

Ann Arbor ASA 'Up and Running' Series:



Anamaria S. Kazanis, PStat
ASKSTATS Consulting, LLC
Michigan State University

Disclosure

- Portions of the presentation were taken *verbatim from the following sources:*
 - JMP 12.0.0 – ***Help documentation***
 - Hinrichs, Curt & Boiler. 2010 *JMP Essentials: An Illustrated Step-by-Step Guide for New Users.* Cary, NC: SAS Institute Inc.

Contents

- Introduction
- Launching JMP
- User Interface
- Getting Data into JMP
- Examining Data
- Manipulating Data
- Graphing
- Bivariate Statistics
- Generalized Linear Model
- Script

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Introduction

- Interact with data tables and reports
- Compute values using the Formula Editor
- Design experiments
- Use scripting features
- Open SAS data sets, run stored processes, and submit SAS code

Introduction

Terminology

- ***Data Tables***

- Enter, View, Edit, Manipulate
- Variable - ***column***
- Observation – ***row***

- ***Platform***

- ***Analyze data***
- Work with ***Graphs***

- ***Launch windows***

- Set up and run analysis

- ***Report windows***

- Output of analysis

- Graph

- ***Report***

- Disclosure button

- ***Options***

- ***Hotspots***: red triangle menus



Introduction

Hotspots ▼

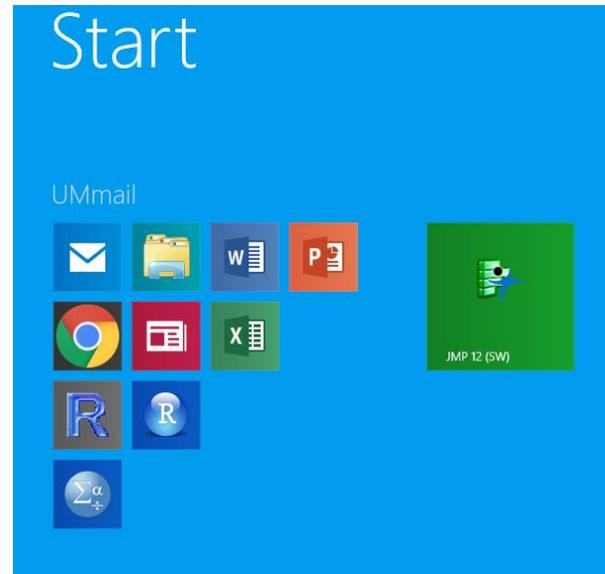
- JMP uses the space in windows to show results
- Commands that extend the analysis
 - right-clicking inside the outline items
- ***Hotspots*** look like a downward red triangle ▼

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Launching JMP

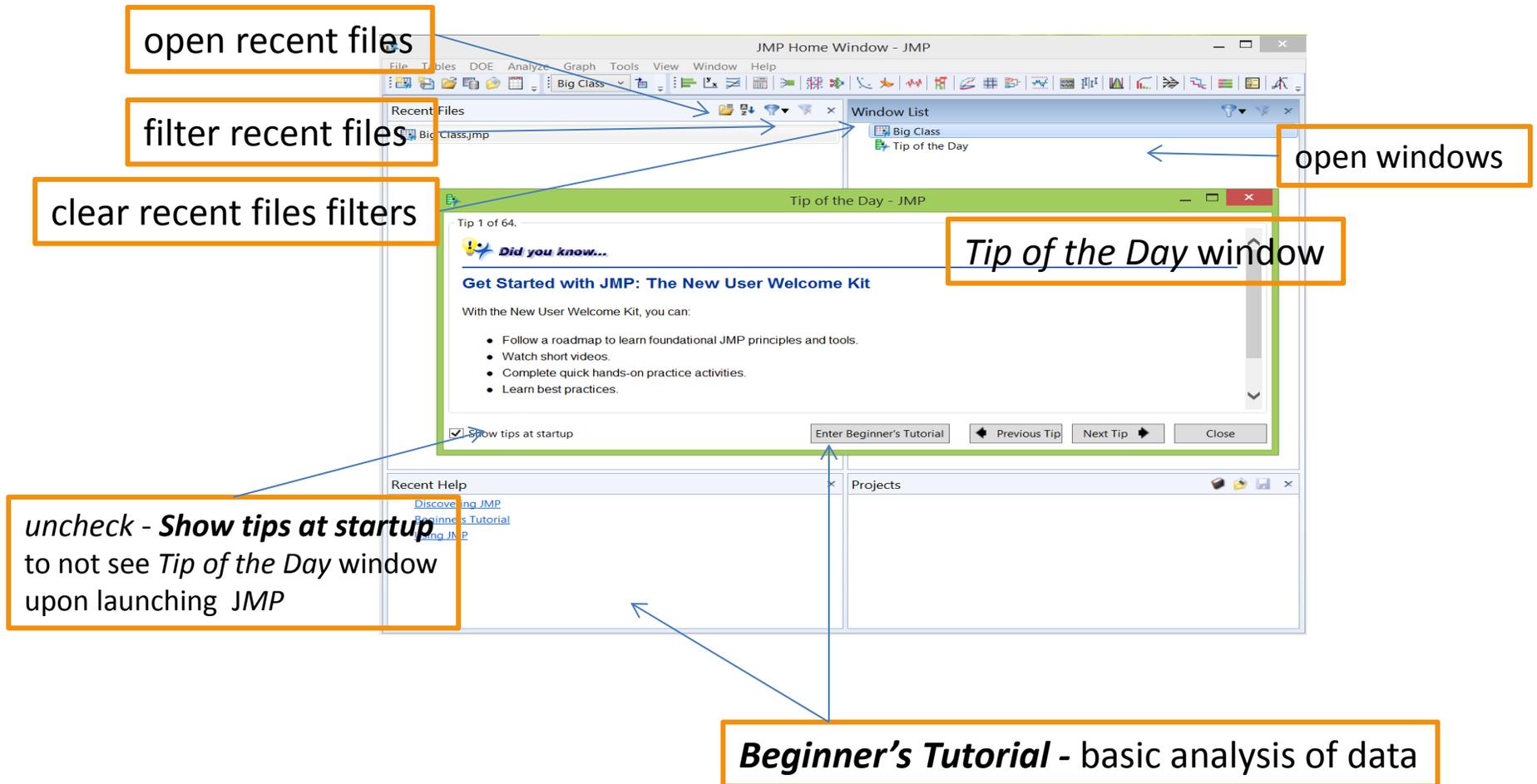
Start →



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User Interface Home Window



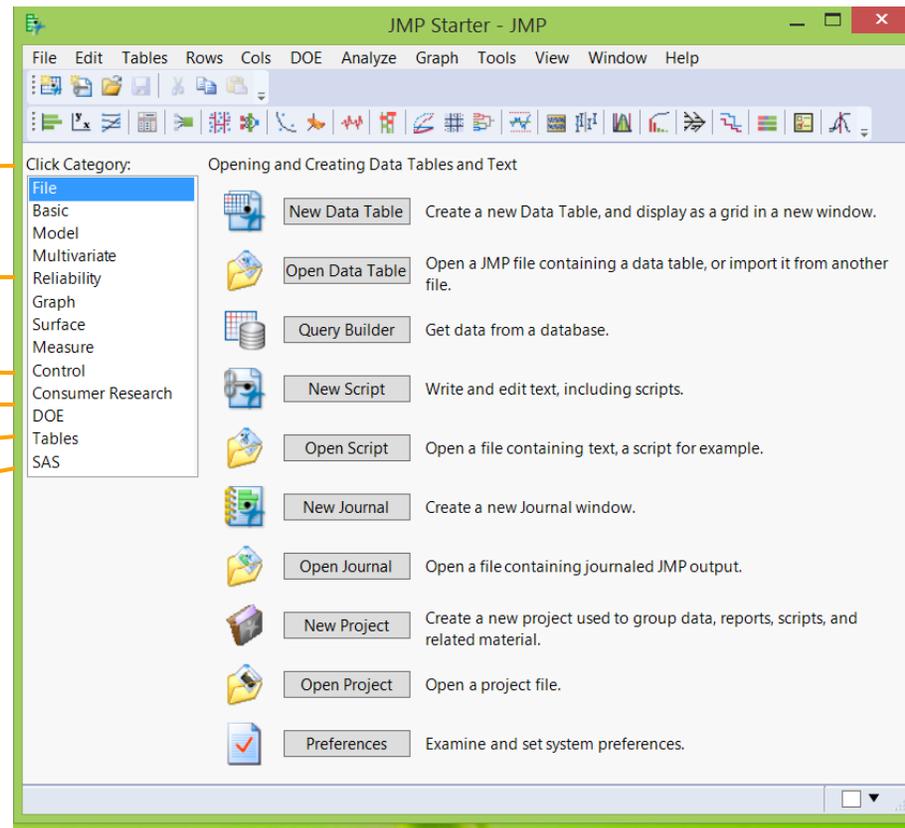
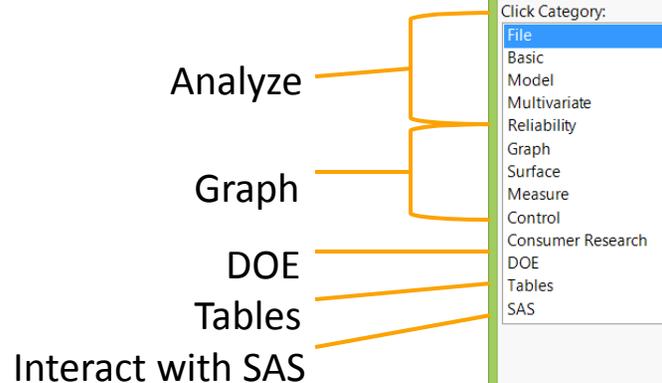
User Interface

JMP Starter Window

- Alternative access to most commands found on the main menu or on toolbars

View → **JMP Starter**

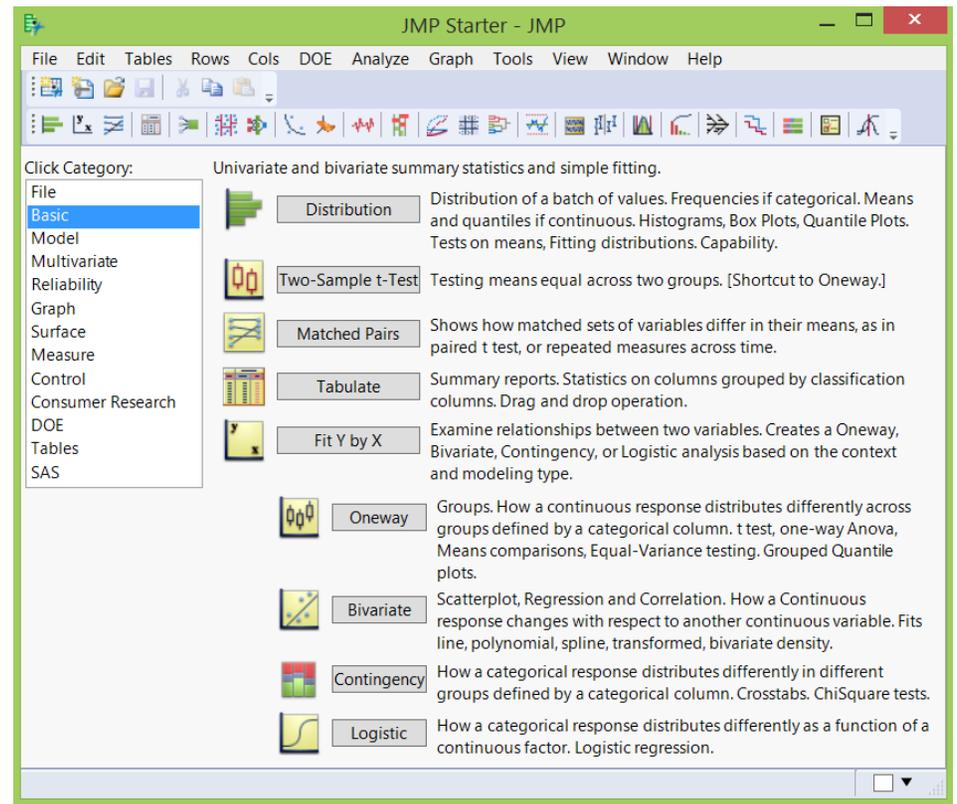
- **File**



User Interface

JMP Starter Window

- **Basic**
 - Univariate and Bivariate analyses
 - Distributions
 - Single response(y) and a single factor (x)
 - analysis according to whether variables are continuous or categorical



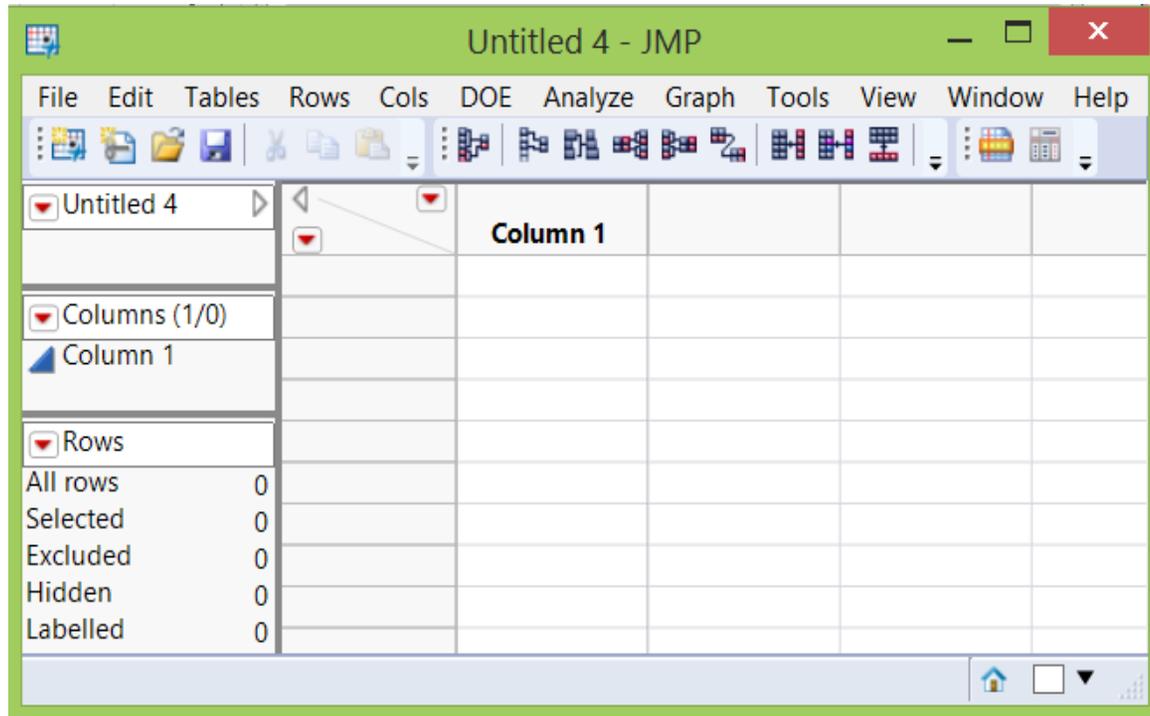
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Getting Data into JMP

New *Data Tables*

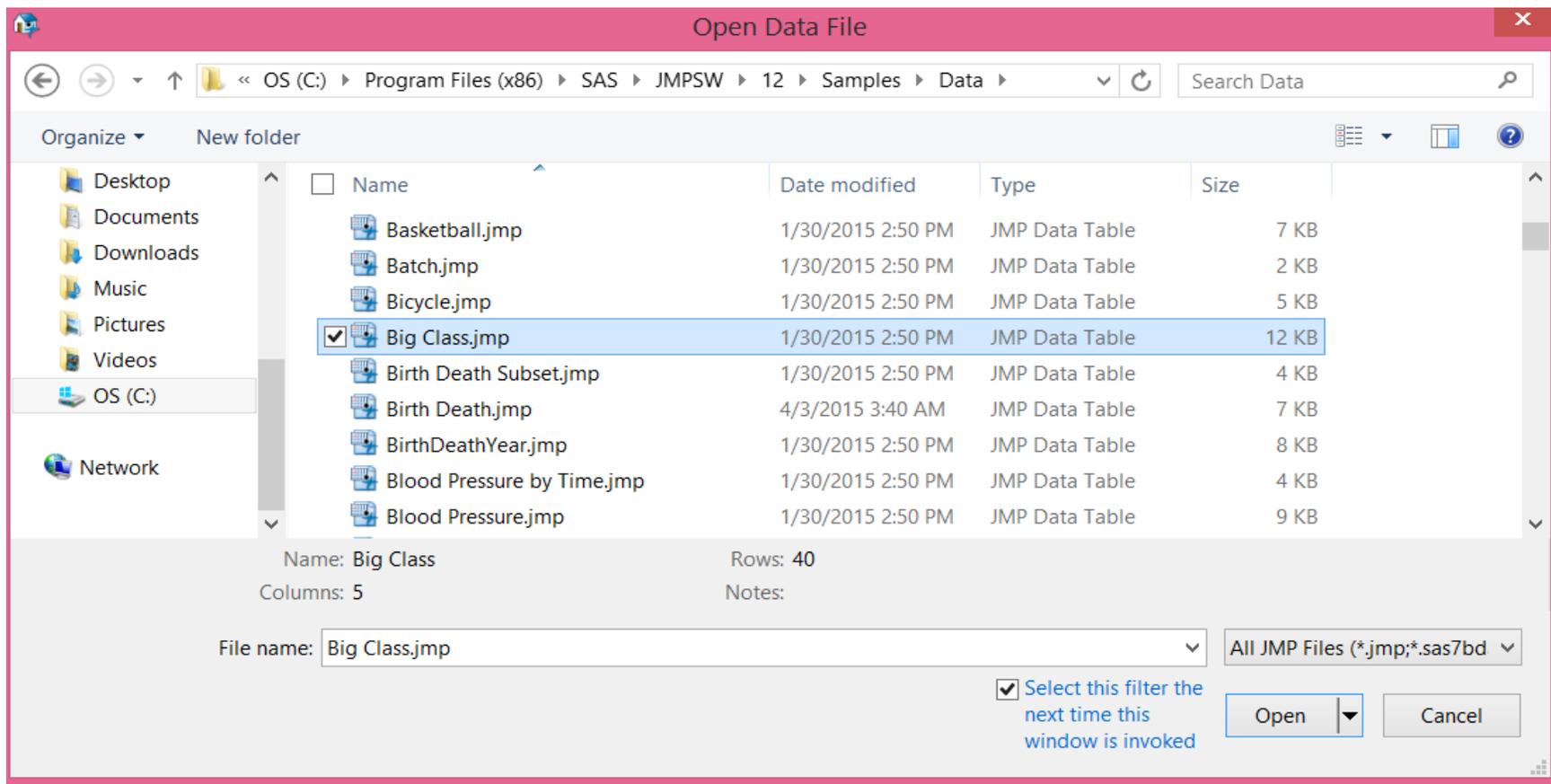
- **File → New → Data Table** Ctrl + N
 - Empty *data table* with no *rows*
 - One numeric column, labeled *Column 1*



Getting Data into JMP

Sample JMP Files

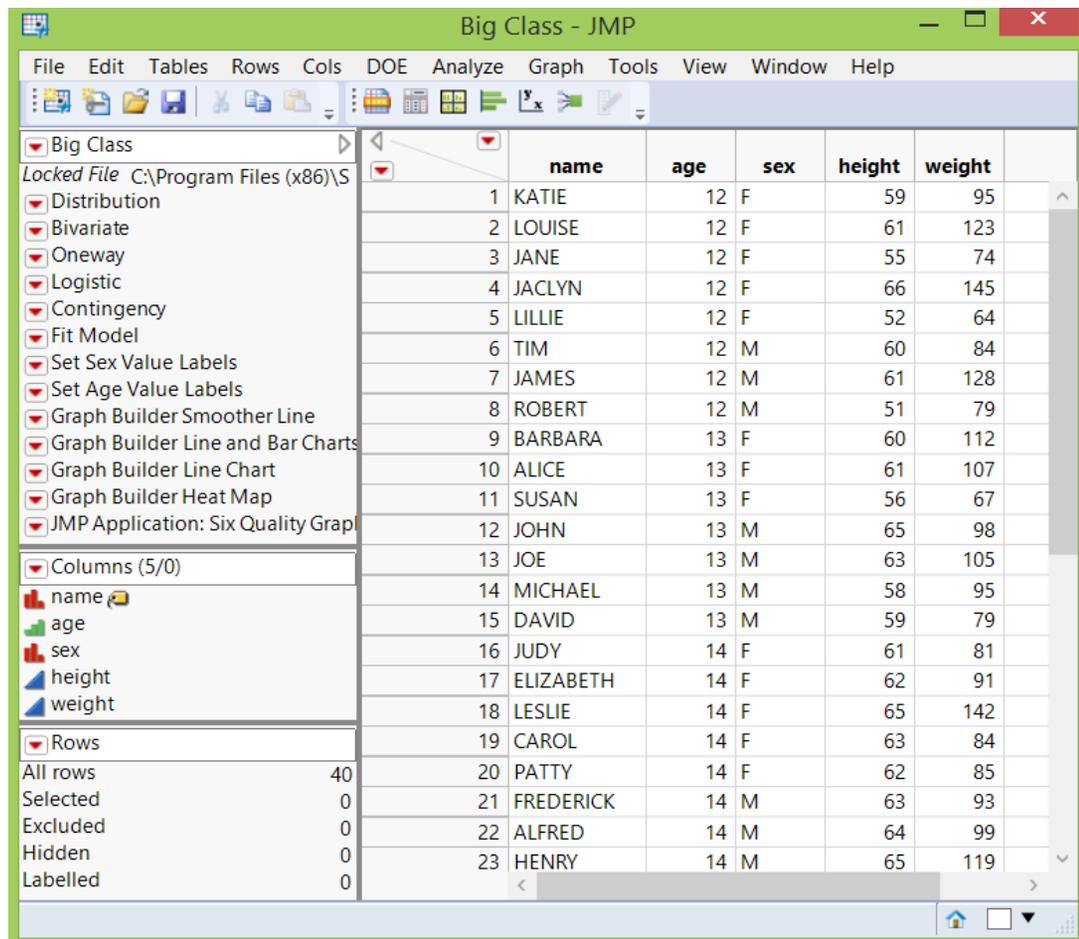
File → Open → C:\Program Files (x86)\SAS\JMPSW\12\Samples\Data\Big Class.jmp



Getting Data into JMP

Sample JMP Files

- Sample Data
– *Big Class.jmp*



Big Class - JMP

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

Big Class
Locked File C:\Program Files (x86)\S

	name	age	sex	height	weight
1	KATIE	12	F	59	95
2	LOUISE	12	F	61	123
3	JANE	12	F	55	74
4	JACLYN	12	F	66	145
5	LILLIE	12	F	52	64
6	TIM	12	M	60	84
7	JAMES	12	M	61	128
8	ROBERT	12	M	51	79
9	BARBARA	13	F	60	112
10	ALICE	13	F	61	107
11	SUSAN	13	F	56	67
12	JOHN	13	M	65	98
13	JOE	13	M	63	105
14	MICHAEL	13	M	58	95
15	DAVID	13	M	59	79
16	JUDY	14	F	61	81
17	ELIZABETH	14	F	62	91
18	LESLIE	14	F	65	142
19	CAROL	14	F	63	84
20	PATTY	14	F	62	85
21	FREDERICK	14	M	63	93
22	ALFRED	14	M	64	99
23	HENRY	14	M	65	119

Columns (5/0)
name
age
sex
height
weight

Rows
All rows 40
Selected 0
Excluded 0
Hidden 0
Labelled 0

Getting Data into JMP

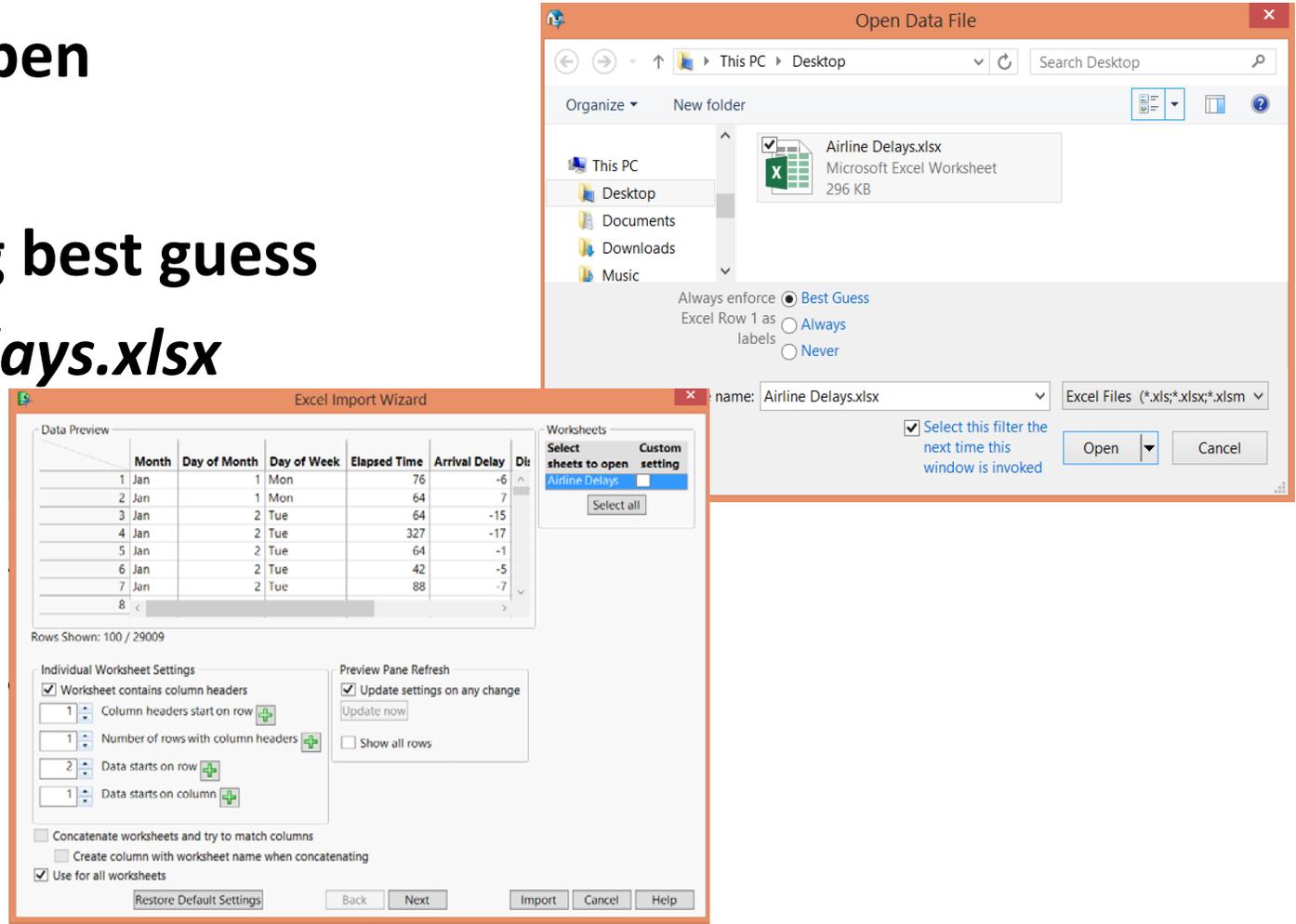
Importing an Excel *.xlsx file

• File → Open

Open as:

Data, using best guess

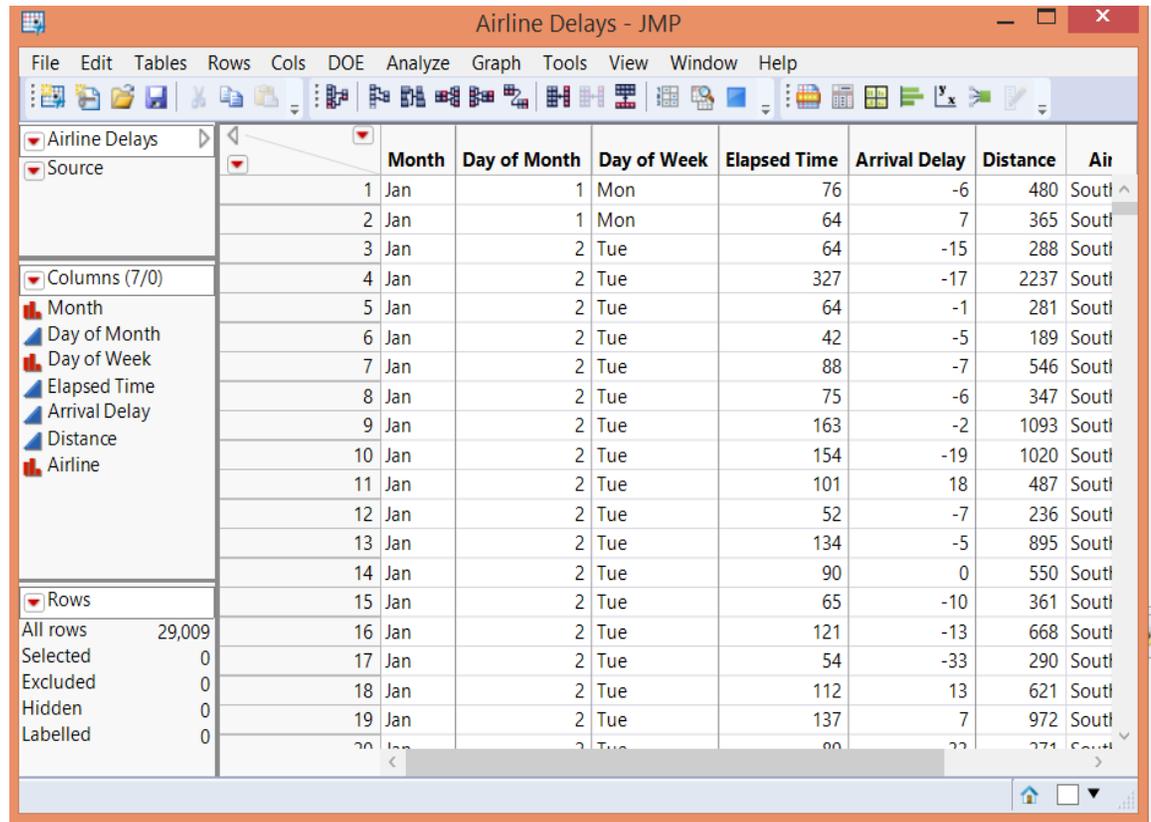
Airline Delays.xlsx



Getting Data into JMP

Importing an Excel *.xlsx file

- Excel
 - *Airline Delays.xlsx*
- *File* → *Save as*
 - *Airline Delays.jmp*



The screenshot shows the JMP software interface with the title bar 'Airline Delays - JMP'. The menu bar includes File, Edit, Tables, Rows, Cols, DOE, Analyze, Graph, Tools, View, Window, and Help. The main data table is displayed with the following columns: Month, Day of Month, Day of Week, Elapsed Time, Arrival Delay, Distance, and Airline. The left sidebar shows the column list and row counts.

	Month	Day of Month	Day of Week	Elapsed Time	Arrival Delay	Distance	Airline
1	Jan	1	Mon	76	-6	480	South
2	Jan	1	Mon	64	7	365	South
3	Jan	2	Tue	64	-15	288	South
4	Jan	2	Tue	327	-17	2237	South
5	Jan	2	Tue	64	-1	281	South
6	Jan	2	Tue	42	-5	189	South
7	Jan	2	Tue	88	-7	546	South
8	Jan	2	Tue	75	-6	347	South
9	Jan	2	Tue	163	-2	1093	South
10	Jan	2	Tue	154	-19	1020	South
11	Jan	2	Tue	101	18	487	South
12	Jan	2	Tue	52	-7	236	South
13	Jan	2	Tue	134	-5	895	South
14	Jan	2	Tue	90	0	550	South
15	Jan	2	Tue	65	-10	361	South
16	Jan	2	Tue	121	-13	668	South
17	Jan	2	Tue	54	-33	290	South
18	Jan	2	Tue	112	13	621	South
19	Jan	2	Tue	137	7	972	South
20	Jan	2	Tue	80	22	271	South

Getting Data into JMP

Import Data

Default

- Comma-separated (.csv)
- .dat files that consist of text
- ESRI shapefiles (.shp)
- Flow Cytometry versions 2.0 + 3.0(.fcs)
- HTML (.htm, .html)
- Microsoft Excel 1997–2003 (.xls)
- Minitab (.mtw, .mtp, but not .mpj)
- Plain text (.txt)
- SAS transport (.xpt, .stx)
- SAS versions 6–9 on Macintosh
 - (.sas7bdat, .ssd, .ssd01, .saseb\$data)
- SAS versions 6–9 on Windows
 - (.sd2, .sd5, .sd7, .sas7bdat)
- SPSS files (.sav)
- Tab-separated (.tsv)

ODBC drivers

- Database (dBASE) (.dbf, .ndx, .mdx)
 - supported with a V3+ compliant driver
- Microsoft Access Database (.mdb)
 - supported with a V3+ compliant driver
- Microsoft Excel 2007 (.xlsm, .xlsx, .xlsb)
 - supported with a V3+ compliant driver
 - 64-bit JMP requires a 64-bit driver

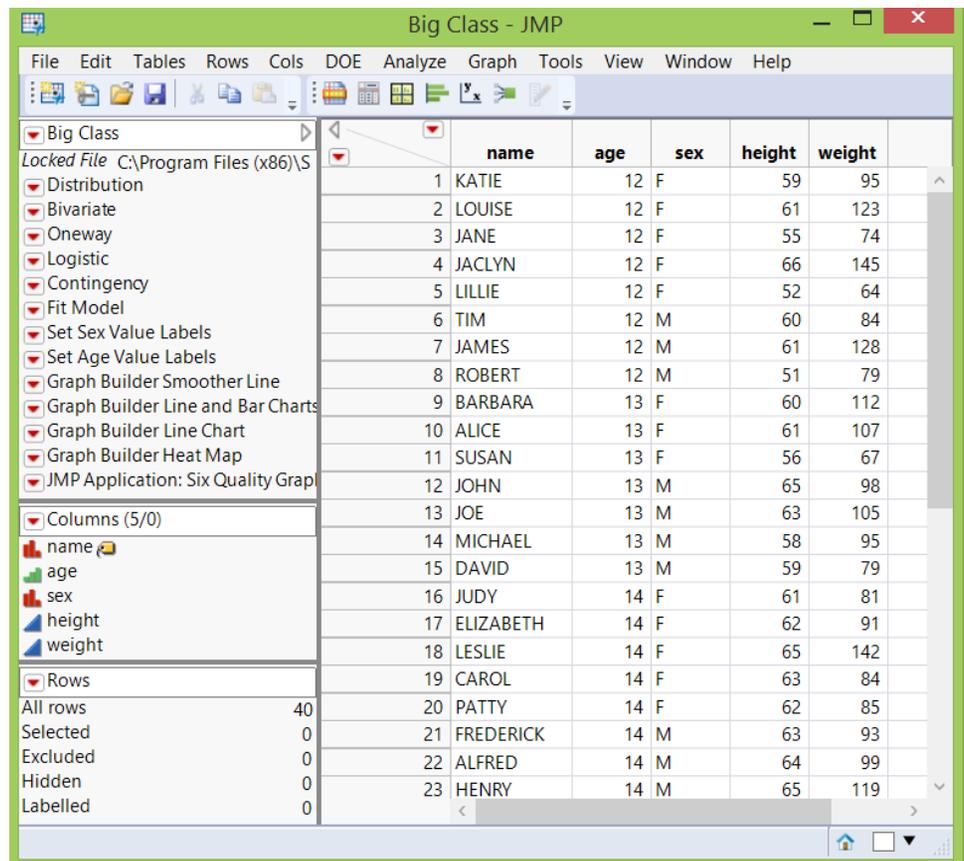
AND MANY MORE!!

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Examining Data Data Table

- Spreadsheet-like grid
- Metadata
 - Three panels on the left
 - Information about data
- Structured data
 - **Columns**
 - variables
 - **Rows**
 - Observations
 - Cases



The screenshot shows the JMP software interface with a data table titled 'Big Class'. The table has 5 columns: 'name', 'age', 'sex', 'height', and 'weight'. The rows represent individual students, numbered 1 through 23. The left sidebar shows a list of analysis options and a 'Columns' panel with icons for each variable. The 'Rows' panel shows 40 total rows, with 0 selected, 0 excluded, 0 hidden, and 0 labelled.

	name	age	sex	height	weight
1	KATIE	12	F	59	95
2	LOUISE	12	F	61	123
3	JANE	12	F	55	74
4	JACLYN	12	F	66	145
5	LILLIE	12	F	52	64
6	TIM	12	M	60	84
7	JAMES	12	M	61	128
8	ROBERT	12	M	51	79
9	BARBARA	13	F	60	112
10	ALICE	13	F	61	107
11	SUSAN	13	F	56	67
12	JOHN	13	M	65	98
13	JOE	13	M	63	105
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16	JUDY	14	F	61	81
17	ELIZABETH	14	F	62	91
18	LESLIE	14	F	65	142
19	CAROL	14	F	63	84
20	PATTY	14	F	62	85
21	FREDERICK	14	M	63	93
22	ALFRED	14	M	64	99
23	HENRY	14	M	65	119

Examining Data Data Table Panels

table options →

script options →

column options →

modeling type :
nominal
ordinal
continuous

row options →

data table name

table variable

table scripts

Columns (5/0)	
name	
age	
sex	
height	
weight	

Rows	
All rows	40
Selected	0
Excluded	0
Hidden	0
Labelled	0

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Manipulating Data

- Formatting
- Tables

Manipulating Data

- Formatting
- Tables

Manipulating Data Formatting

- Cleaning up data format
 - Decimal places
 - Dates
 - Times
 - Currency
- Formula editor
 - New columns from old ones
 - Add IF statements
 - Transform data

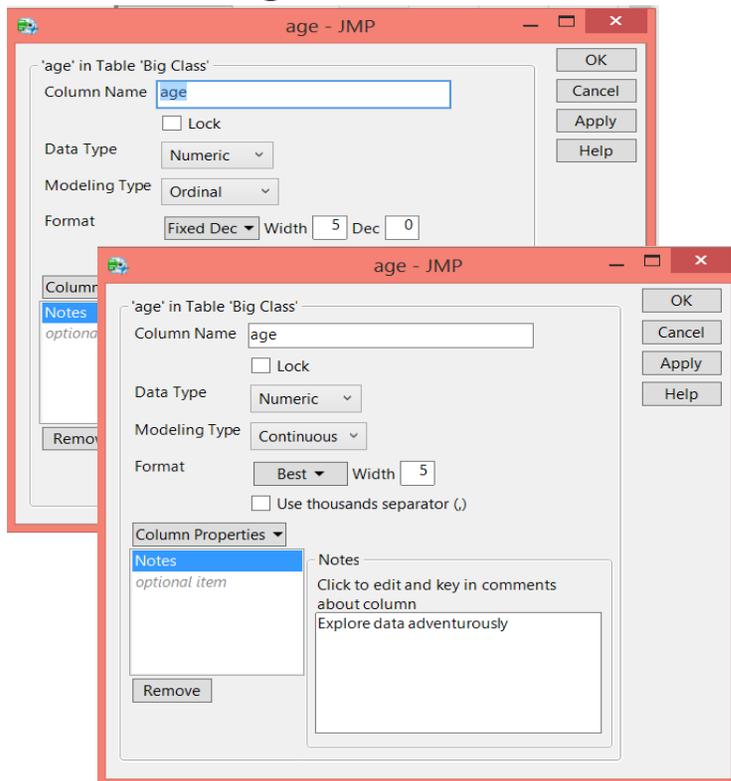
Manipulating Data Formatting

- Cleaning up data format
 - Decimal places
 - Dates
 - Times
 - Currency
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 - New columns from old ones
 - Add IF statements
 - Transform data

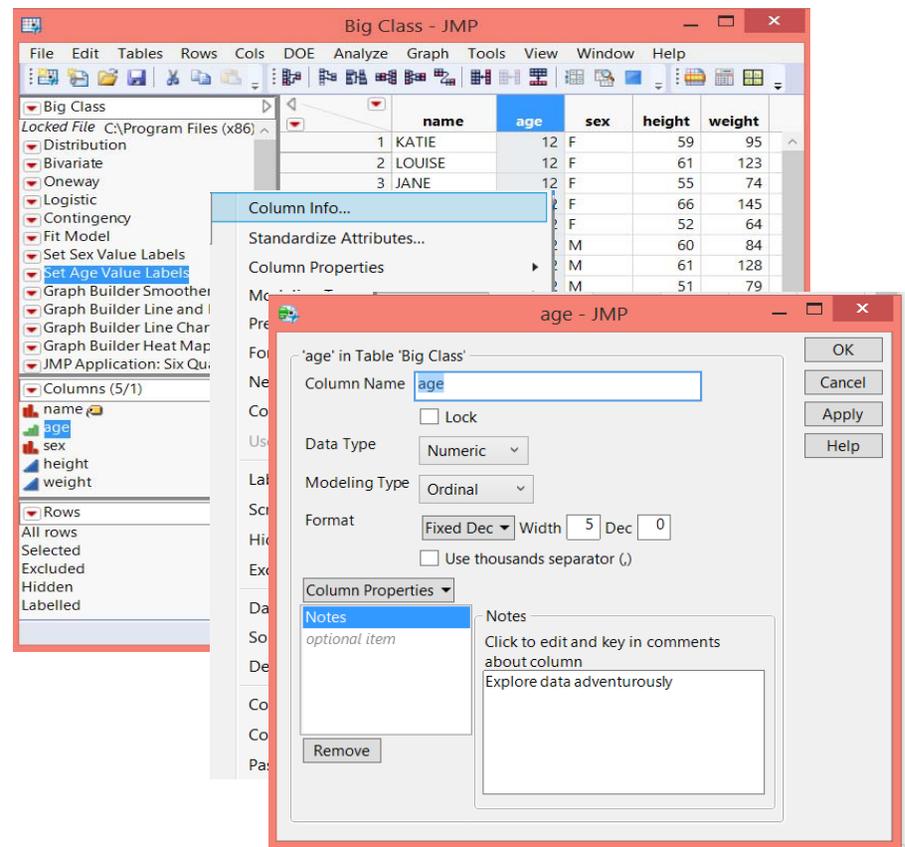
Manipulating Data

Formatting – Cleaning up data format

- Double-click area above an existing column name



- Right-click column name → select *Column Info*



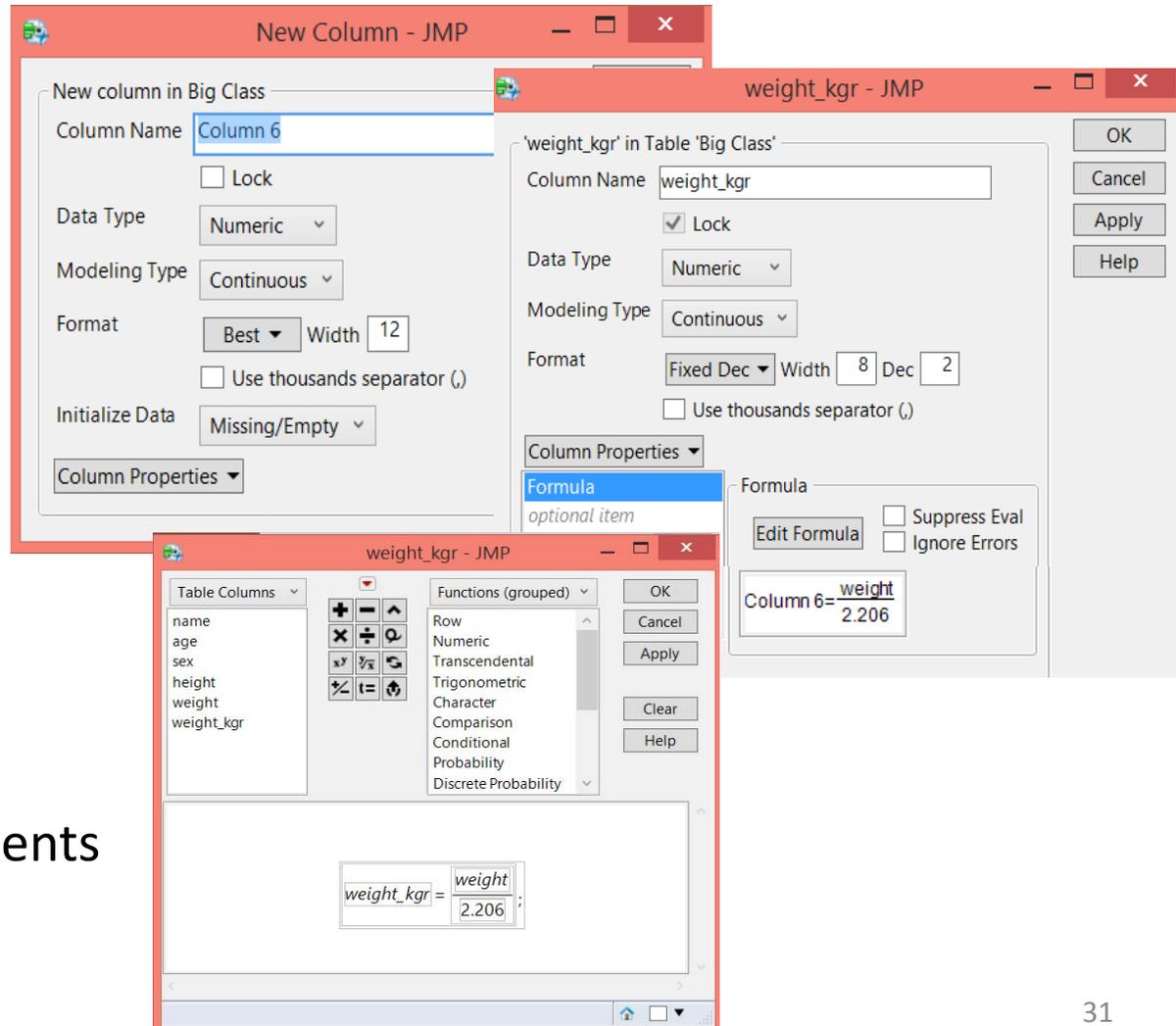
Manipulating Data Formatting

- Cleaning up data format
 - Decimal places
 - Dates
 - Times
 - Currency
- Formula editor
 - New columns from old ones
 - Add IF statements
 - Transform data

Manipulating Data

Formatting – Formula Editor

- Create new column
 - Values calculated or derived from existing columns
- Transform data
- Add conditional statements



Manipulating Data

- Formatting
- Tables

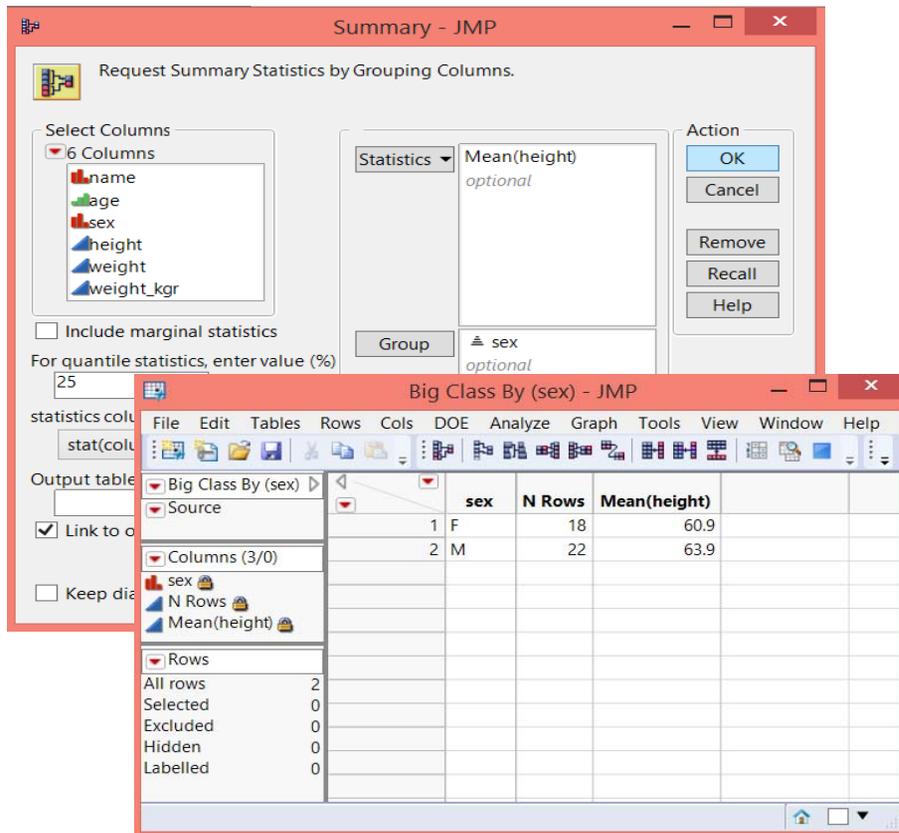
Manipulating Data Tables

- Structure data into form that JMP will recognize
 - Summary
 - Dealing with missing data

Manipulating Data Tables

- Structure data into form that JMP will recognize
 - Summary
 - Dealing with missing data

Manipulating Data Tables - Summary



Summary statistics

Tables → Summary

- Select Columns: *height* →
Statistics: *Mean (height)*
- Select Columns: *sex* →
Group: *sex*
- Action: *OK*

Help → Sample Data → Examples for teaching → Big Class

Manipulating Data Tables

- Structure data into form that JMP will recognize
 - Summary
 - Dealing with missing data

Manipulating Data Tables – Missing Data

For this example,

delete some data from 'Big Class'

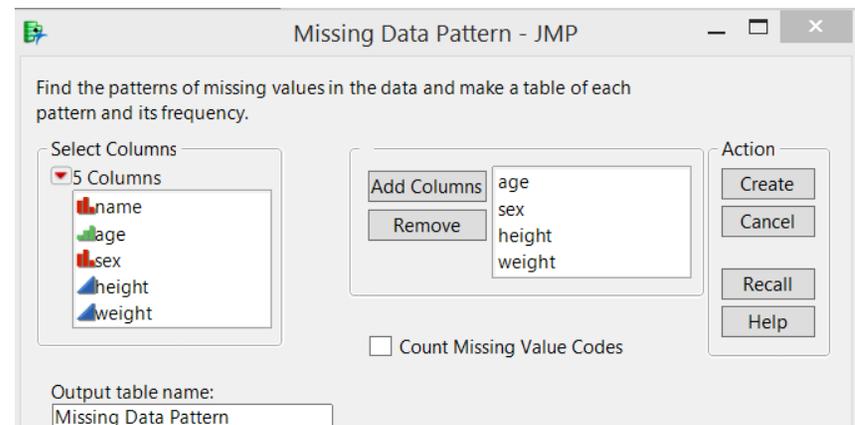
- Identify quantity of missing data
- Existence of patterns
 - Non-response
 - Data importing
 - Data entry errors

Tables → Missing Data Pattern

Select Columns: *age, sex, height, weight* →

Add Columns → Action: OK

Help → Sample Data → Examples for teaching → Big Class



	Count	Number of columns missing	Patterns	age	sex	height	weight
1	35	0	0000	0	0	0	0
2	2	1	0001	0	0	0	1
3	1	1	0010	0	0	1	0
4	1	2	0110	0	1	1	0
5	1	1	1000	1	0	0	0

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Graphing

- Graphs of One Column
 - Distribution – examine data
 - Normal Quantile Plot
 - Time Series

- Comparing Two Columns
 - Fit Y by X

Graphing

- Graphs of One Column
 - Distribution – examine data
 - Normal Quantile Plot
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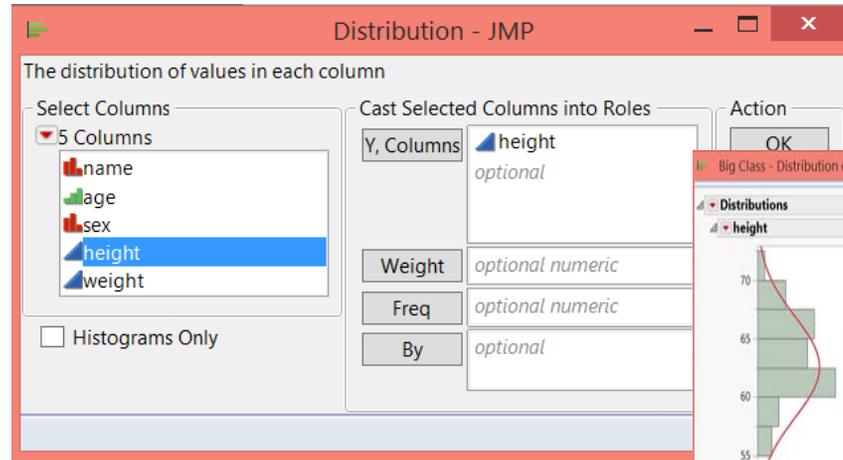
Graphing

One Column - Distribution

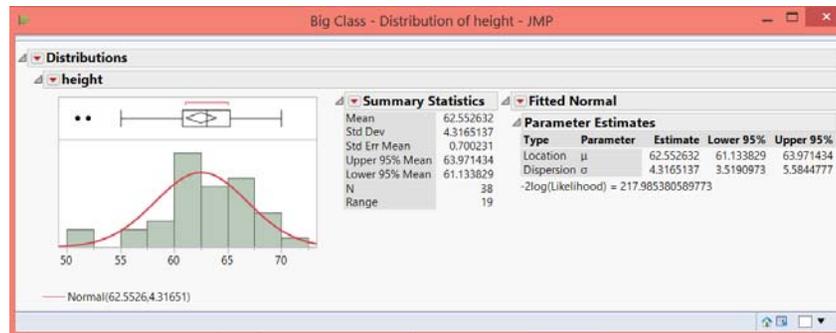
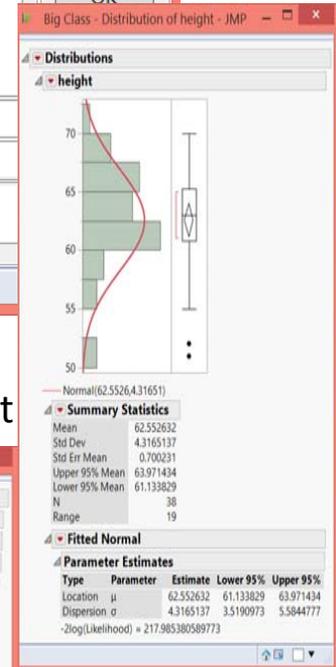
- Continuous
 - Shape
 - Range
 - Data density

Analyze → Distribution
 Select Columns: *height*

Y, Columns: *height*
 Action: *OK*



▼ *height*
 Display Options → Horizontal Layout



Help → Sample Data → Examples for teaching → Big Class

Graphing

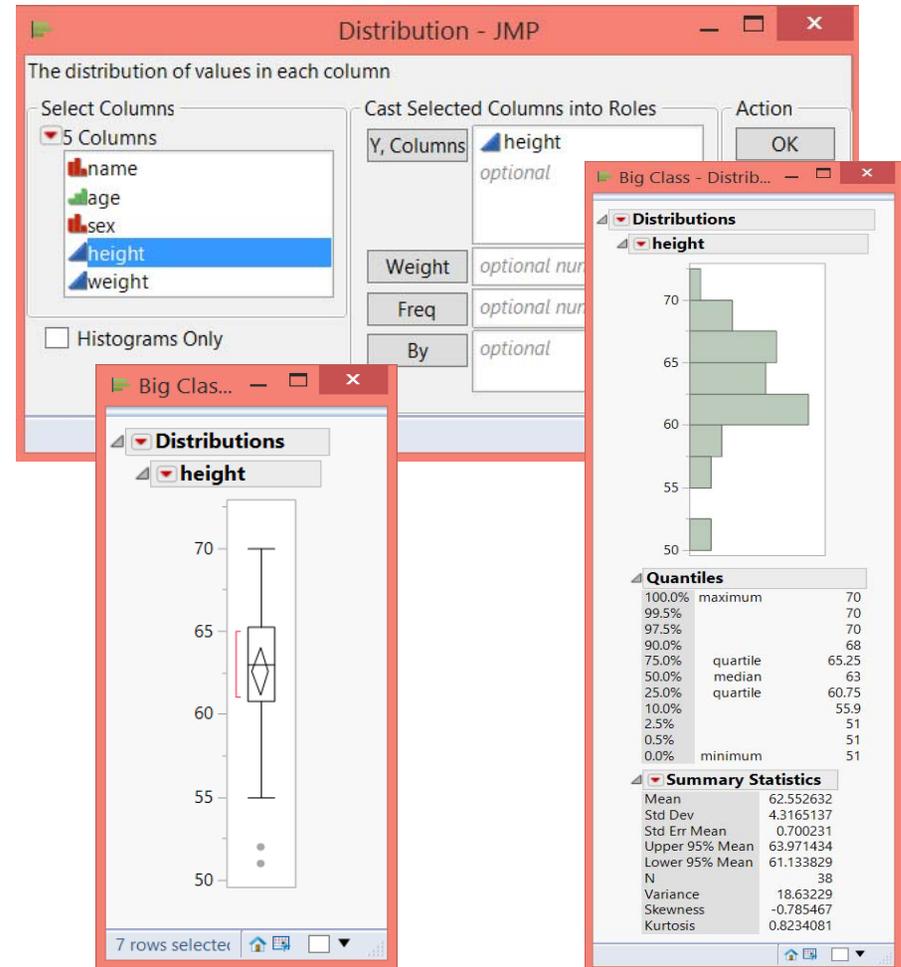
One Column - Distribution

- Outlier Box Plot
 - Chart for detecting extreme values
 - Properties of a continuous distribution
- Quartiles
- Moments
- Outliers

Analyze → Distribution → height

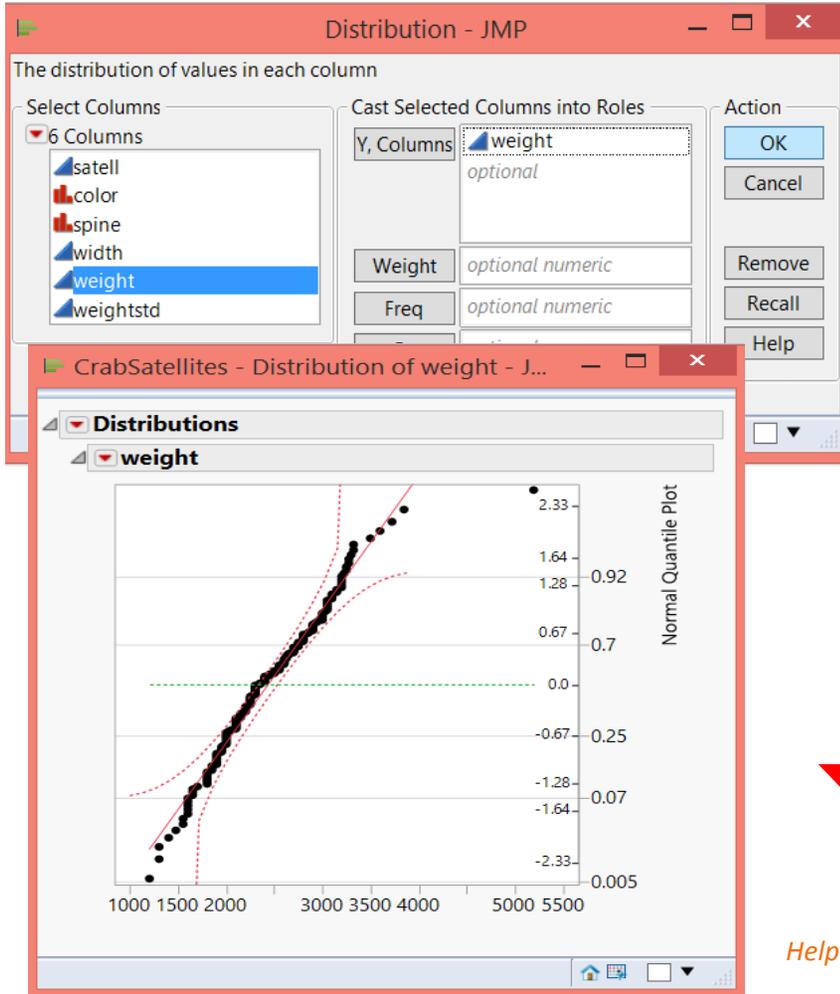
▼ *height → Outlier Box Plot*

Help → Sample Data → Examples for teaching → Big Class



Graphing

One Column – Normal Quantile Plot



- Chart for visualizing extend to which a *column is normally distributed*
- Points would fall upon the line
- Point would not fall beyond confidence curves

Analyze → Distribution

Select Columns: *Weight* → Y

Columns: *Weight*

→ Action: *OK*

▼ *Weight* → *Normal Quantile Plot*

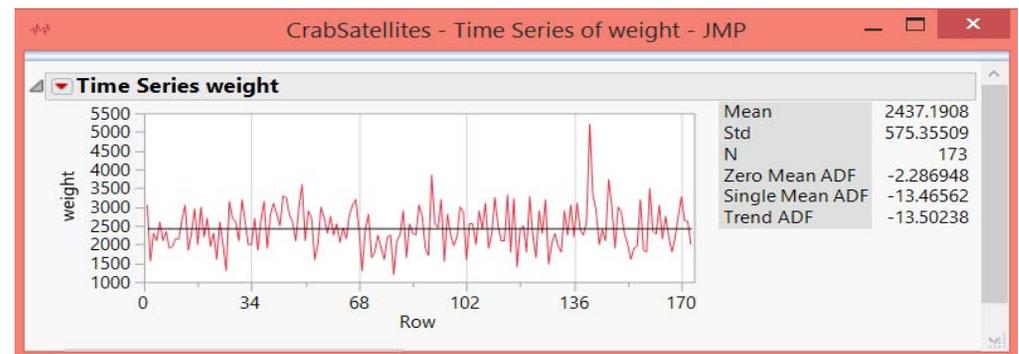
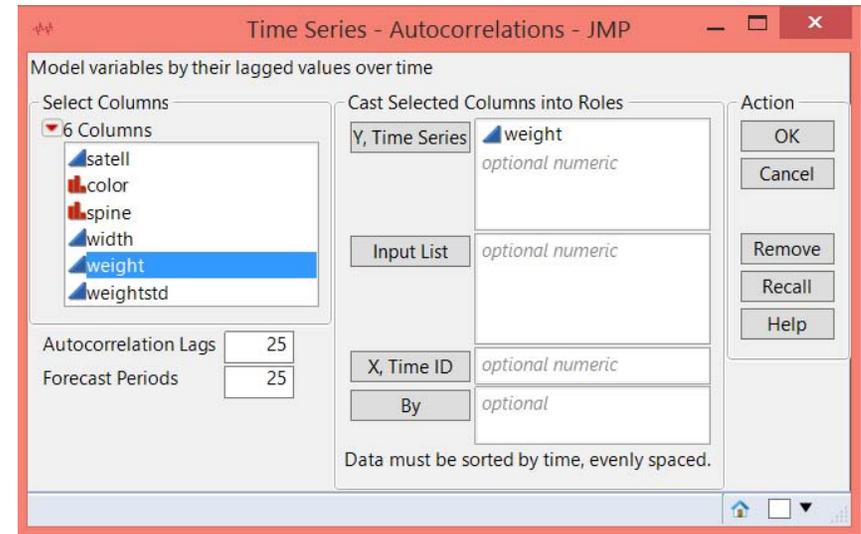
Help → *Sample Data* → *See an Alphabetical List of all Sample Data Files* → *CrabSatellites*

Graphing

One Column – Time Series

- Separate platform
 - Forecasting techniques
 - Statistical Results
- Graph of numeric variable
 - Random sample from population
 - Independent and identically distributed (i.i.d.)
 - Check: Time Series
- View and fit
 - variability over time
 - potential seasonality of a variable over time

Analyze → Modeling → Time Series
Select Columns: *Weight* →
Y, Time Series: *Weight* → Action: *OK*



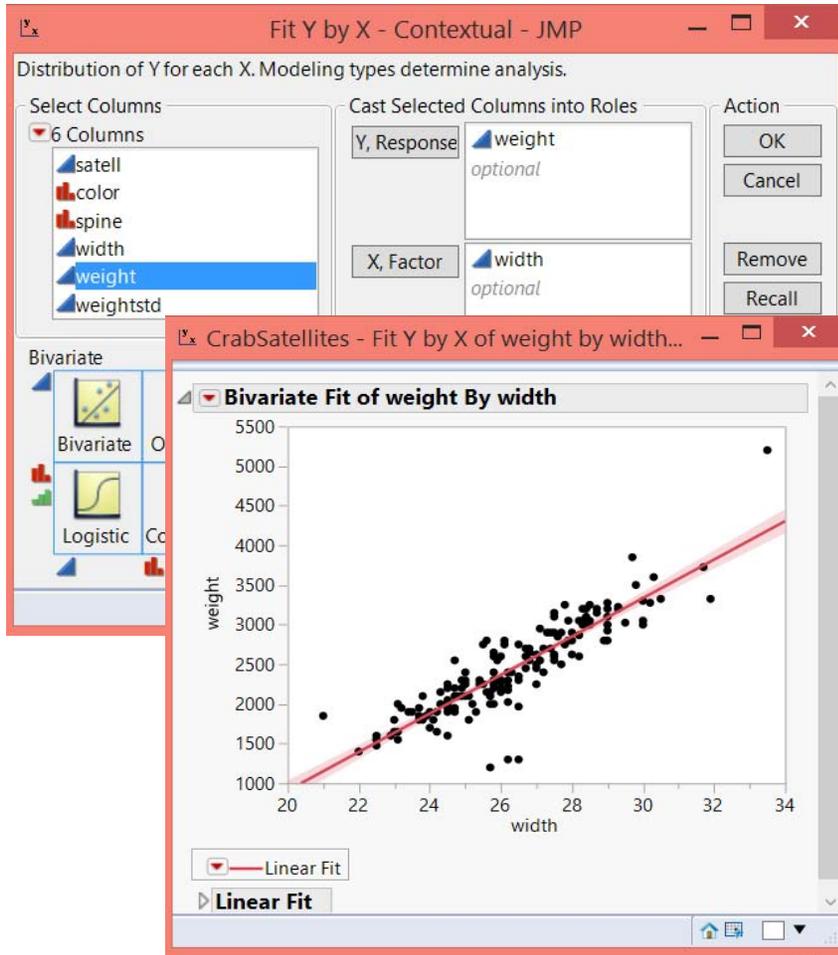
Help → Sample Data → See an Alphabetical List of all Sample Data Files → CrabSatellites

Graphing

- Graphs of One Column
 - Distribution – examine data
 - Normal Quantile Plot
 - Time Series
- Comparing Two Columns
 - Fit Y by X

Graphing

Comparing Two Columns – Fit Y by X



- Relationship of two columns
- Graph are always based on *Modeling Type*
 - *Continuous*
 - *Nominal*
 - *Ordinal*
- Matrix in *Fit Y by X* window provides *visual preview of graphs*
 - See icons on margin of matrix

Analyze → Fit Y by X → Y, Response: *weight*
 X, Factor : *width*

- ▼ Bivariate Fit of *weight* By *width* → *Fit Line*
- ▼ Linear Fit → *Confid Shaded Fit*

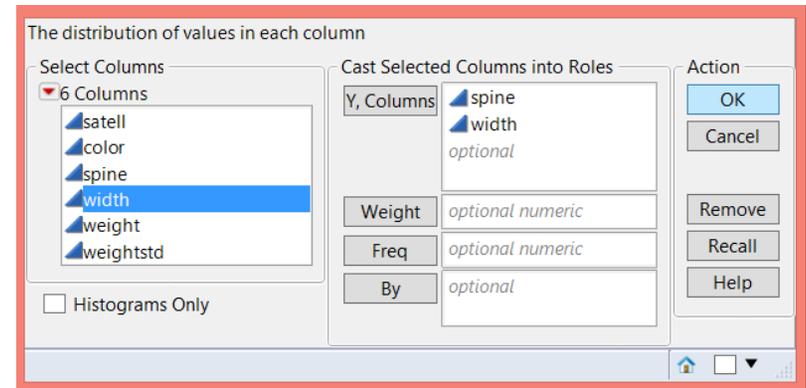
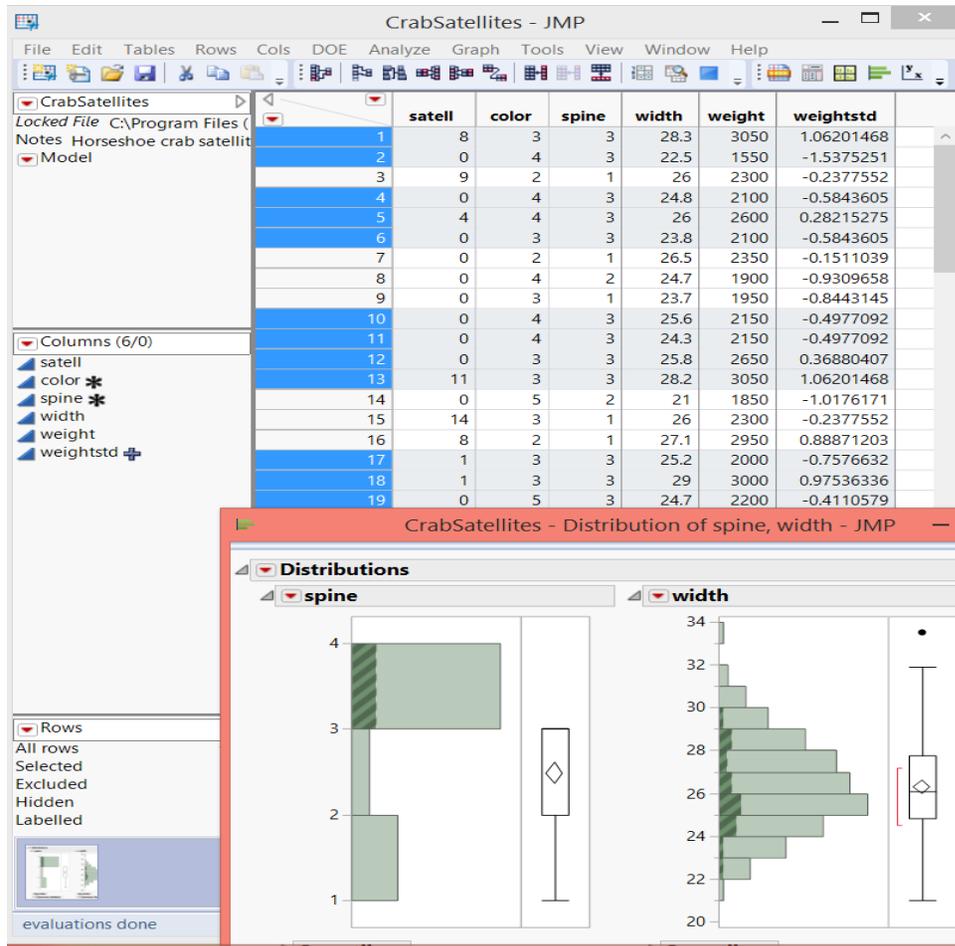
Help → Sample Data → See an Alphabetical List of all Sample Data Files → CrabSatellites

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Bivariate Statistics

Comparing One Column to Another



Analyze → Distribution

Dynamic Link of Graphs and data

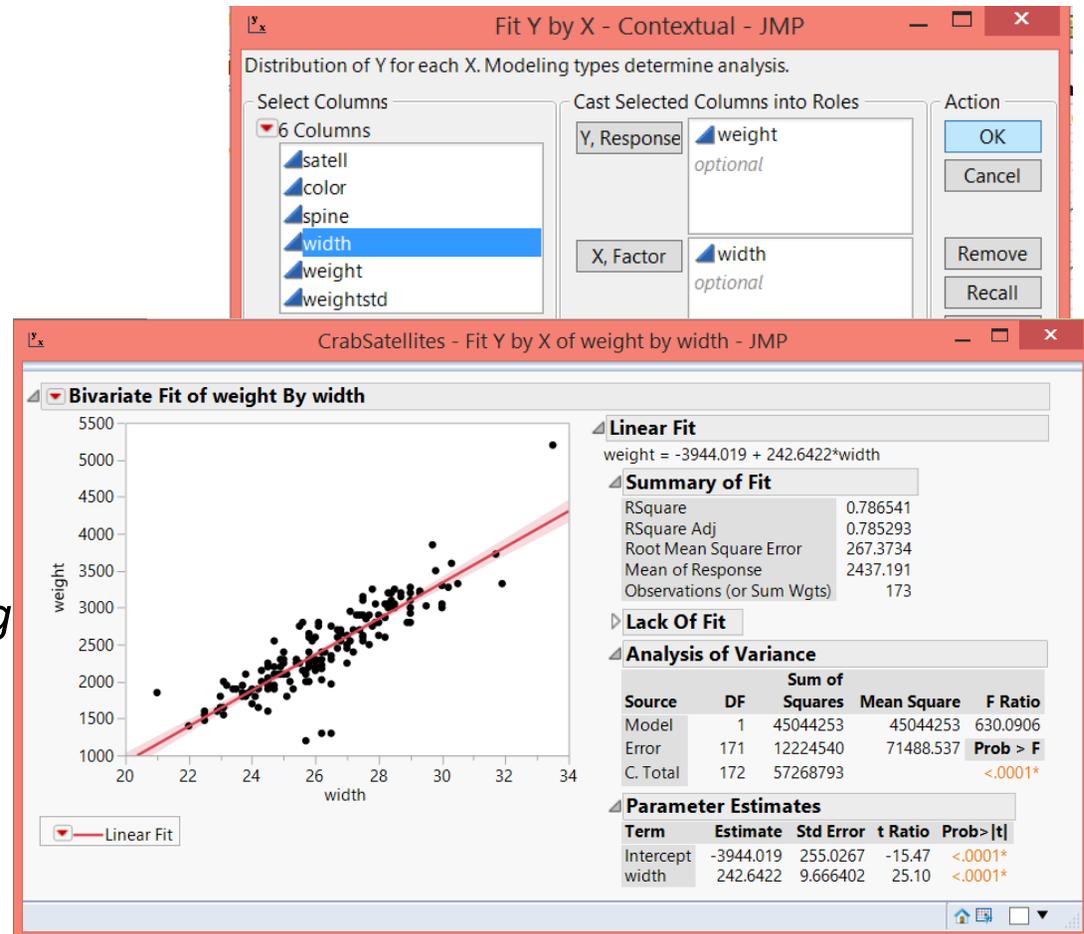
[Note: check value display of 'spine']

Help → Sample Data → See an Alphabetical List of all Sample Data Files → CrabSatellites

Bivariate Statistics

Comparing One Column to Another

- *Fit Y by X*
- *Relationship of one column to another column.*
- *Modeling type of the column determines the type of analysis produced.*
- *Picture previews are references of the kind of analysis, according to the modeling type of the columns.*

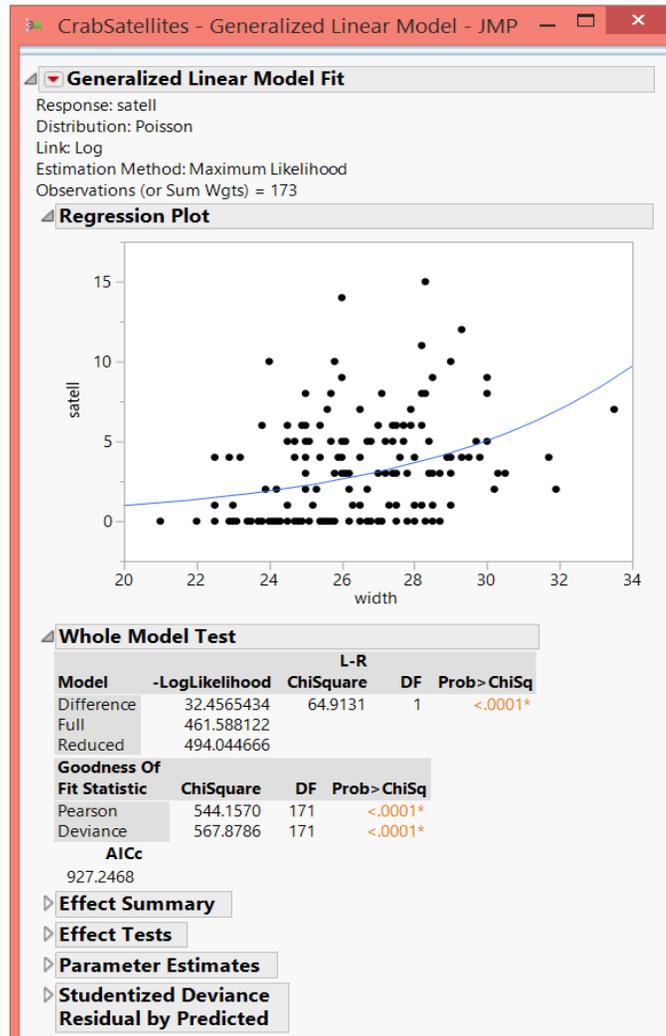


Help → Sample Data → See an Alphabetical List of all Sample Data Files → CrabSatellites

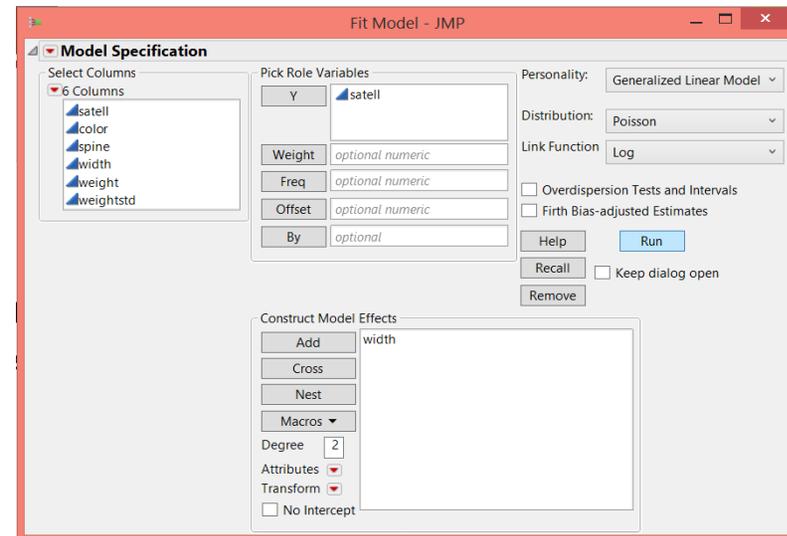
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Generalized Linear Model Poisson



Analyze → Fit Model
 Pick Role Variables: Y → satell
 Construct Model Effects → width
 Personality: Generalized Linear Model
 Distribution: Poisson
 Link Function: Log



Help → Sample Data → See an Alphabetical List of all Sample Data Files → CrabSatellites

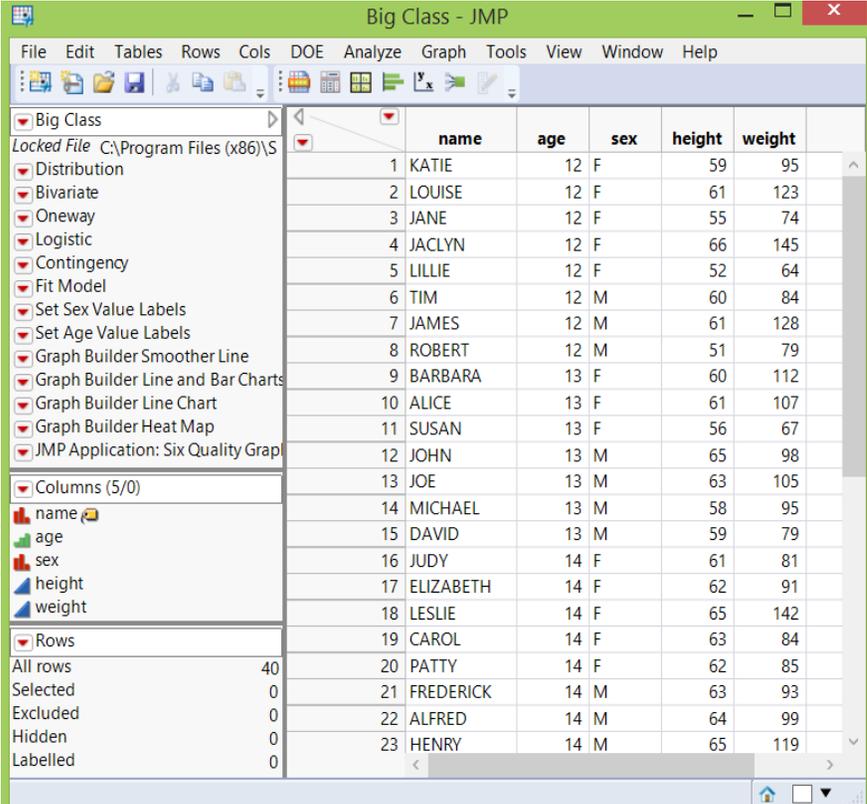
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Script - JSL

- *JSL - JMP Scripting Language*
- Open a data table
- Make changes:
 - add rows and columns
 - change values
 - make a formula column
 - build charts
 - run analyses

.....



The screenshot shows the JMP software interface with a data table titled "Big Class". The table has columns for "name", "age", "sex", "height", and "weight". The data is as follows:

	name	age	sex	height	weight
1	KATIE	12	F	59	95
2	LOUISE	12	F	61	123
3	JANE	12	F	55	74
4	JACLYN	12	F	66	145
5	LILLIE	12	F	52	64
6	TIM	12	M	60	84
7	JAMES	12	M	61	128
8	ROBERT	12	M	51	79
9	BARBARA	13	F	60	112
10	ALICE	13	F	61	107
11	SUSAN	13	F	56	67
12	JOHN	13	M	65	98
13	JOE	13	M	63	105
14	MICHAEL	13	M	58	95
15	DAVID	13	M	59	79
16	JUDY	14	F	61	81
17	ELIZABETH	14	F	62	91
18	LESLIE	14	F	65	142
19	CAROL	14	F	63	84
20	PATTY	14	F	62	85
21	FREDERICK	14	M	63	93
22	ALFRED	14	M	64	99
23	HENRY	14	M	65	119

Script - JSL

File → New → Script

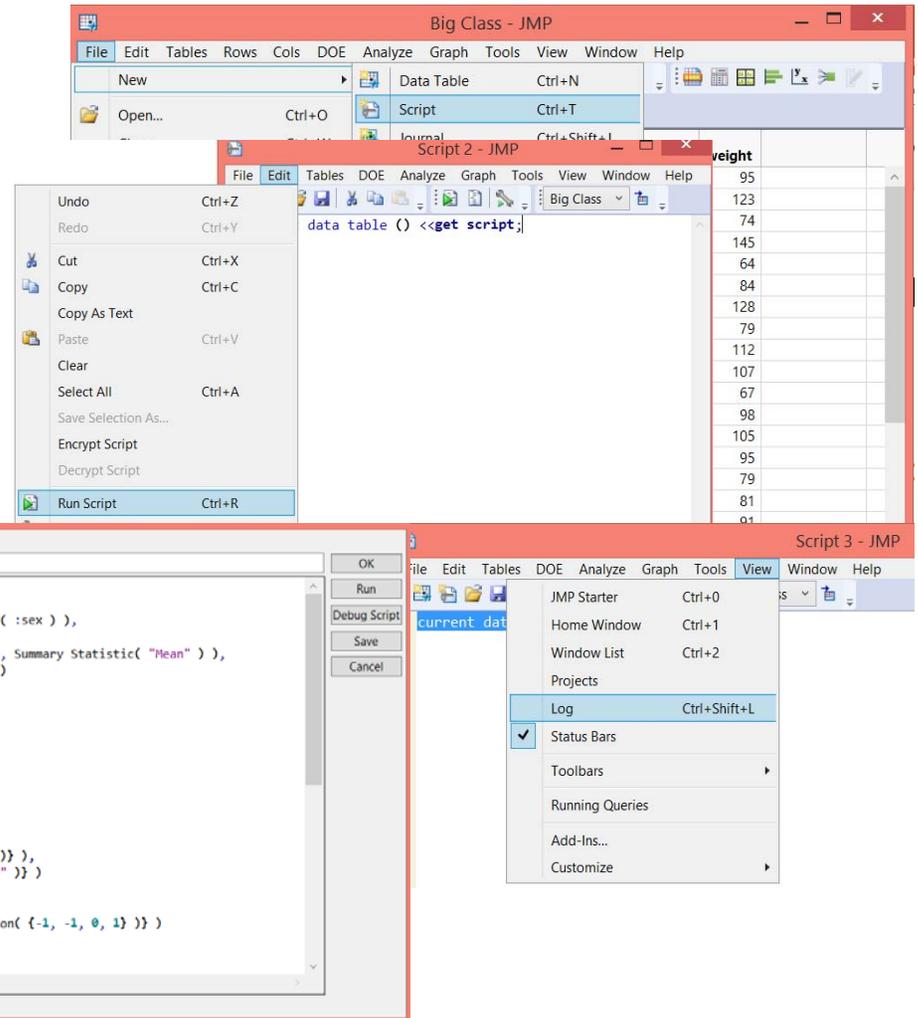
Type:

current data table () <<get script;

Select text:

→ Edit → *Run Script*

→ View → *Log*



Help → Sample Data → Examples for teaching → Big Class

QUESTIONS



JMP Use

www.jmp.com/applications

- [Analytical Application Development](#)
- [Data Visualization](#)
- [Design of Experiments](#)
- [Exploratory Data Analysis](#)
- [Modeling and Predictive Analytics](#)
- [Quality Improvement](#)
- [Reliability](#)
- [Six Sigma](#)
- [Statistics](#)