |
|        |      | 3      | e    |

| pk | t1c1 | fk | t2c1 |
|----|------|----|------|
| 1  | a    | 1  | c    |
| 1  | a    | 1  | d    |
| 2  | b    |    |      |
|    |      | 3  | e    |

Join - JMP Pro

Join rows from several sources by matching value.

Join 'Table1' with

- Table2
- Table1

Options

- Preserve main table order
- Update main table with data from second table
- Merge same name columns
- Match Flag

Main Table

- Copy formula
- Suppress formula evaluation

Second Table

- Copy formula
- Suppress formula evaluation

Matching Specification

By Matching Columns

Match Columns

Match pk=fk

Drop multiples  Main Table  With Table

Include non-matches

Full Outer Join

Output Columns

- Select columns for joined table

Action

OK

Cancel

Remove

Recall

Help

Output table name:

Keep dialog open

Save Script to Source Table

# Join – Full Outer Join with Exclusion

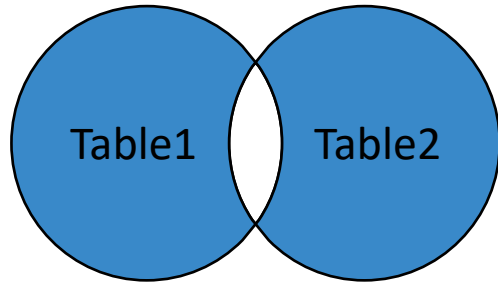


Table1

| pk | t1c1 |
|----|------|
| 1  | a    |
| 2  | b    |

Table2

| fk | t2c1 |
|----|------|
| 1  | c    |
| 1  | d    |
| 3  | e    |

| pk | t1c1 | fk | t2c1 |
|----|------|----|------|
| 2  | b    |    |      |
|    |      | 3  | e    |

- step 1: Full (outer) join
- step 2: filter rows (row selection)
  - pk is missing **OR** fk is missing
- step 3: subset table according to filtering result

# Your Turn (Hands-on)

- Load the Table1.jmp and Table2.jmp data tables
  - The two tables are inside data\basics\ folder
- Implement the Full Outer Join with Exclusion case

# JMP Query Builder

- Similar as the Join menu
- Learn on your own
  - query builder will make more sense after you complete the SQL bootcamp

The screenshot displays the JMP Pro interface. The 'Tables' menu is open, showing options like Summary, Subset, Sort, Stack, Split, Transpose, Join, Update, Concatenate, and 'JMP Query Builder' (highlighted). The 'Select Tables for Query' dialog is open, showing 'Table1 (t1)' as the Primary table and 'Table2 (t2)' as the Secondary table. The 'Add Condition' dialog is also open, showing a join condition between 'Table1 (t1)' and 'Table2 (t2)'. The 'Left Column' is 'pk' and the 'Right Column' is 'fk'. The 'Data Type' is 'double' and the 'Join' is 'optional'. The 'Table2' preview shows 3 rows and 2 columns.

| Column Name | Data Type | Key | Join     |
|-------------|-----------|-----|----------|
| fk          | double    |     | optional |

| Table2 | Column Name | Data Type | Key | Join     |
|--------|-------------|-----------|-----|----------|
|        | fk          | double    |     | optional |

# Your Turn (Hands-on)

- Show all products and their associated suppliers
  - Use tables from Northwind Co.
  - Display the **ProductID**, **ProductName**, and **CompanyName** of the Suppliers
- **Before you start**, let's talk about JMP Project

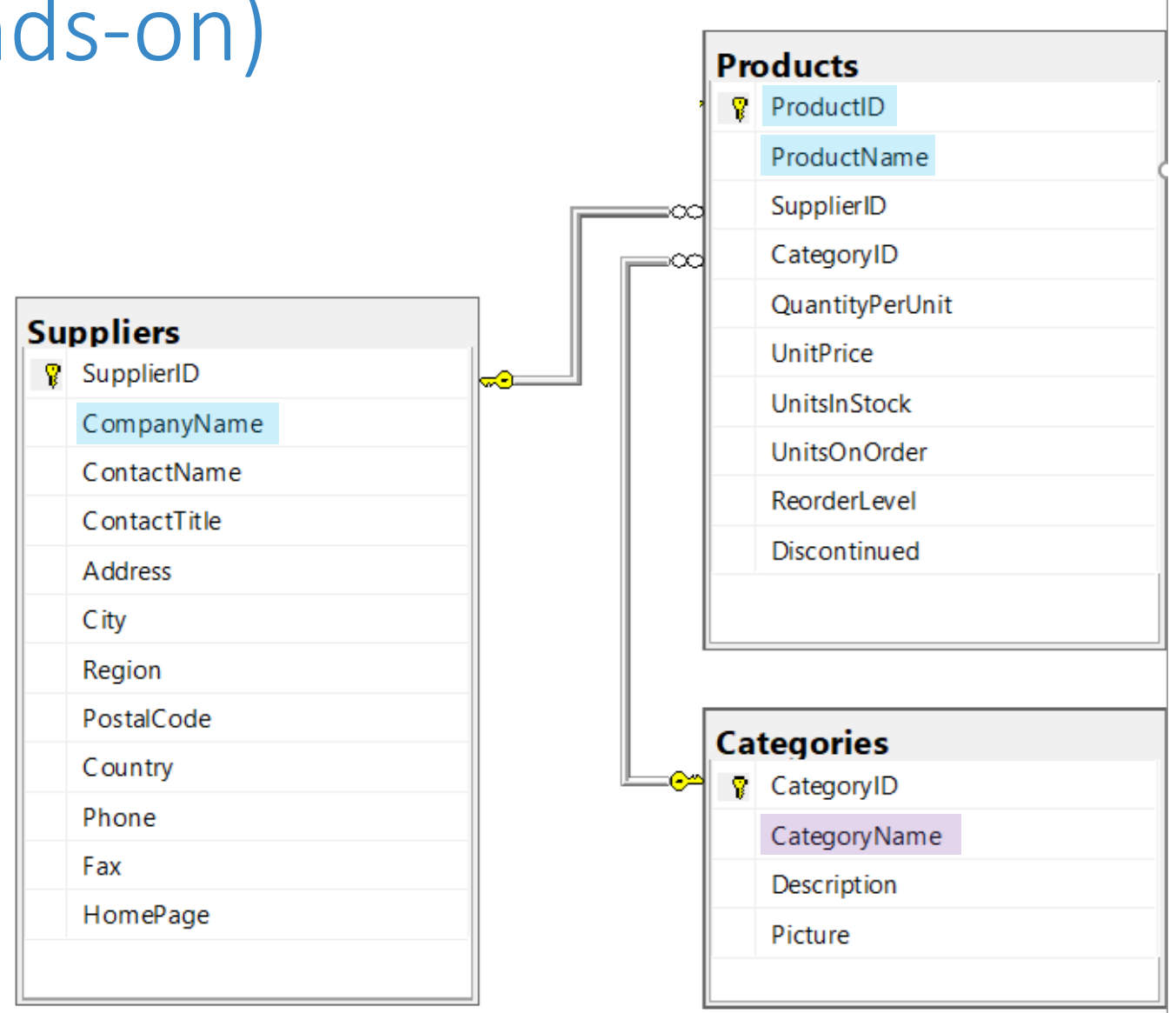
|    | ProductID | ProductName         | CompanyName            |  |
|----|-----------|---------------------|------------------------|--|
| 1  | 1         | Chai                | Exotic Liquids         |  |
| 2  | 2         | Chang               | Exotic Liquids         |  |
| 3  | 3         | Aniseed Syrup       | Exotic Liquids         |  |
| 4  | 4         | Chef Anton's Caj... | New Orleans Caj...     |  |
| 5  | 5         | Chef Anton's Gu...  | New Orleans Caj...     |  |
| 6  | 6         | Grandma's Boyse...  | Grandma Kelly's ...    |  |
| 7  | 7         | Uncle Bob's Orga... | Grandma Kelly's ...    |  |
| 8  | 8         | Northwoods Cra...   | Grandma Kelly's ...    |  |
| 9  | 9         | Mishi Kobe Niku     | Tokyo Traders          |  |
| 10 | 10        | Ikura               | Tokyo Traders          |  |
| 11 | 11        | Queso Cabrales      | Cooperativa de Q...    |  |
| 12 | 12        | Queso Mancheg...    | Cooperativa de Q...    |  |
| 13 | 13        | Konbu               | Mayumi's               |  |
| 14 | 14        | Tofu                | Mayumi's               |  |
| 15 | 15        | Genen Shouyu        | Mayumi's               |  |
| 16 | 16        | Pavlova             | Pavlova, Ltd.          |  |
| 17 | 17        | Alice Mutton        | Pavlova, Ltd.          |  |
| 18 | 18        | Carnarvon Tigers    | Pavlova, Ltd.          |  |
| 19 | 19        | Teatime Chocolat... | Specialty Biscuits,... |  |
| 20 | 20        | Sir Rodney's Mar... | Specialty Biscuits,... |  |
| 21 | 21        | Sir Rodney's Sco... | Specialty Biscuits,... |  |
| 22 | 22        | Gustaf's Knäckeb... | DR Knäckebrod AB       |  |

# JMP Project (Demo)

- Organize your data analysis with project
  - data tables
  - reports
  - scripts
  - journals
  - ...
- Getting-started resources
  - Short video: [Creating, Navigating, Saving and Archiving Projects](#)
  - Document: [Create a Project](#)

# Your Turn Now (Hands-on)

- Show all products and their associated suppliers
  - Use tables from Northwind Co.
  - Display the **ProductID**, **ProductName**, and **CompanyName** of the Suppliers
- What if we also want to display the **CategoryName**



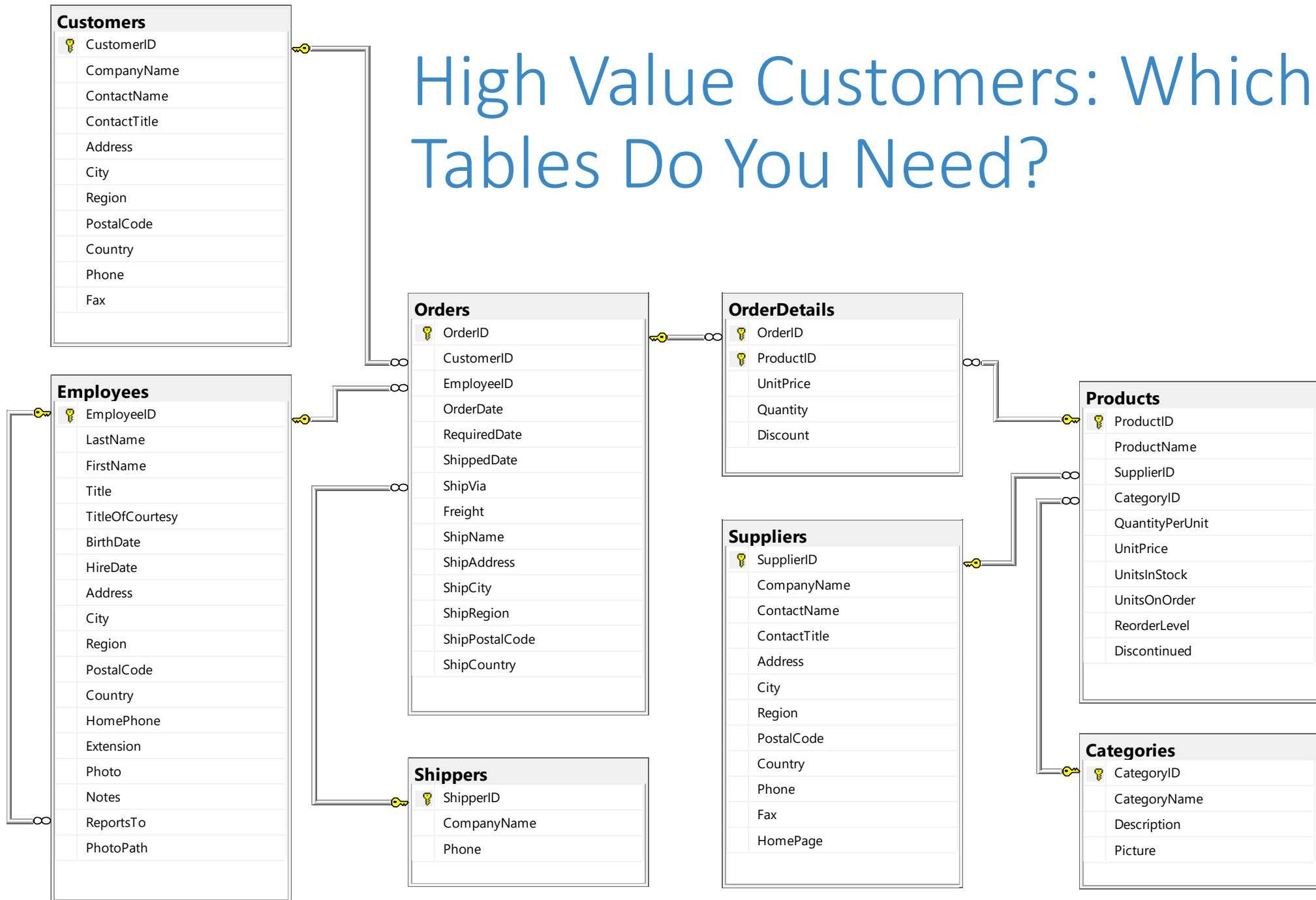


# Your Turn (Hands-on): High Value Customers

- Find high value customers
  - We define high-value customers as those who have made total order  $\geq$  \$15,000 (ignore discount) in **2016**
  - Note: only consider orders in year 2016 (**OrderDate**)
  - Display **CustomerID** and its corresponding total order value

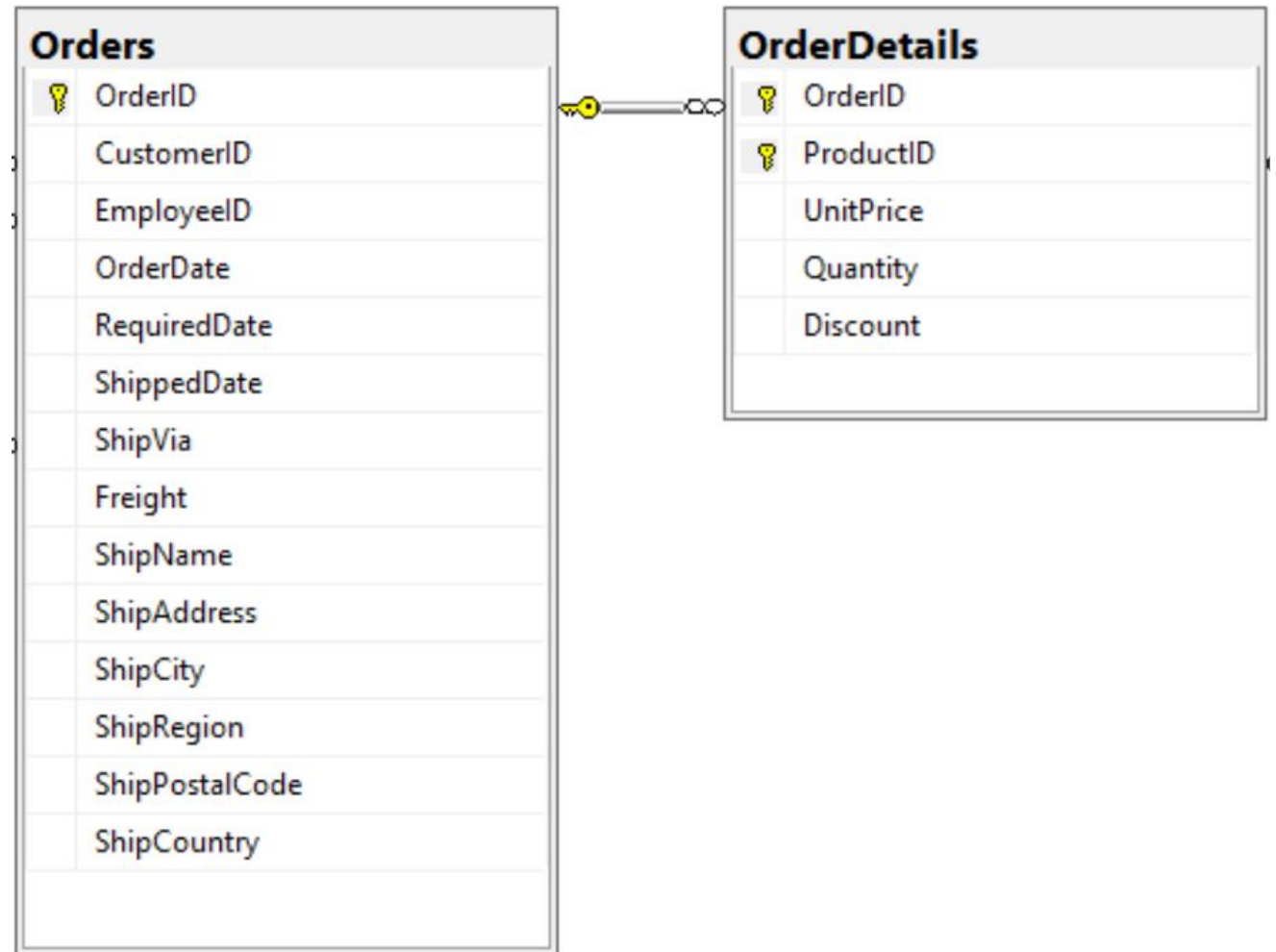
|  |   | <b>CustomerID</b> | <b>Total</b> |  |
|--|---|-------------------|--------------|--|
|  | 1 | SAVEA             | 42806.25     |  |
|  | 2 | ERNSH             | 42598.9      |  |
|  | 3 | QUICK             | 40526.99     |  |
|  | 4 | HANAR             | 24238.05     |  |
|  | 5 | HUNGO             | 22796.34     |  |
|  | 6 | RATTC             | 21725.6      |  |
|  | 7 | KOENE             | 20204.95     |  |
|  | 8 | FOLKO             | 15973.85     |  |
|  | 9 | WHITC             | 15278.9      |  |
|  |   |                   |              |  |

# High Value Customers: Which Tables Do You Need?



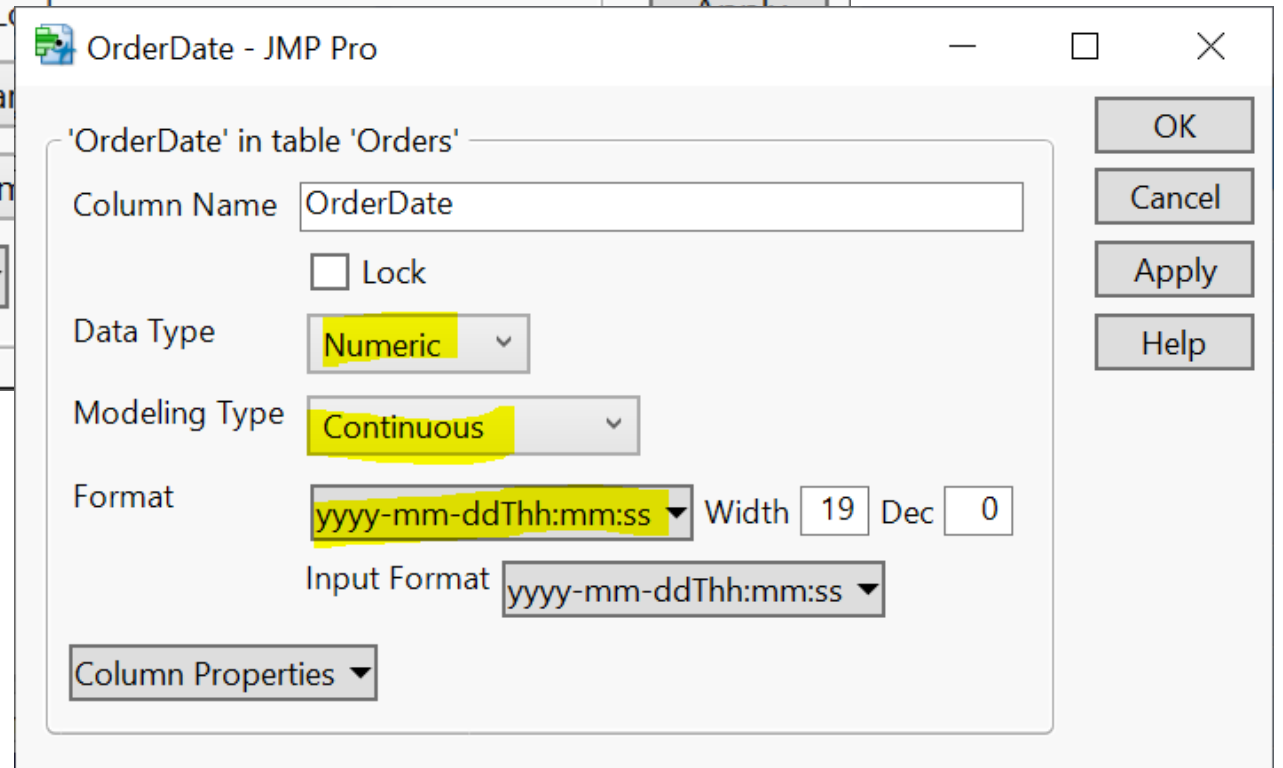
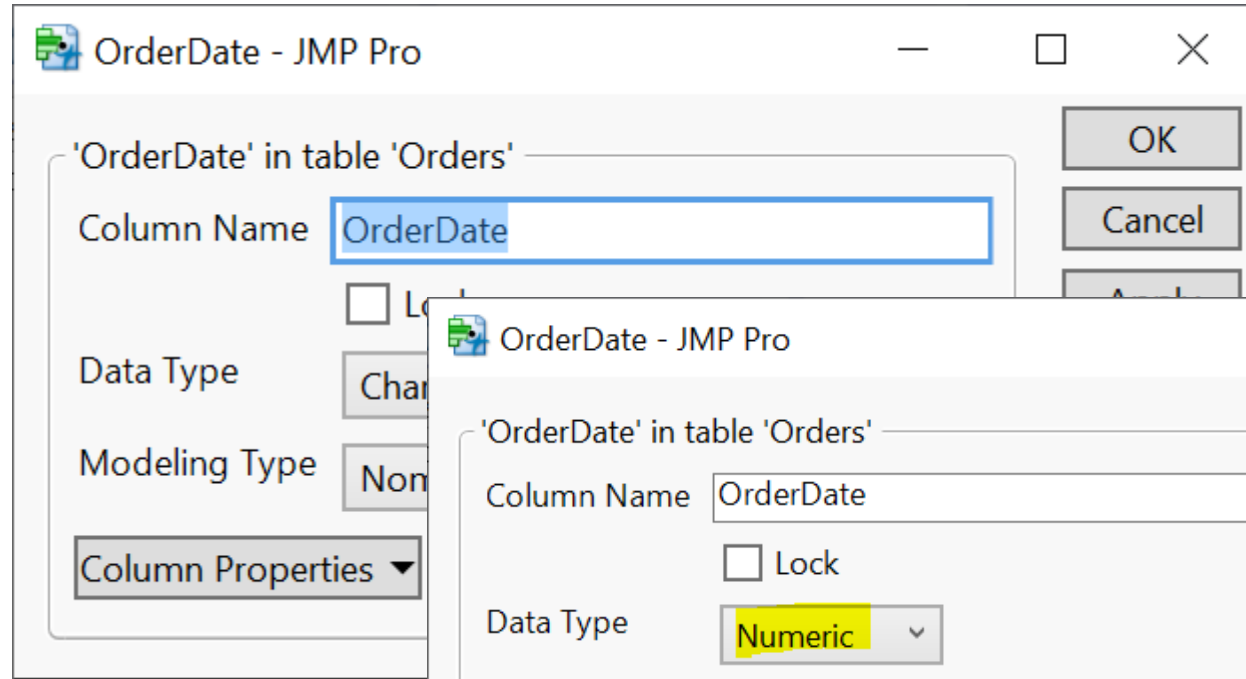
# Your Turn (Hands-on): High Value Customers

- After you finish the exercise, reflect on the following
  - how many steps did you take?
  - Is there an optimal way (order of the steps) of doing this?
  - Can you reproduce the result easily
  - pros and cons of point-and-click



# A Quick Detour – Date & Time

- Column Info
  - Data Type
  - Modeling Type
  - Format



# Your Turn (Take home)

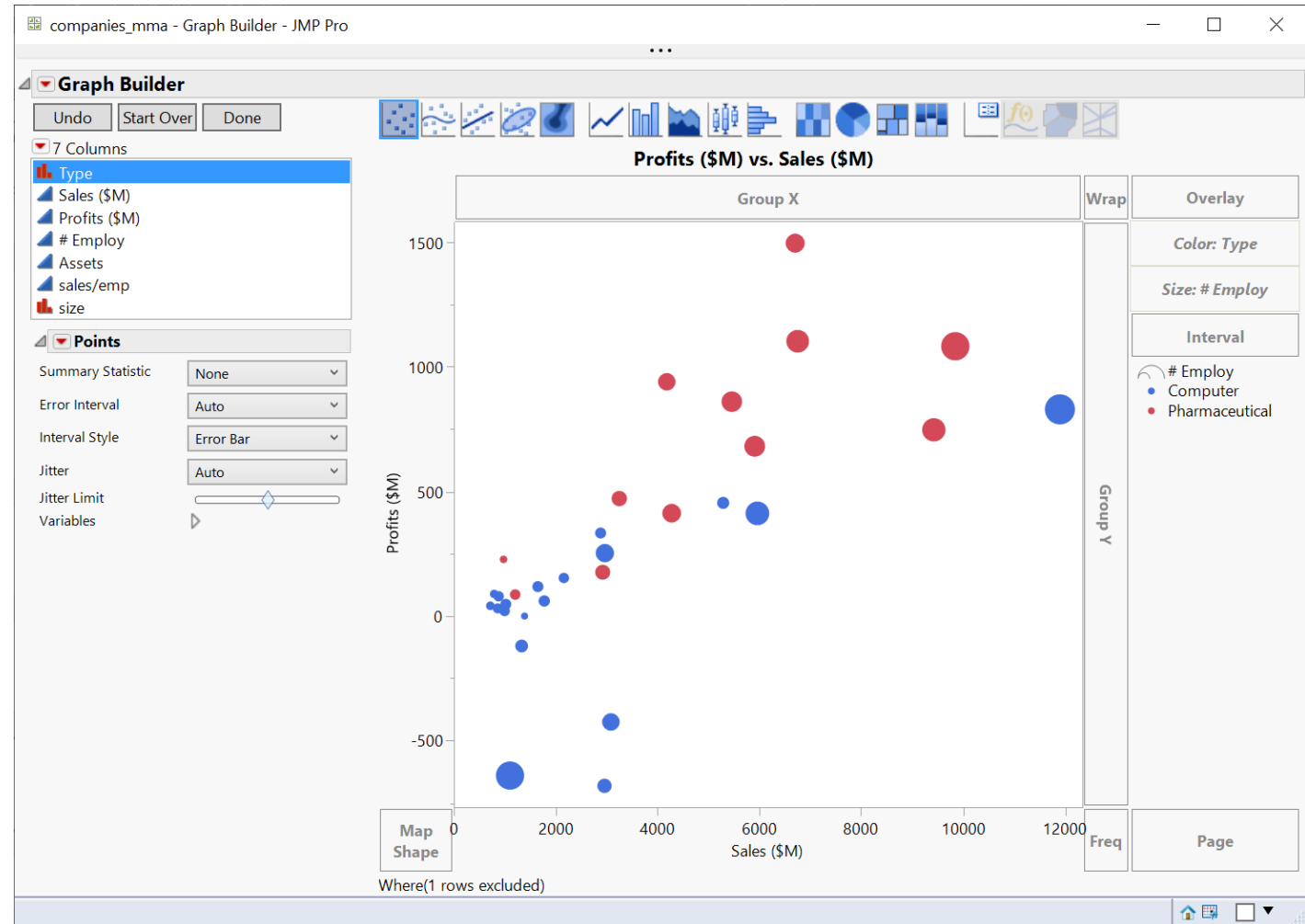
- Q1. Find customers that never placed an order
- Q2. Find customers who never placed an order from Margaret Peacock (EmployeeID 4)

# Plan

- Session 1
  - Workflow overview
  - Basic data manipulation
- Session 2
  - Join data tables
  - **JMP graphing**
- Session 3
  - Modelling
  - JMP Journal
  - JMP Scripting Language

# JMP Graphing (Demo)

- Graph Builder
- Labelling



# Your Turn (Hands-on)

- Import the gapminder.csv file (data/basics/gapminder.csv)
- Create a Data Filter on the **year** column
  - First change the year col modeling type to nominal
- Use the Graph Builder to plot
  - **LifeExp** (Y) vs **gpdPerCap** (X)
  - Use **pop** for marker Size
  - Use **continent** for marker Color
  - Use the data filter on **year** to explore the change of Y vs X over the years



# Your Turn (Hands-on)

Data Filter f... — □ ×

**Data Filter**

Clear Favorites Help

Select  Show  Include  
142 matching rows

Inverse

| year (12) |     |
|-----------|-----|
| 1952      | 142 |
| 1957      | 142 |
| 1962      | 142 |
| 1967      | 142 |
| 1972      | 142 |
| 1977      | 142 |
| 1982      | 142 |
| 1987      | 142 |
| 1992      | 142 |
| 1997      | 142 |
| 2002      | 142 |
| 2007      | 142 |

AND OR

Home □ ▼

gapminder - Graph Builder - JMP Pro — □ ×

**Graph Builder**

Undo Start Over Done

6 Columns

- country
- continent
- year
- lifeExp
- pop
- gdpPerCap

**Points**

Summary Statistic: None  
Error Interval: Auto  
Interval Style: Error Bar  
Jitter: Auto  
Jitter Limit: [Slider]  
Variables: ▶

**lifeExp vs. gdpPerCap**

Group X: Wrap Overlay

Color: continent  
Size: pop

Interval

pop

- Africa
- Americas
- Asia
- Europe
- Oceania

Group Y

Map Shape

gdpPerCap

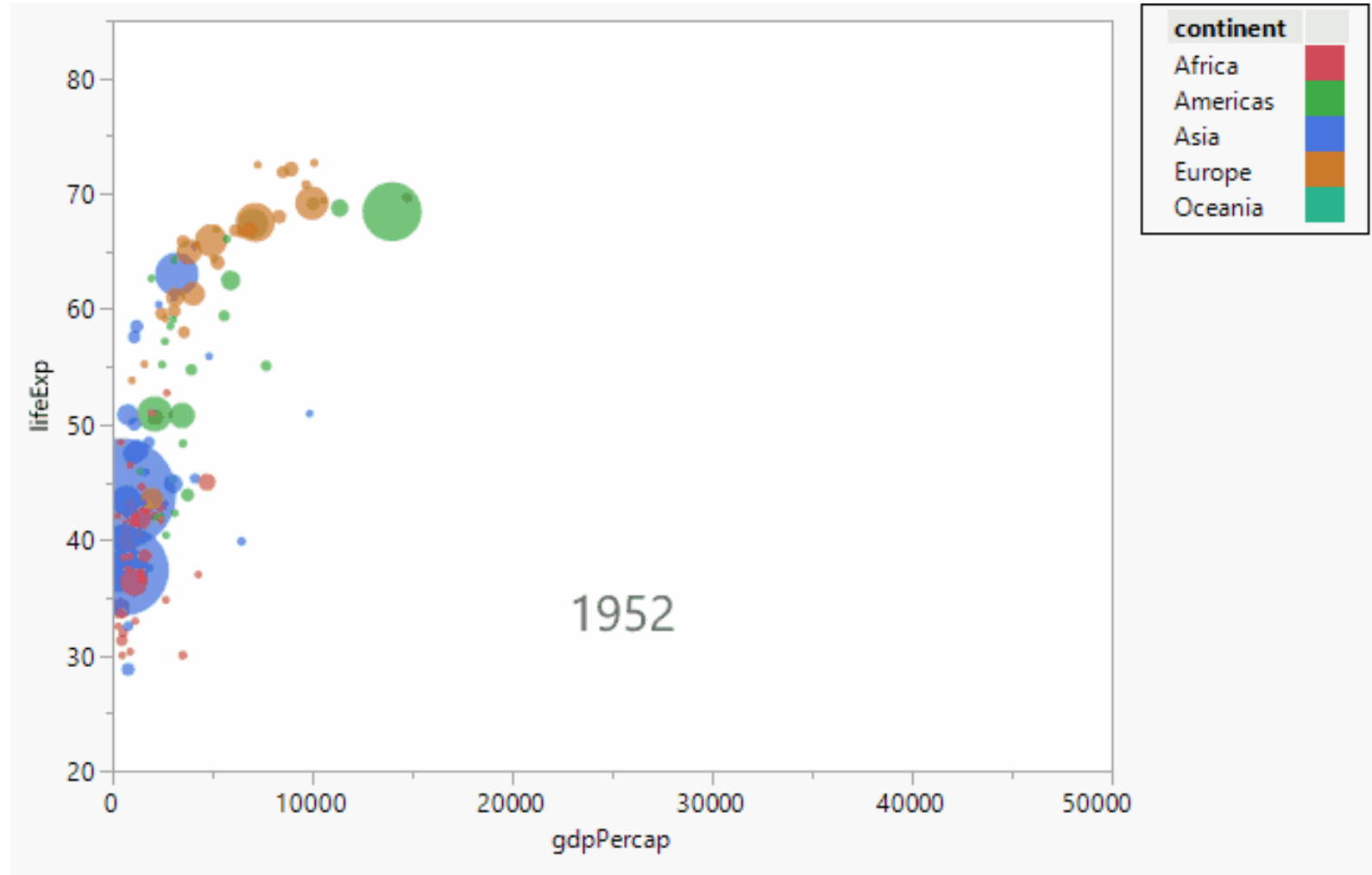
Page

142 rows selected

Home □ ▼

# Your Turn (Hands-on): Challenge

- How to animate the previous graph as a time lapse video?



# Your Turn (Hands-on): Challenge

- How to animate the previous graph as a time lapse video?
- Hint
  - Method 1: Data Filter Animation
  - Method 2 (better): Bubble plot

