

***Rotman***

**Master of  
Management  
Analytics**

# INTRO TO JMP – PART 1

Bootcamp

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



Rotman School of Management  
UNIVERSITY OF TORONTO

# What is JMP

- Predictive analytics software from SAS Institute
  - data manipulation
  - [visualization](#)
  - statistical & machine learning modeling
  - reporting
- Intuitive point-and-click interface for beginners
  - Analytics with zero/minimum coding
- Flexible and extensible for advanced users
  - JMP Scripting Language (JSL) for automating or extending point-and-click functionality
  - Connect to Database engine, Matlab, R, Python, Excel, Web API, etc.
  - Connect to the richness of SAS: retrieve SAS data and submit SAS code

See key features of JMP Pro at [JMP Pro website](#).


# Why JMP

- Get you started as quickly as possible
  - **amazing** intuitive point-and-click interface
  - quickly get things done
- JMP is a great tool
  - sufficient for many analytics tasks
  - good [visualization](#) for reporting/presentation
  - good for initial exploration or rapid prototyping
    - even you plan to use more advanced tools later
- Guide you to learn other tools
  - How do I achieve this JMP data manipulation/modeling/visualization in Python or R?
  - Try to separate the concepts with the software

# Learning by Doing

- This workshop is task/problem based;
  - I show you how to do a task
  - You will try yourself on a variation of the task
    - you will discover JMP on your own
- We will mostly focus
  - On learning the tools to do
    - data manipulation
    - visualization and report
    - simple modeling
  - Not on statistical or modeling theories

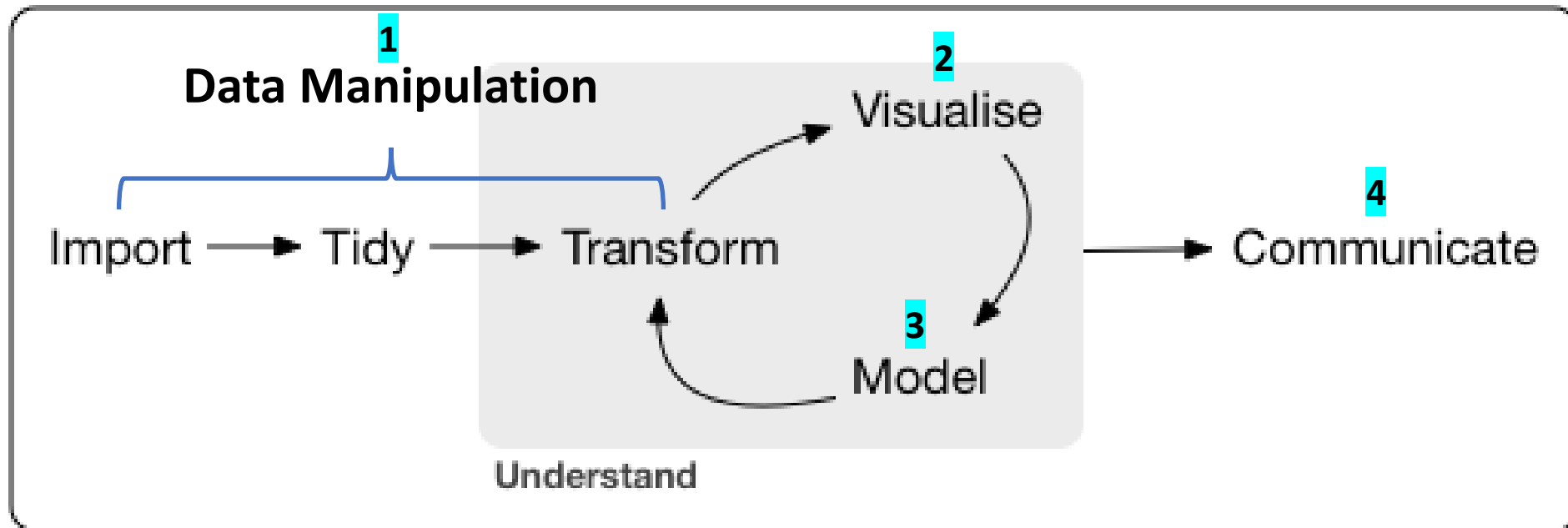
# Learning Resources (jmp.com)

- [JMP Academic \(Students\)](#) 
  - [JMP Basics](#) (great beginner videos!)
  - [Go Deeper](#) (one-page guide, short videos, webinars, and a full course.)
- [JMP Documentation Library](#) (many examples using included datasets)
  - Getting started document: [Discovering JMP](#)
  - Basics
    - [Using JMP](#) (data table)
    - [Basic Analysis](#)
    - [Essential Graphing](#)
  - Specific topics
    - [Fitting Linear Models](#)
    - [Predictive and Specialized Modeling](#)

# Plan

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

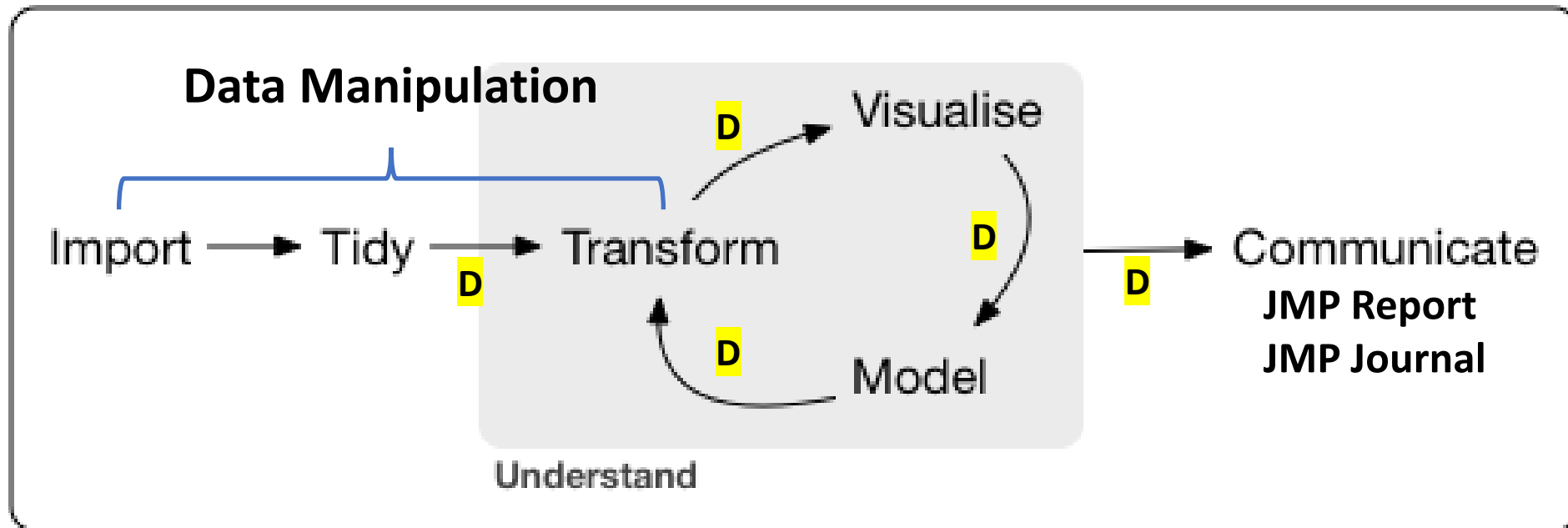
# Overview: A Typical Workflow



point-and-click & programming

Concept and graph adapted from <https://r4ds.had.co.nz/introduction.html>

# Overview: JMP Dynamic Link



**point-and-click** & programming

**D**: Dynamic Link



# Overview: A Simple Workflow Demo

- A simple example
  - import data
  - fit y by x (Profit by # Employ; linear model; “removing” an outlier)
- Data (data/basics/companies\_mma.csv)

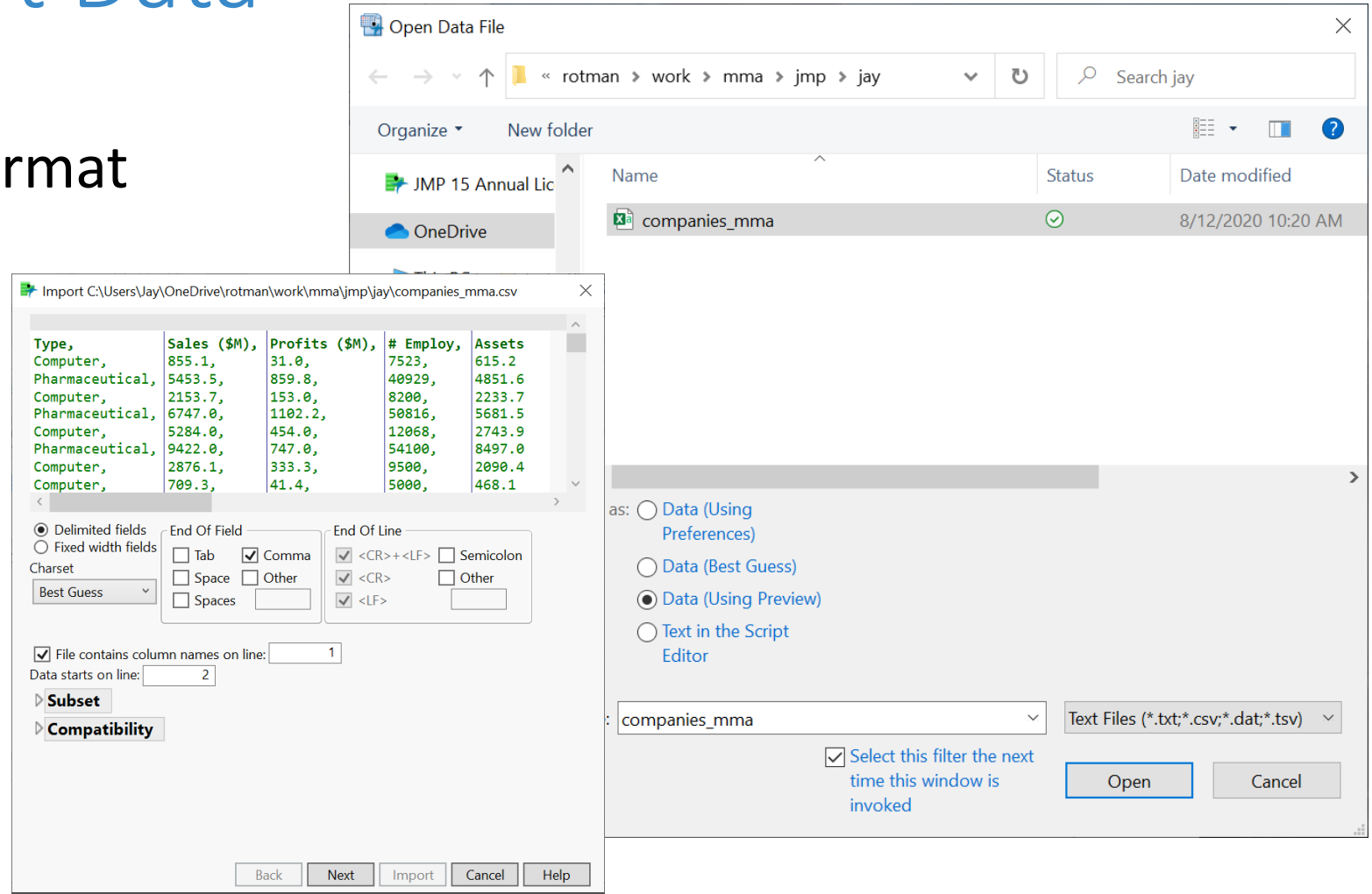
```
Type,Sales ($M),Profits ($M),# Employ,Assets
Computer,855.1,31.0,7523,615.2
Pharmaceutical,5453.5,859.8,40929,4851.6
Computer,2153.7,153.0,8200,2233.7
...
```

# Your Turn (Hands-on; 5mins)

- Repeat the demo I just did
  - import the dataset to a JMP data table
  - fit y by x (Profit by # Employ)
  - exclude an outlier; redo the fit
  - save the analysis script in the data table
- Challenge: run a multiple linear regression
  - predict Profits using number of employees (# Employ) and Sales

# Review: Import Data

- Support many file format
  - csv
  - Excel
  - json
  - many more



<https://www.jmp.com/support/help/en/15.2/#page/jmp/import-your-data.shtml#>

# Review: Data Table

- Three panels on the left
  - Table (JMP Script)
  - Columns
  - Rows
- Column Info
- Excluding rows

The screenshot displays the JMP Pro interface for a data table named 'companies\_mma'. The main window shows a table with columns: Type, Sales (\$M), Profits (\$M), # Employ, and Assets. The '# Employ' column is selected. A dialog box titled '# Employ - JMP Pro' is open, showing the column's properties. The dialog includes fields for Column Name, Data Type (set to Numeric), Modeling Type (set to Continuous), and Format (set to Best with a width of 12). There are also checkboxes for Lock and Use thousands separator (,).

	Type	Sales (\$M)	Profits (\$M)	# Employ	Assets
16	Pharmaceutical	969.2	227.4	3418	784
17	Pharmaceutical	6698.4	1495.4	34400	6756.7
18	Computer	5956	412	56000	4500
19	Pharmaceutical	5903.7	681.1	42100	8324.8
20	Computer	2959.3	252.8	31404	5611.1
21	Pharmaceut				
22	Computer				
23	Pharmaceut				
24	Computer				
25	Computer				
26	Computer				
27	Computer				
28	Computer				
29	Pharmaceut				
30	Computer				
31	Pharmaceut				
32	Computer				

Dialog Box: '# Employ' in table 'companies\_mma'

Column Name: # Employ

Lock

Data Type: Numeric

Modeling Type: Continuous

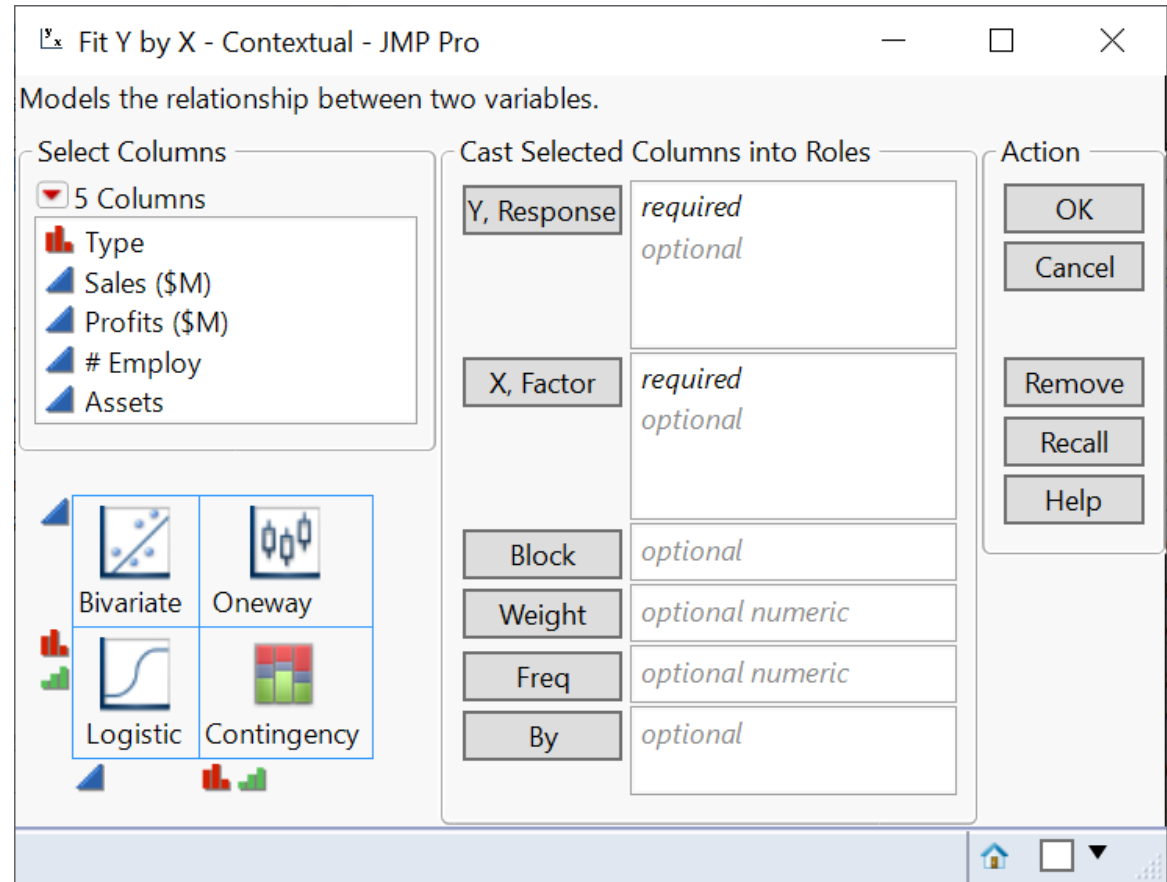
Format: Best Width: 12

Use thousands separator (,)

Column Properties

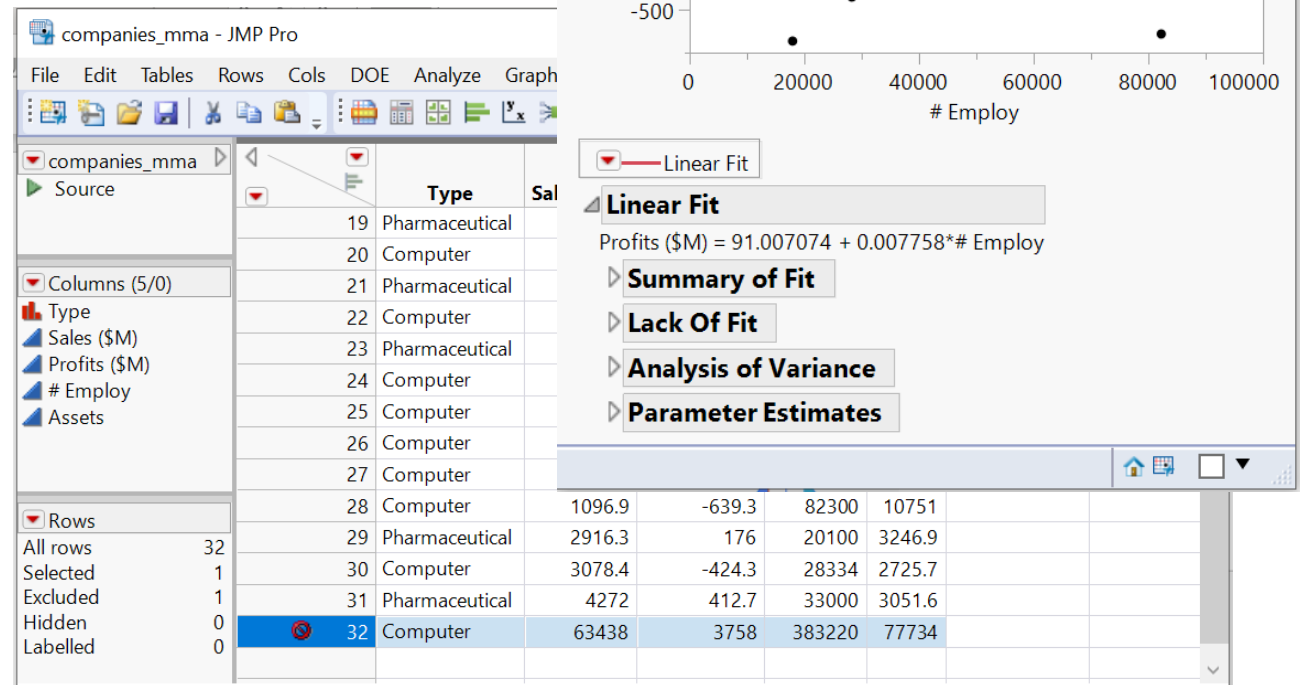
# Review: Fit Y by X Platform

- Relationships between two variables
- Model depends on Y and X variable types
  - 4 main types
  - many model choices under bivariate model



# Review: Analysis Report

- Analysis reports are dynamic
  - a report and its underlying data are linked
- Many actions are available under the red triangle buttons
  - redo analysis
  - save script
- Right click gives many actions too



# Review: Save Analysis

- Save data table
- Capture a script for analysis report

The screenshot displays the JMP Pro interface. The main window shows a data table with columns: Type, Sales (\$M), Profits (\$M), and # Employ. The data is as follows:

Type	Sales (\$M)	Profits (\$M)	# Employ	
1 Computer	855.1			
2 Pharmaceutical	5453.5			
3 Computer	2153.7			
4 Pharmaceutical	6747			
5 Computer	5284			
6 Pharmaceutical	9422			
7 Computer	2876.1			
8 Computer	709.3			
9 Computer	2952.1			
10 Computer	784.7			
11 Computer	1324.3			
12 Pharmaceutical	4175.6			
13 Computer	11899			
14 Computer	873.6			
15 Pharmaceutical	9844			
16 Pharmaceutical	969.2	227.4	3418	784
17 Pharmaceutical	6698.4	1495.4	34400	6756.7
18 Computer	5956	412	56000	4500
19 Pharmaceutical	5903.7	681.1	42100	8324.8

The right-hand window, titled 'companies\_mma - Bivariate of Profits (\$M) b...', shows a 'Bivariate Fit of Profits (\$M) By # Employ'. A red regression line is plotted against the data points. The 'Save Script' menu is open, showing options: 'To Data Table...', 'To Journal', 'To Script Window', 'To Report', and 'To Clipboard'. Other menu items include 'Show Points', 'Histogram Borders', 'Summary Statistics', 'Fit Mean', 'Fit Line', 'Fit Polynomial', 'Fit Special...', 'Flexible', 'Fit Orthogonal', 'Robust', 'Density Ellipse', 'Nonpar Density', 'Group By...', 'Local Data Filter', 'Redo', 'Analysis of Variance', and 'Parameter Estimates'.

# Review: Fit Model - Multiple Linear Reg

- Analyze > Fit Model

Fit Model - JMP Pro

**Model Specification**

Select Columns

- 5 Columns
- Type
- Sales (\$M)
- Profits (\$M)
- # Employ
- Assets

Pick Role Variables

Y Profits (\$M)  
*optional*

Weight *optional numeric*

Freq *optional numeric*

Validation *optional*

By *optional*

Personality: Standard Least Squares

Emphasis: Effect Leverage

Help Run

Recall  Keep dialog open

Remove

Construct Model Effects

Add Sales (\$M)  
# Employ

Cross

Nest

Macros

Degree 2

Attributes

Transform

No Intercept



# Plan

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

# Data Manipulation - Overview

- Three levels
  - Columns
    - col + row operations
    - JMP creates a new table
  - Rows
  - Tables

companies\_mma - JMP Pro

File Edit **Tables** **Rows** **Cols** DOE Analyze Graph Tools View Window Help

companies\_mma

- Source
  - Fit Y by ...# Employ
- Columns (5/0)
  - Type
  - Sales (\$M)
  - Profits (\$M)
  - # Employ
  - Assets
- Rows
  - All rows 32
  - Selected 0
  - Excluded 1
  - Hidden 0
  - Labelled 0

	Type	Sales (\$M)	Profits (\$M)	# Employ	Assets
1	Computer	855.1	31	7523	615.2
2	Pharmaceutical	5453.5	859.8	40929	4851.6
3	Computer	2153.7	153	8200	2233.7
4	Pharmaceutical	6747	1102.2	50816	5681.5
5	Computer	5284	454	12068	2743.9
6	Pharmaceutical	9422	747	54100	8497
7	Computer	2876.1	333.3	9500	2090.4
8	Computer	709.3	41.4	5000	468.1
9	Computer	2952.1	-680.4	18000	1860.7
10	Computer	784.7	89	4708	955.8
11	Computer	1324.3	-119.7	13740	1040.2
12	Pharmaceutical	4175.6	939.5	28200	5848
13	Computer	11899	829	95000	10075
14	Computer	873.6	79.5	8200	808
15	Pharmaceutical	9844	1082	83100	7919
16	Pharmaceutical	969.2	227.4	3418	784
17	Pharmaceutical	6698.4	1495.4	34400	6756.7
18	Computer	5956	412	56000	4500
19	Pharmaceutical	5903.7	681.1	42100	8324.8

# Data Manipulation - Basics

- **Cols**
  - select or de-select columns
  - drop/delete columns
  - add new columns
- Rows
  - order/sort rows (see table operation)
  - filter rows (we have tried excluding certain rows)
- Tables
  - subset a table
  - sort a table
  - aggregate/summarize (by group)

# Select and Delete Columns

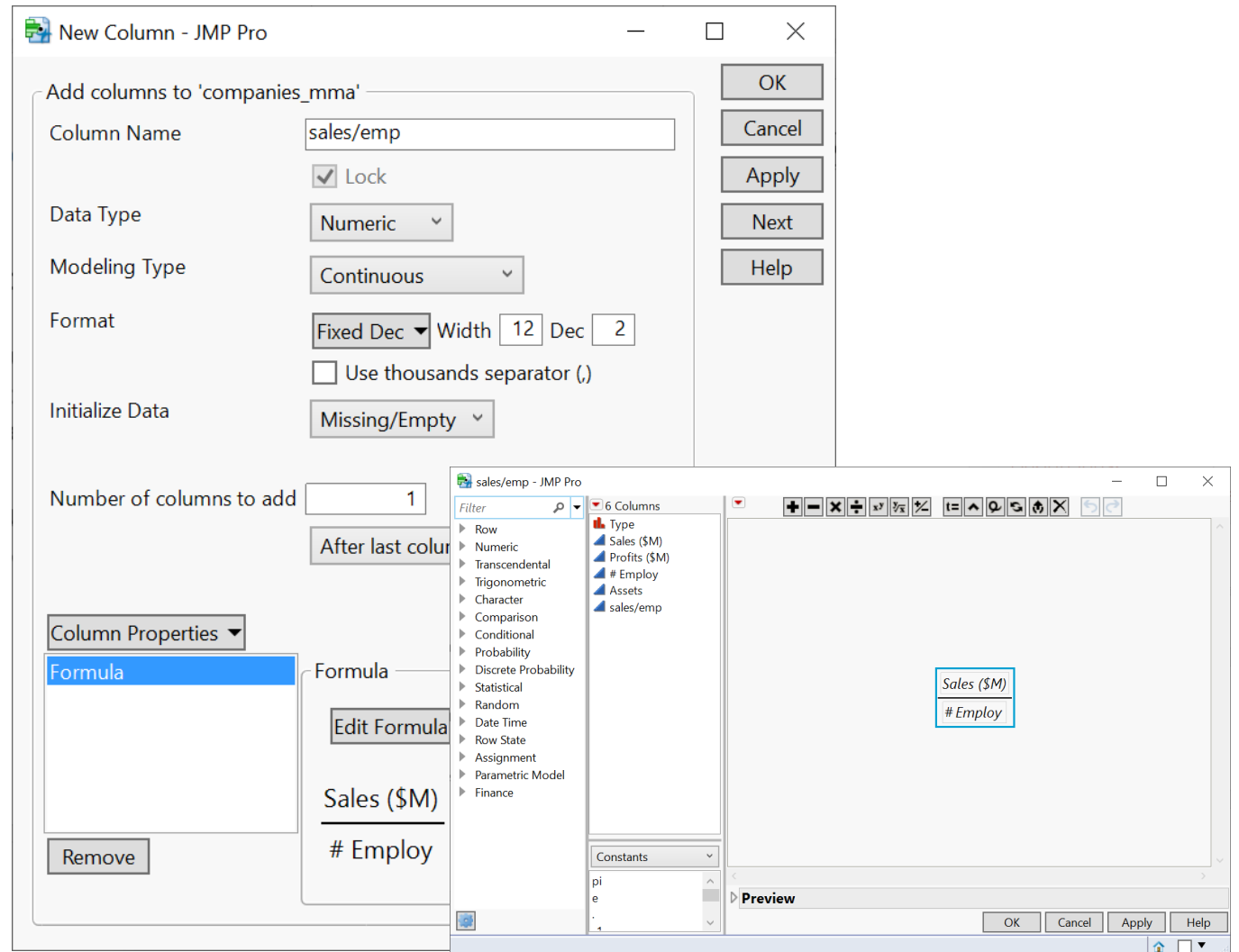
- Select or deselect columns
  - along with doing analysis
  - in data table window
- Drop/delete columns
  - in data table window
  - Tables -> Subset
    - A new data table will be created

The screenshot shows the JMP Pro interface with a data table named 'companies\_mma'. The table has columns: Type, Sales (\$M), Profits (\$M), # Employ, and Assets. The first 15 rows are visible, with columns Sales (\$M), Profits (\$M), and # Employ highlighted in blue. A context menu is open over the table, showing options like 'Column Info...', 'Standardize Attributes...', 'Column Properties', 'Formula...', 'Recode...', 'New Formula Column', 'Insert Columns', 'Delete Columns', 'Label/Unlabel', 'Sort', and 'Copy Columns'. The 'Delete Columns' option is highlighted.

	Type	Sales (\$M)	Profits (\$M)	# Employ	Assets
1	Computer	855.1	31	7	
2	Pharmaceutical	5453.5	859.8	40	
3	Computer	2153.7	153	8	
4	Pharmaceutical	6747	1102.2	50	
5	Computer	5284	454	12	
6	Pharmaceutical	9422	747	54	
7	Computer	2876.1	333.3	9	
8	Computer	709.3	41.4	5	
9	Computer	2952.1	-680.4	18	
10	Computer	784.7	89	4	
11	Computer	1324.3	-119.7	13	
12	Pharmaceutical	4175.6	939.5	28	
13	Computer	11899	829	95	
14	Computer	873.6	79.5	8	
15	Pharmaceutical	9844	1082	83	
16	Pharmaceutical	969.2	227.4	3418	784
17	Pharmaceutical	6698.4	1495.4	34400	6756.7
18	Computer	5956	412	56000	4500
19	Pharmaceutical	5903.7	681.1	42100	8324.8

# Create a New Column (Demo)

- Create a new column
  - Col name: sales/emp
  - Data type: Numeric
  - Col property: Formula
  - Formula: Sales (\$M) / # Employ
- A note on column names
  - JMP is flexible with col names
  - In general, special symbols in col names is not a good idea
- Formula editor



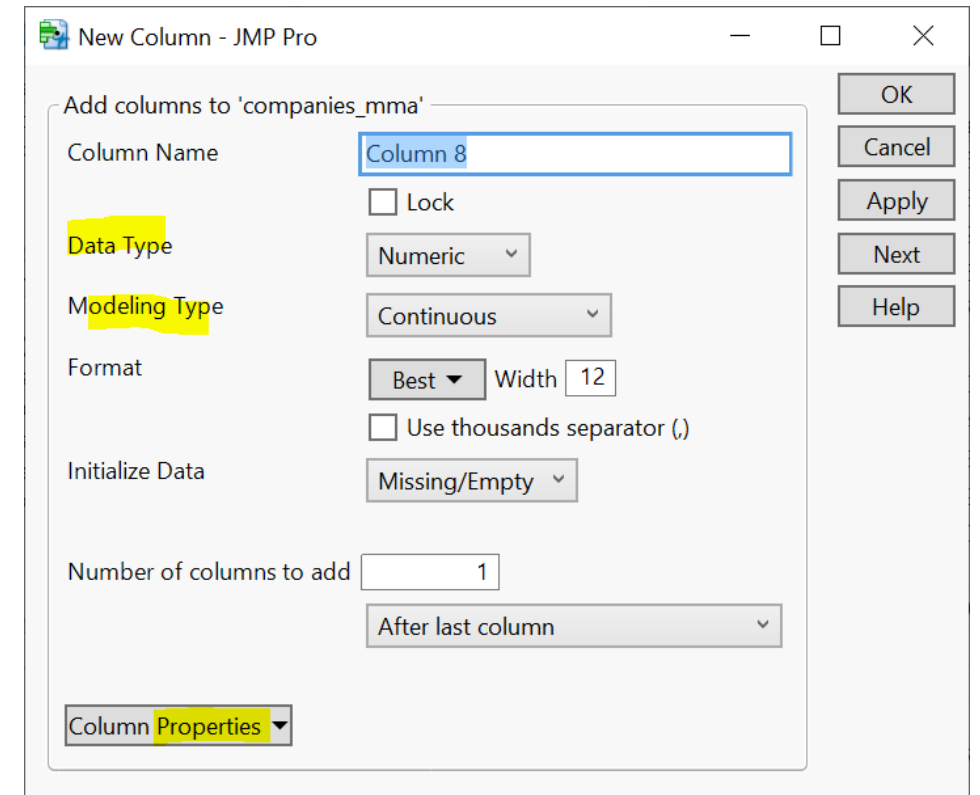
# Your Turn (Hands-on)

- Create a new column
  - Col name: size
  - Data type: Character
  - Col property: formula
- It's a categorical variable
  - if # Employ < 20000, then size = "small"
  - if 20000 <= #Employ < 40000, then size = "medium"
  - if #Employ >= 40000, then size = "big"
- Save the result

The image shows two overlapping windows from the JMP Pro software. The top window is titled 'New Column - JMP Pro' and is used for creating a new column. The 'Column Name' is 'size', the 'Data Type' is 'Character', and the 'Modeling Type' is 'Nominal'. The 'Initialize Data' is set to 'Missing/Empty'. The 'Number of columns to add' is 1, and the location is 'After last column'. The bottom window is titled 'Column 6 - JMP Pro' and shows the 'Formula' editor. The formula is: 
$$\text{If} \left( \begin{array}{l} \# \text{Employ} < 20000 \Rightarrow \text{"small"} \\ 20000 \leq \# \text{Employ} < 40000 \Rightarrow \text{"medium"} \\ \text{else} \Rightarrow \text{"big"} \end{array} \right)$$
 The 'Filter' pane on the left shows the 'If' function selected under the 'Conditional' category. The 'Preview' pane at the bottom right shows the resulting formula.

# Review: Create a Column

- Data type
  - Numeric
  - Character
- Modelling type
  - Continuous
  - Ordinal (e.g., age: 1, 2, 3, ...; Monday, Tuesday, ...)
  - Nominal (e.g., male, female)
- Column Property
  - Formula



# Review: Create a Column Shortcut (Demo)

The screenshot shows the JMP Pro interface with a data table named 'companies\_mma'. The table has columns for 'Type', 'Sales', 'Profits', 'sales/emp', and 'size'. A context menu is open over the 'Sales' column, and the 'New Formula Column' option is selected. The sub-menu for 'New Formula Column' is also visible, showing options like 'Transform', 'Combine', 'Aggregate', 'Distributional', 'Random', 'Row', and 'Group By'.

Row	Type	Sales	Profits	sales/emp	size		
1	Computer			0.1136647614	small		
2	Pharmaceutical			0.1332429329	big		
3	Computer			0.2626463415	small		
4	Pharmaceutical			0.1327731423	big		
5	Computer			0.437852171	small		
6	Pharmaceutical			0.1741589649	big		
7	Computer						
8	Computer						
9	Computer						
10	Computer						
11	Computer						
12	Pharmaceutical						
13	Computer						
14	Computer						
15	Pharmaceutical						
16	Pharmaceutical	969.2	227.4	3418	784	0.283557636	small
17	Pharmaceutical	6698.4	1495.4	34400	6756.7	0.1947209302	medium
18	Computer	5956	412	56000	4500	0.1063571429	big
19	Pharmaceutical	5002.7	681.1	42100	8224.8	0.1402204028	big



# Review: Create a Column Shortcut

- Some useful transformations for time series manipulation

The screenshot shows the JMP Pro interface with a data table named 'Monthly Sales'. The 'Sales' column is selected, and a context menu is open. The 'Row' option is highlighted in the submenu, and its options are also highlighted in yellow.

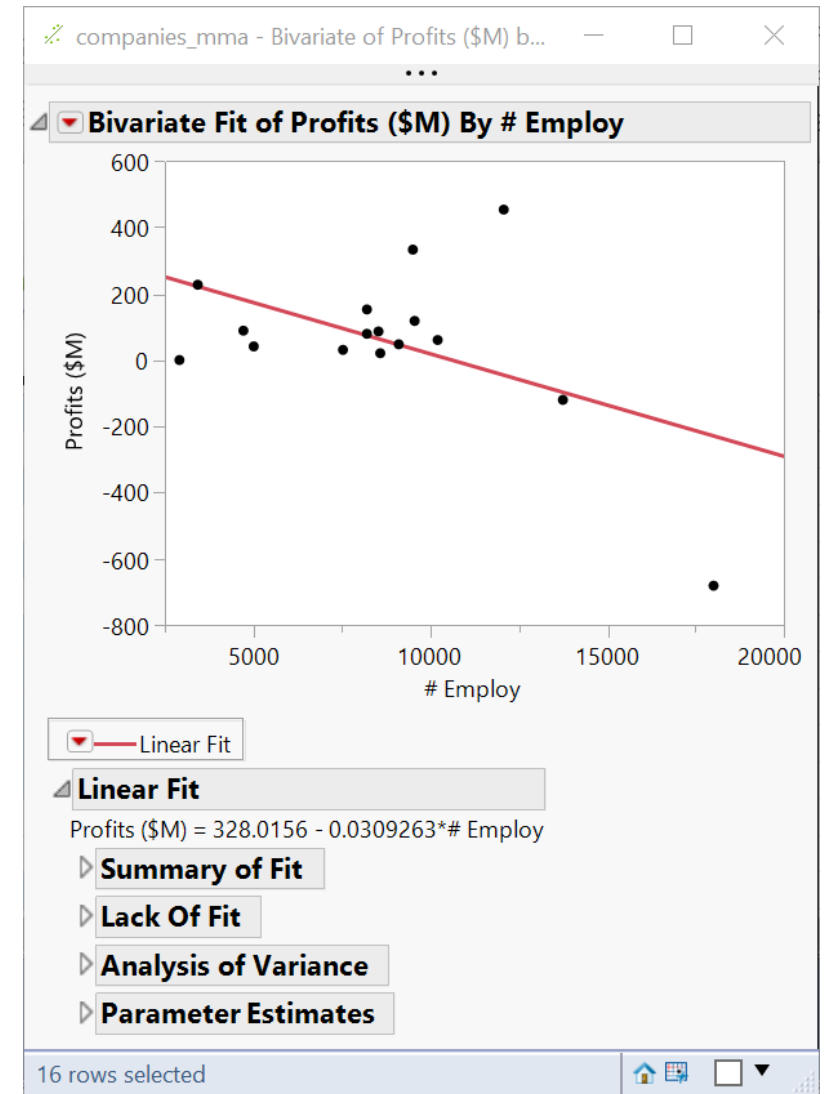
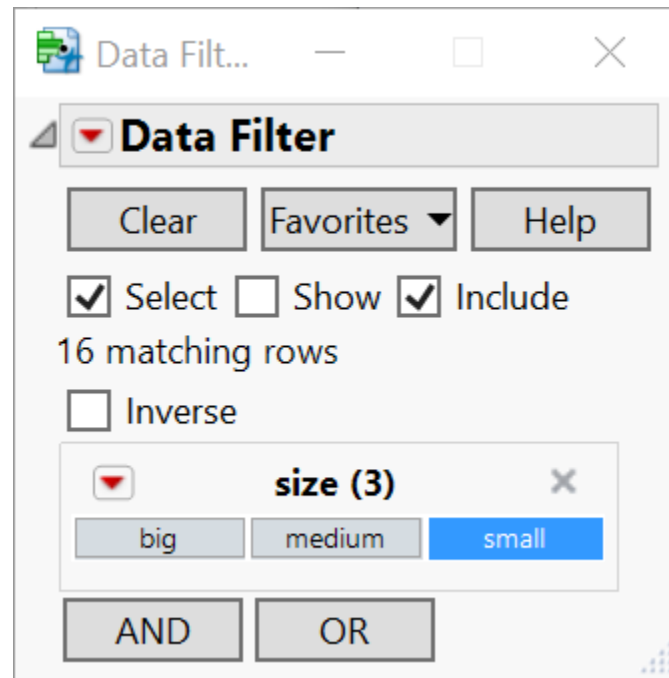
Row	Sales (\$1000)	Date
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19	170	03/1980
20	170	04/1980
21	158	05/1980
22	133	06/1980
23	114	07/1980
24	110	08/1980

# Data Manipulation - Basics

- Cols
  - select or de-select columns
  - drop/delete columns
  - add new columns
- **Rows**
  - order/sort rows (see table operation)
  - **filter rows** (we have tried excluding certain rows)
- Tables
  - subset a table
  - sort a table
  - aggregate/summarize (by group)

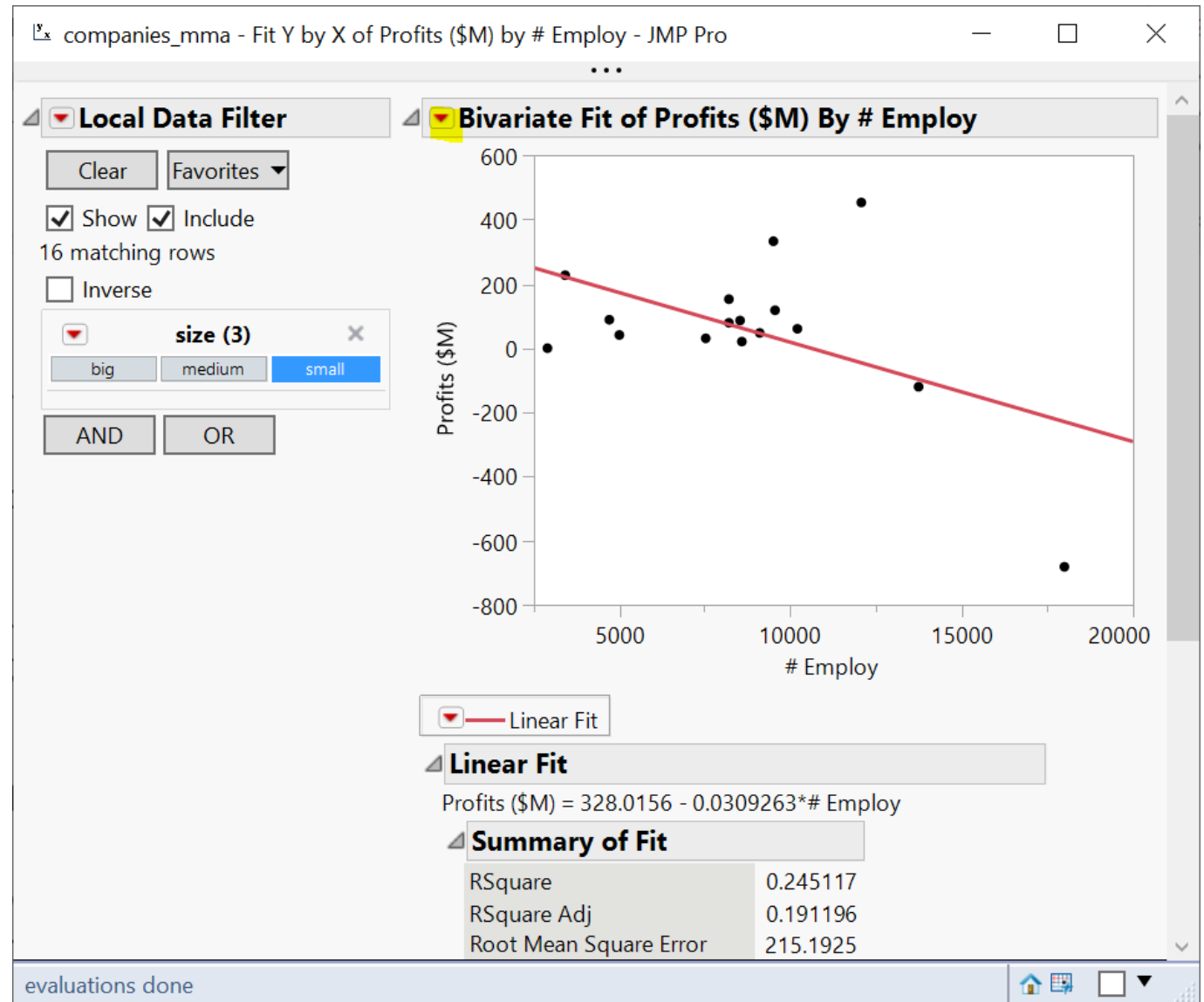
# Filter Rows (Demo)

- Data Filter (global)
  - Affects all linked analysis report
- Rows > Data Filter
  - filter on the **size** col



# Filter Rows (Demo)

- Local Data Filter
  - only affects the report where the filter is enabled



# Your Turn (Hands-on)

- Create a data filter based on size & Type
  - either global or local
- Explore the filter in a linear regression analysis
- Save the filter script
- Explore adding a continuous col into the filter

Data Filter

Clear Favorites Help

Select  Show  Include  
14 matching rows

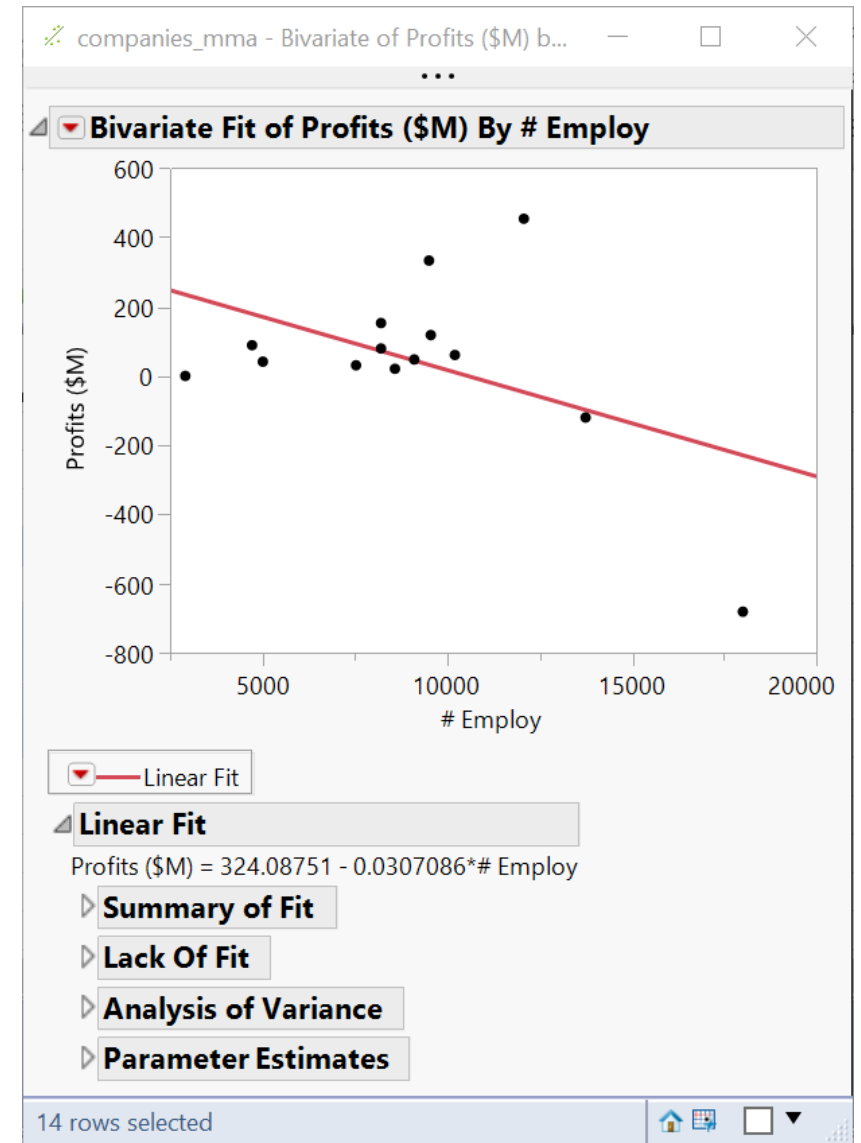
Inverse

size (3)  
big medium **small**

Type (2)  
**Computer** Pharmaceutical

AND OR

evaluations done



# Filter Rows (Demo)

- Rows > Row Selection > Select Where...

The screenshot shows the JMP Pro interface with the 'Rows' menu open. The 'Select Where...' option is highlighted in the menu. A dialog box titled 'Select Where...' is open, showing various selection options. The 'Select Where...' option is also highlighted in the dialog box. The background shows a data table with columns for sales, profits, and employment.

Row	Sales (\$M)	Profits (\$M)	# Employ	Assets	sales/emp	size
1	-680.4	18000	1860.7	0.1640055556	small	
2	89	4708	955.8	0.1666737468	small	
3	-119.7	13740	1040.2	0.0963828239	small	
4	939.5	28200	5848	0.148070922	medium	
5	829	95000	10075	0.1252526316	big	
6	79.5	8200	808	0.1065365854	small	
7	1082	83100	7919	0.1184596871	big	
8	227.4	3418	784	0.283557636	small	
9	495.4	34400	6756.7	0.1947209302	medium	
10	412	56000	4500	0.1063571429	big	

# Data Manipulation - Basics

- Cols
  - select columns
  - add new columns
- Rows
  - order/sort rows (see table operation)
  - filter rows (have tried excluding certain rows)
- **Tables**
  - subset a table
  - sort a table
  - aggregate/summarize (by group)

# Subset a table (demo)

The screenshot shows the JMP Pro interface with the 'Tables' menu open, highlighting the 'Subset' option. The 'Subset - JMP Pro' dialog box is open, showing the following settings:

- Subset by
- Rows:
  - All rows
  - Selected Rows
  - Random - sampling rate :
  - Random - sample size :
  - Stratify
- Columns:
  - All columns  Selected columns
  - Keep by columns
- Output table name:
- Link to original data table
- Copy formula
- Suppress formula evaluation
- Keep dialog open
- Save Script to Source Table

The background data table is partially visible, showing columns for Sales (\$M), Profits (\$M), # Employ, and Assets.

	Sales (\$M)	Profits (\$M)	# Employ	Assets
	855.1	31	7523	615.2
utical	5453.5	859.8	40929	4851.6
	2153.7	153	8200	2233.7
utical	6747	1102.2	50816	5681.5
	5284	454	12068	2743.9
utical	9422	747	54100	8497
	2876.1	333.3	9500	2090.4
	709.3	41.4	5000	468.1
	2952.1	-680.4	18000	1860.7
	784.7	89	4708	955.8
	1324.3	-119.7	13740	1040.2
utical	4175.6	939.5	28200	5848
	11899	829	95000	10075
	873.6	79.5	8200	808
	9844	1082	83100	7919
	969.2	227.4	3418	784
	6698.4	1495.4	34400	6756.7
	5956	412	56000	4500
	5903.7	681.1	42100	8324.8



# Sort Table / Order Rows (demo)

- Order rows by
  - a single column
  - multiple columns

The screenshot shows the JMP Pro interface with the 'Sort' menu open. The 'Sort' option is highlighted, and a tooltip reads 'Sort rows by specified columns.' The background data table has columns: Type, Sales (\$M), Profits (\$M), # Employ, Assets, sales/emp, and size. The 'Sort - JMP Pro' dialog box is open, showing the following configuration:

- Select Columns:** 7 Columns (Type, Sales (\$M), Profits (\$M), # Employ, Assets, sales/emp, size)
- Action:** By (size), Remove (Sales (\$M) optional)
- Copy formula
- Suppress formula evaluation
- Replace table
- Keep dialog open
- Save Script to Source Table

The dialog also includes 'OK', 'Cancel', 'Recall', 'Help', and 'Save Default Options' buttons, and a field for 'Output table name:'.

# Your Turn (Hands-on)

- What's the maximum Sales (\$M) a “small” firm makes?

# Aggregate / Summarize (by Group) (Demo)

- Tables > Summary
- Find average profit by Type

companies\_mma - JMP Pro

File Edit **Tables** Rows Cols DOE Analyze Graph

Summary

Request Summary Statistics by Grouping Columns.

Select Columns

7 Columns

- Type
- Sales (\$M)
- Profits (\$M)
- # Employ
- Assets
- sales/emp
- size

Include marginal statistics

For quantile statistics, enter value (%)

25

statistics column name format

stat(column)

Output table name:

Link to original data table

Prompt to save when closing summary tables

Keep dialog open

Save Script to Source Table

Statistics

Mean(Profits (\$M)) optional

Group

Type optional

Subgroup

optional

Freq

optional

Weight

optional

Action

OK

Cancel

Remove

Recall

Help

Columns

- Type
- Sales (\$M)
- Profits (\$M)
- # Employ
- Assets
- sales/emp
- size

Rows

All rows	32	15	Pharmaceutical
Selected	0	16	Pharmaceutical
Excluded	1	17	Pharmaceutical
Hidden	0	18	Computer
Labelled	0	19	

evaluations done

# Your Turn (Hands-on)

- Find total sales by Type and Size

The screenshot displays the JMP Pro interface. The main window, titled "companies\_mma By (Type, size) - JMP Pro", shows a data table with the following columns: Type, size, N Rows, and Sum(Sales (\$M)). The data is grouped by Type and size, with 6 rows of data:

	Type	size	N Rows	Sum(Sales (\$M))
1	Computer	big	3	18951.9
2	Computer	medium	2	6037.7
3	Computer	small	14	24612.8
4	Pharmaceutical	big	5	37370.2
5	Pharmaceutical	medium	5	21305.3
6	Pharmaceutical	small	2	2167.5

The "Summary - JMP Pro" dialog box is open, showing the "Request Summary Statistics by Grouping Columns" window. The "Select Columns" list includes 7 columns: Type, Sales (\$M), Profits (\$M), # Employ, Assets, sales/emp, and size. The "Statistics" dropdown is set to "Sum(Sales (\$M))". The "Group" dropdown is set to "Type" and "size". The "Subgroup" dropdown is set to "optional". The "Freq" dropdown is set to "optional" and the "Weight" dropdown is set to "optional". The "Output table name" field is empty. The "Link to original data table" checkbox is checked.

# Aggregate / Summarize (by Group) (Demo)

- Analyze > Tabulate
- Tabulate (red triangle) > Make into data table

companies\_mma - JMP Pro

File Edit Tables Rows Cols DOE Analyze Graph Tools View Window Help

companies\_mma

- Source
- Fit Y by ...# Employ
- Data Filter

Columns (7/0)

- Type
- Sales (\$M)
- Profits (\$M)
- # Employ
- Assets
- sales/emp
- size

Rows

Row	Type	size	Sales (\$M)	Profits (\$M)	# Employ	Assets	sales/emp
1	Computer	big	18951.9				
2	Computer	medium	6037.7				
3	Computer	small	24612.8				
4	Pharmaceutical	big	37370.2				
5	Pharmaceutical	medium	21305.3				
6	Pharmaceutical	small	2167.5				
7	Computer	big	18951.9				
8	Computer	medium	6037.7				
9	Computer	small	24612.8				
10	Pharmaceutical	big	37370.2				
11	Pharmaceutical	medium	21305.3				
12	Pharmaceutical	small	2167.5				
13	Computer	big	18951.9				
14	Computer	medium	6037.7				
15	Computer	small	24612.8				
16	Pharmaceutical	big	37370.2				
17	Pharmaceutical	medium	21305.3				
18	Pharmaceutical	small	2167.5				
19	Computer	big	18951.9				
20	Computer	medium	6037.7				
21	Computer	small	24612.8				
22	Pharmaceutical	big	37370.2				
23	Pharmaceutical	medium	21305.3				
24	Pharmaceutical	small	2167.5				
25	Computer	big	18951.9				
26	Computer	medium	6037.7				
27	Computer	small	24612.8				
28	Pharmaceutical	big	37370.2				
29	Pharmaceutical	medium	21305.3				
30	Pharmaceutical	small	2167.5				
31	Computer	big	18951.9				
32	Computer	medium	6037.7				
33	Computer	small	24612.8				
34	Pharmaceutical	big	37370.2				
35	Pharmaceutical	medium	21305.3				
36	Pharmaceutical	small	2167.5				

evaluations done

companies\_mma - Tabulate - JMP Pro

Tabulate

To add to the table, drag and drop columns or statistics into the column header or row label area of the table.

Undo Start Over Done

7 Columns

- Type
- Sales (\$M)
- Profits (\$M)
- # Employ
- Assets
- sales/emp
- size

Mean

Std Dev

Min

Max

Range

% of Total

N Missing

N Categories

Sum

Sum Wgt

Variance

Std Err

CV

Median

Geom... Mean

Interq... Range

Quantiles

Column %

Row %

All

Include missing for grouping columns

Order by count of grouping columns

Add Aggregate Statistics

Default Statistics

Change Format

Type	size	Sum
Computer	big	18951.9
	medium	6037.7
	small	24612.8
Pharmaceutical	big	37370.2
	medium	21305.3
	small	2167.5

1 row has been excluded.