

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 ▼

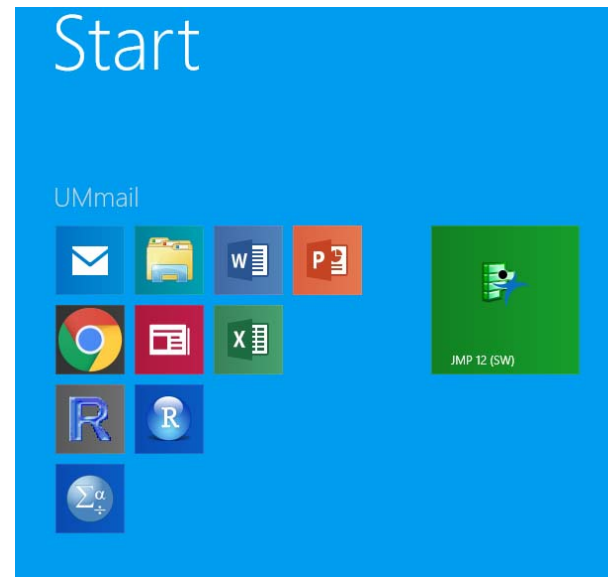
- JMP uses the space in windows to show results
- Commands that extend the analysis
 - right-clicking inside the outline items
- ***Hotspots*** look like a downward red triangle ▼

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- Introduction
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Launching JMP

Start →

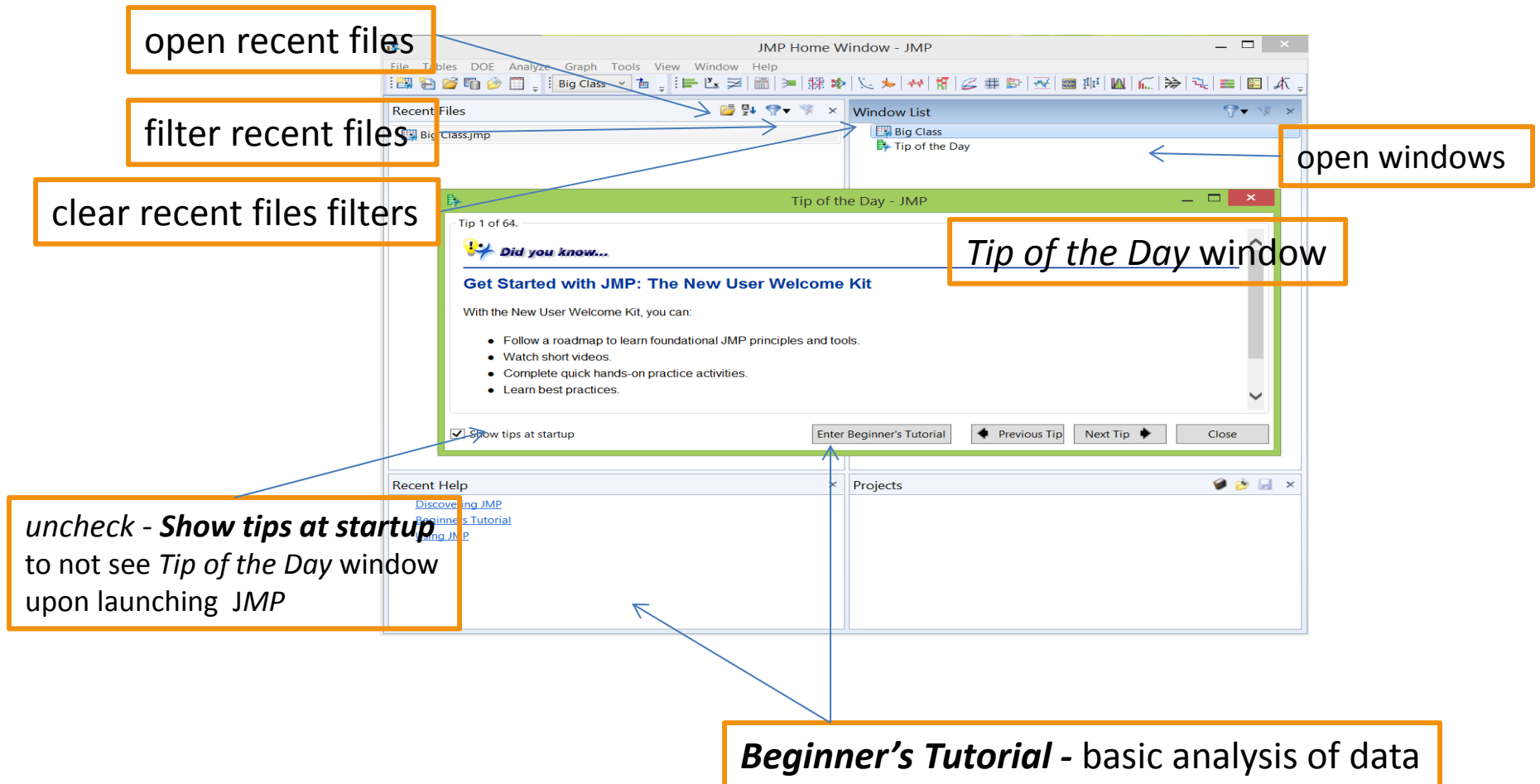


Contents

- Introduction
- Launching JMP
- User Interface
- Getting Data into JMP
- Examining Data
- Manipulating Data
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User Interface

Home Window



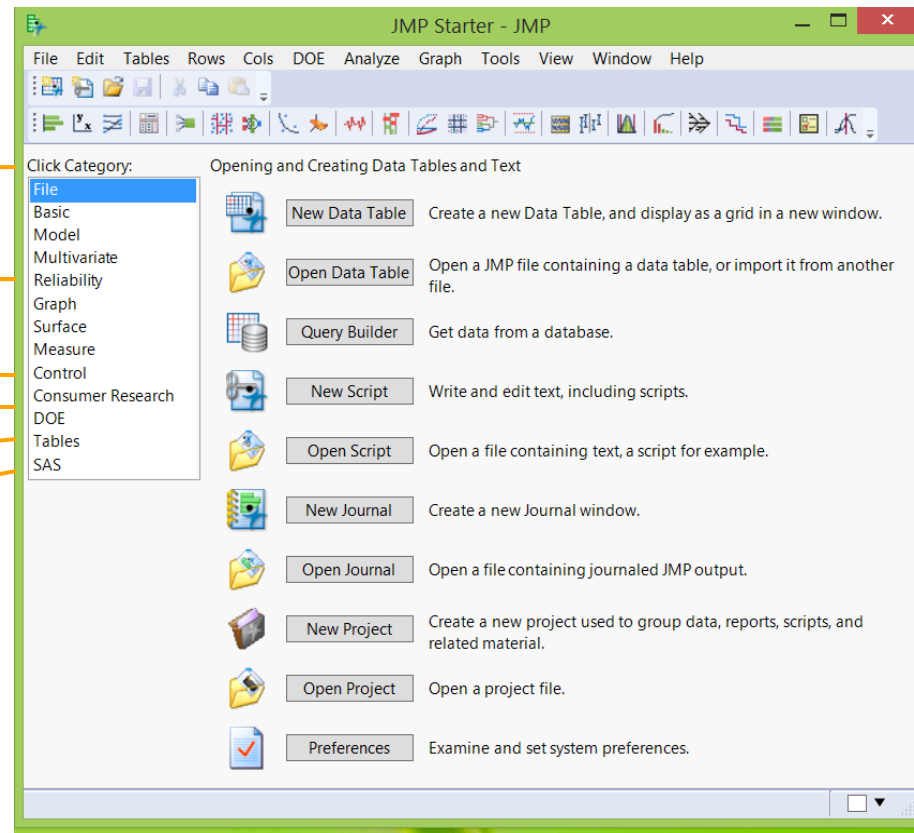
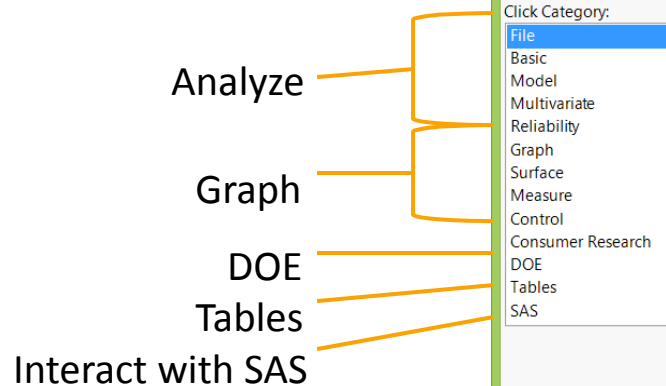
User Interface

JMP Starter Window

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

View → **JMP Starter**

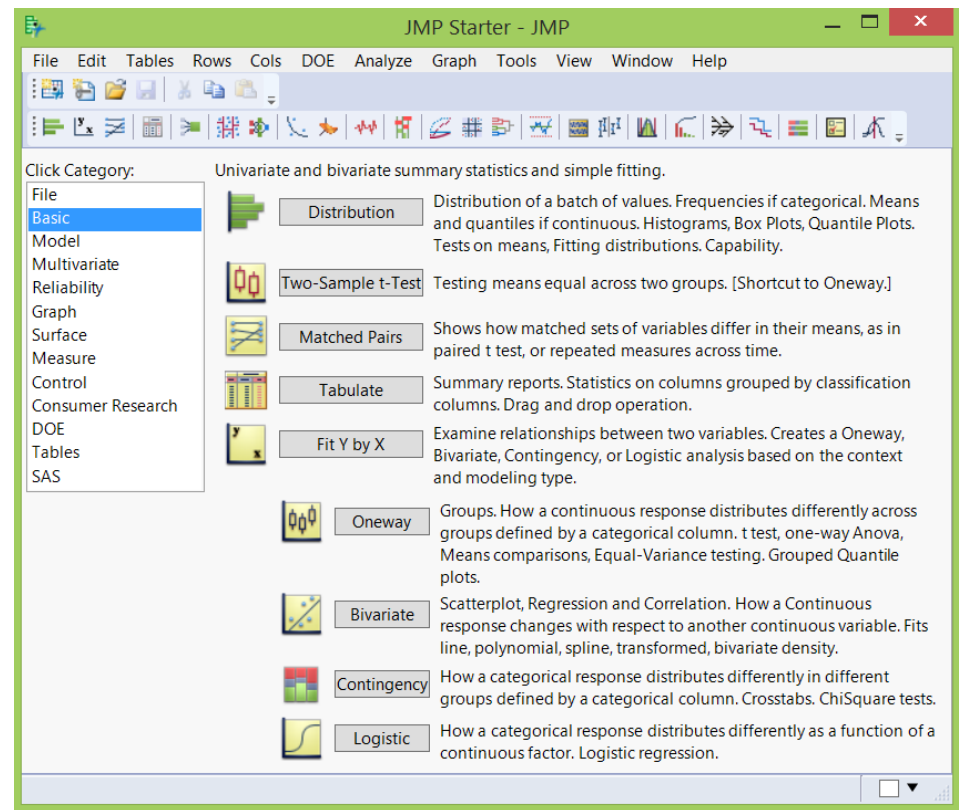
- **File**



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



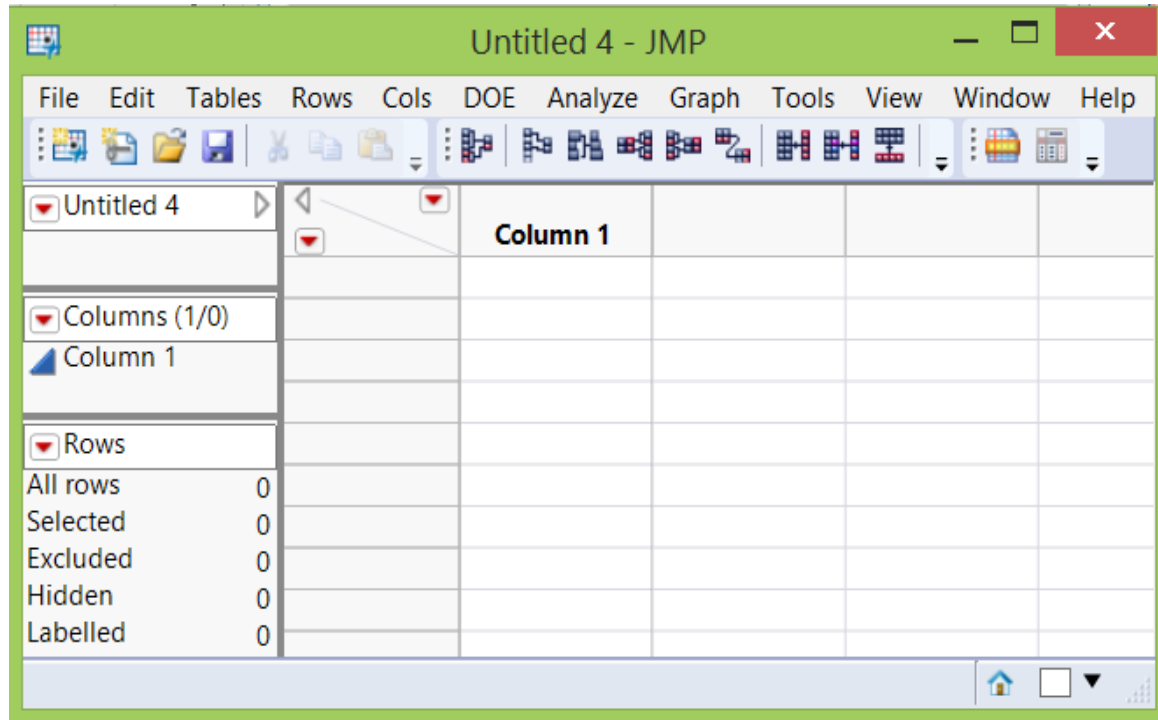
Contents

- Introduction
- Launching JMP
- User Interface
- Getting Data into JMP
- Examining Data
- Manipulating Data
- Graphing
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Getting Data into JMP

New *Data Tables*

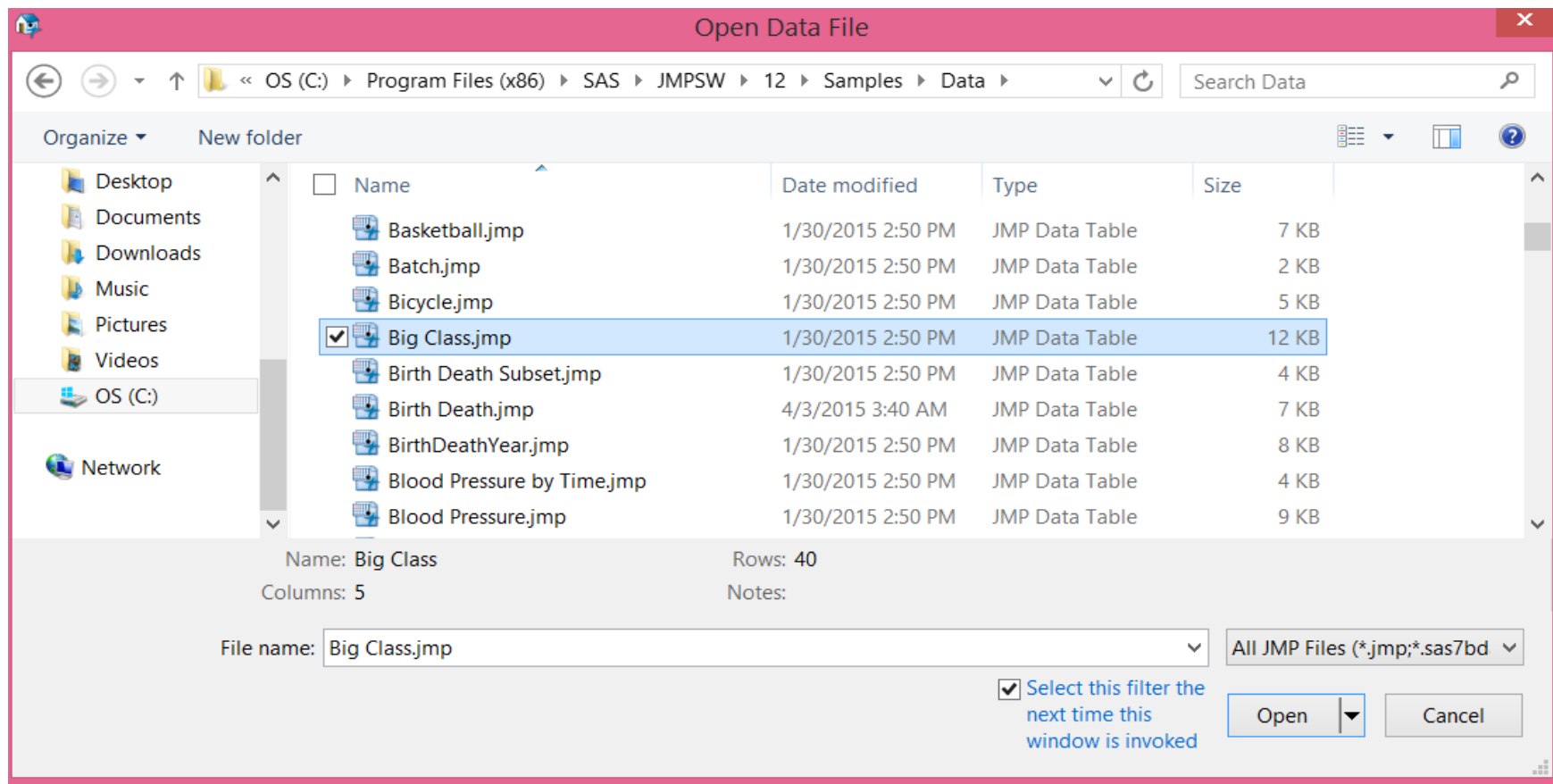
- **File → New → Data Table** Ctrl + N
 - Empty *data table* with no *rows*
 - One numeric column, labeled *Column 1*



Getting Data into JMP

Sample JMP Files

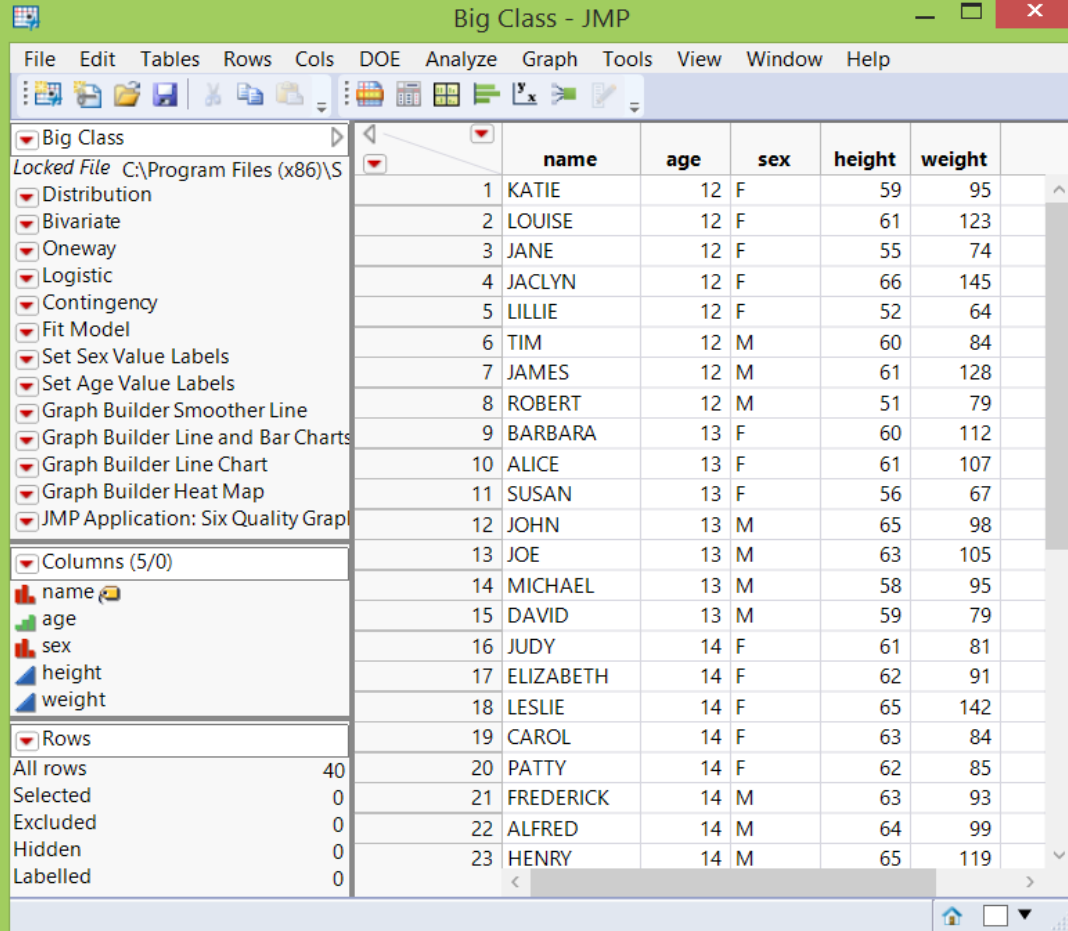
File → Open → C:\Program Files (x86)\SAS\JMPSW\12\Samples\Data\Big Class.jmp



Getting Data into JMP

Sample JMP Files

- Sample Data
– *Big Class.jmp*



	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

Getting Data into JMP

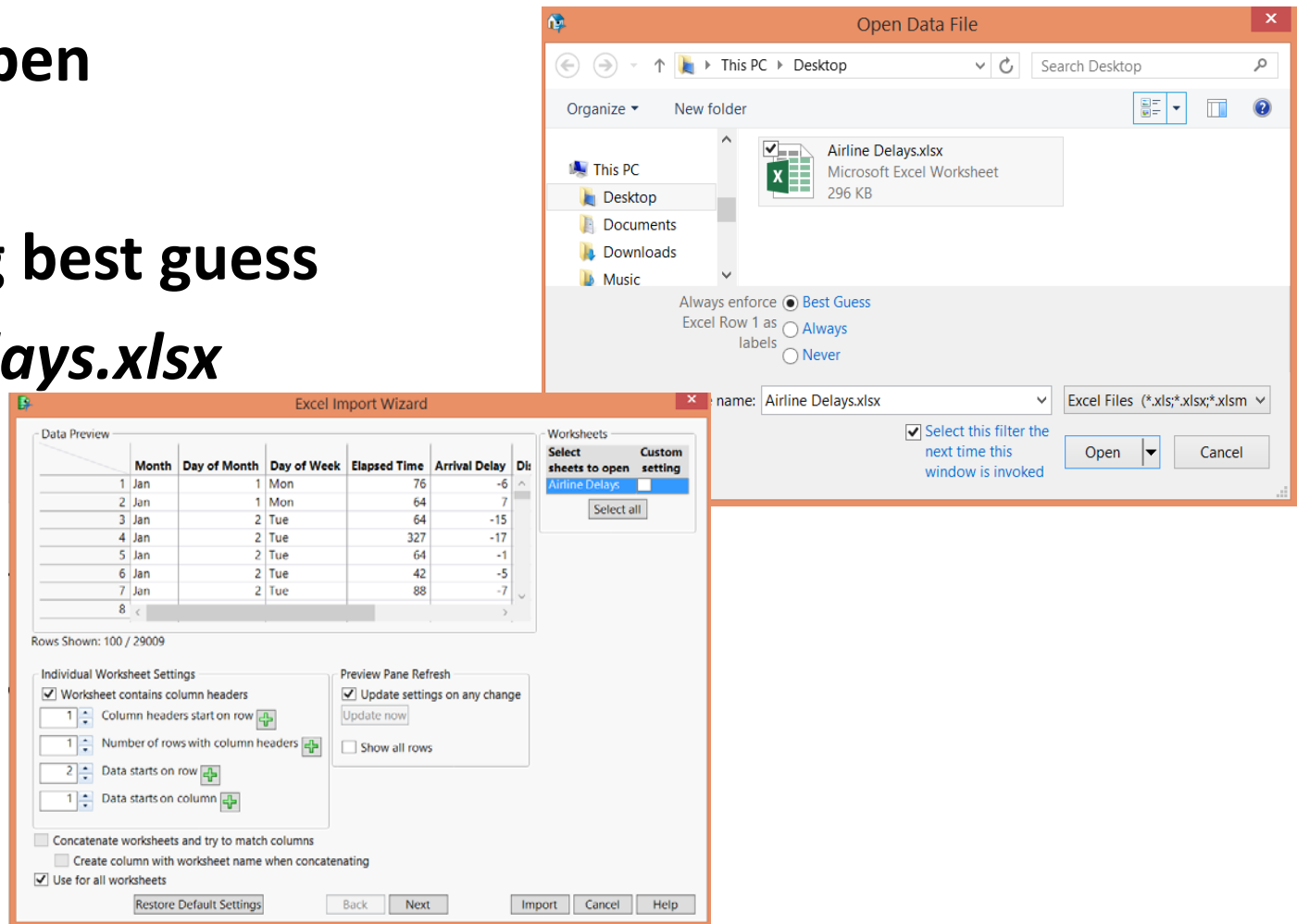
Importing an Excel *.x/sx file

- File → Open

Open as:

Data, using best guess

Airline Delays.xlsx



Getting Data into JMP

Importing an Excel *.x/sx file

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

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

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

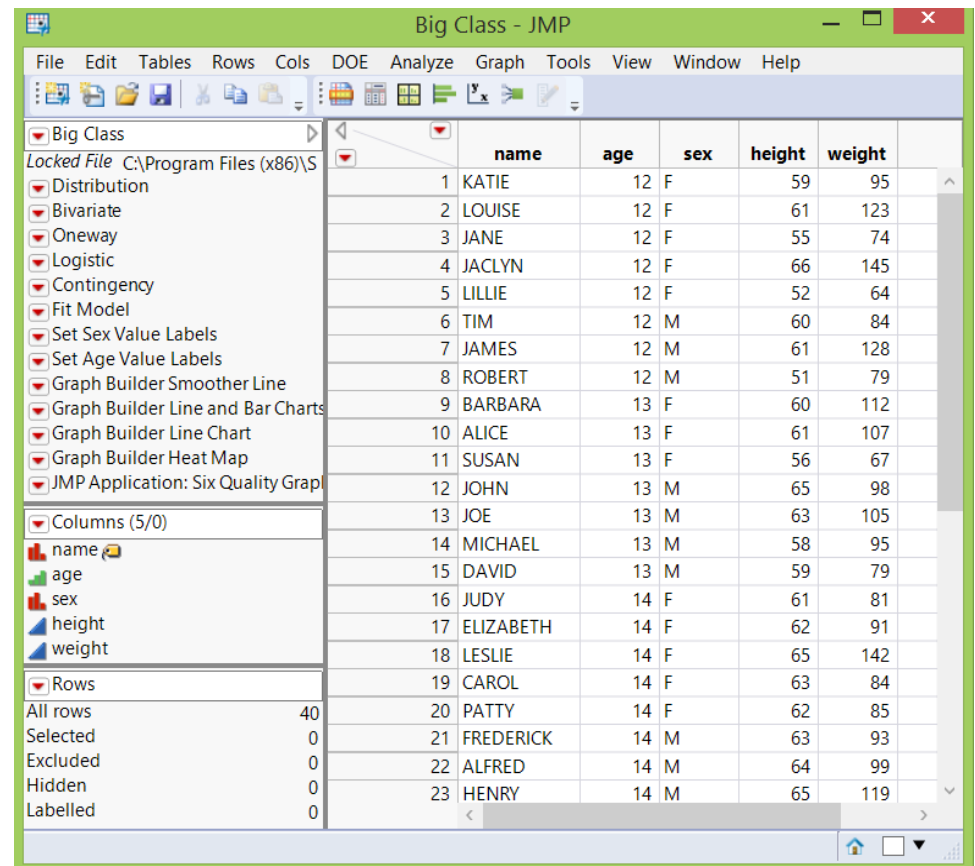
AND MANY MORE!!

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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 v12 software interface. The title bar reads 'Big Class - JMP'. The menu bar includes File, Edit, Tables, Rows, Cols, DOE, Analyze, Graph, Tools, View, Window, and Help. The left sidebar contains a list of analysis options under 'Big Class', including Distribution, Bivariate, Oneway, Logistic, Contingency, Fit Model, Set Sex Value Labels, Set Age Value Labels, Graph Builder Smoother Line, Graph Builder Line and Bar Charts, Graph Builder Line Chart, Graph Builder Heat Map, and JMP Application: Six Quality Grap. Below this is a 'Columns (5/0)' section with icons for name, age, sex, height, and weight. The 'Rows' section shows counts for All rows (40), Selected (0), Excluded (0), Hidden (0), and Labelled (0). The main data table has columns: name, age, sex, height, and weight. The data rows are numbered 1 through 23, with the last row (23) being HENRY, 14 M, 65, 119.

	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
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21	FREDERICK	14	M	63	93
22	ALFRED	14	M	64	99
23	HENRY	14	M	65	119

Examining Data

Data Table Panels

The screenshot shows the JMP Data Table Panels for a table named 'Big Class'. The panels are organized into three main sections: **table options**, **script options**, and **column options**.

- table options**: Includes 'Distribution', 'Bivariate', 'Oneway', 'Logistic', 'Contingency', 'Fit Model', 'Set Sex Value Labels', 'Set Age Value Labels', 'Graph Builder Smoother Line', 'Graph Builder Line and Bar Charts', 'Graph Builder Line Chart', 'Graph Builder Heat Map', and 'JMP Application: Six Quality Graphs'.
- script options**: Includes 'Columns (5/0)' and 'Rows'.
- column options**: Includes 'name', 'age', 'sex', 'height', and 'weight'.

Annotations with arrows point to the following elements:

- data table name**: Points to 'Big Class'.
- table variable**: Points to 'Distribution'.
- table scripts**: Points to 'Logistic' and 'Fit Model'.
- column options**: Points to 'Columns (5/0)'.
- modeling type**: Points to 'nominal', 'ordinal', and 'continuous'.
- row options**: Points to 'Rows'.

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

Contents

- Introduction
- Launching JMP
- User Interface
- Getting Data into JMP
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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

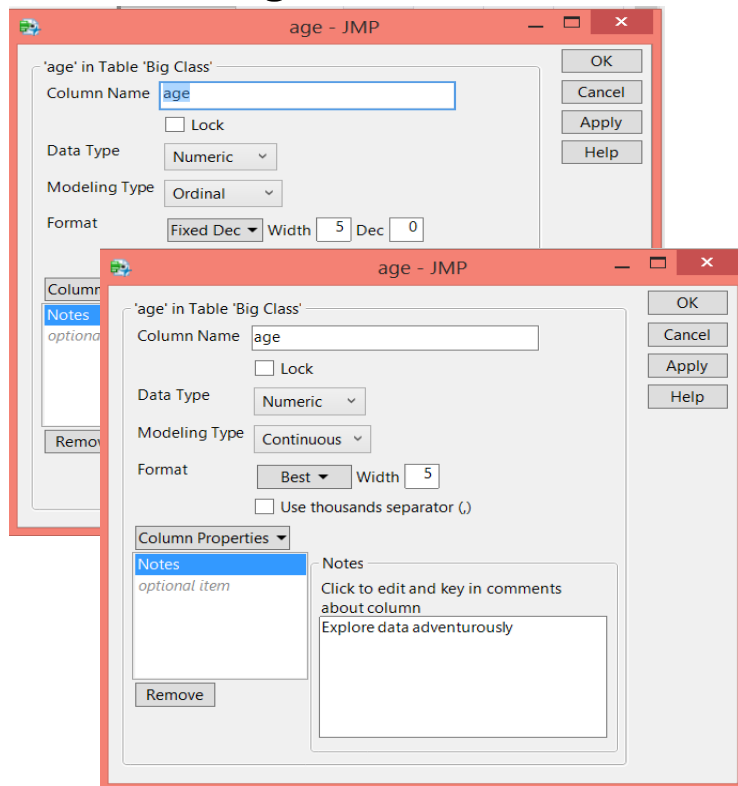
Manipulating Data Formatting

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

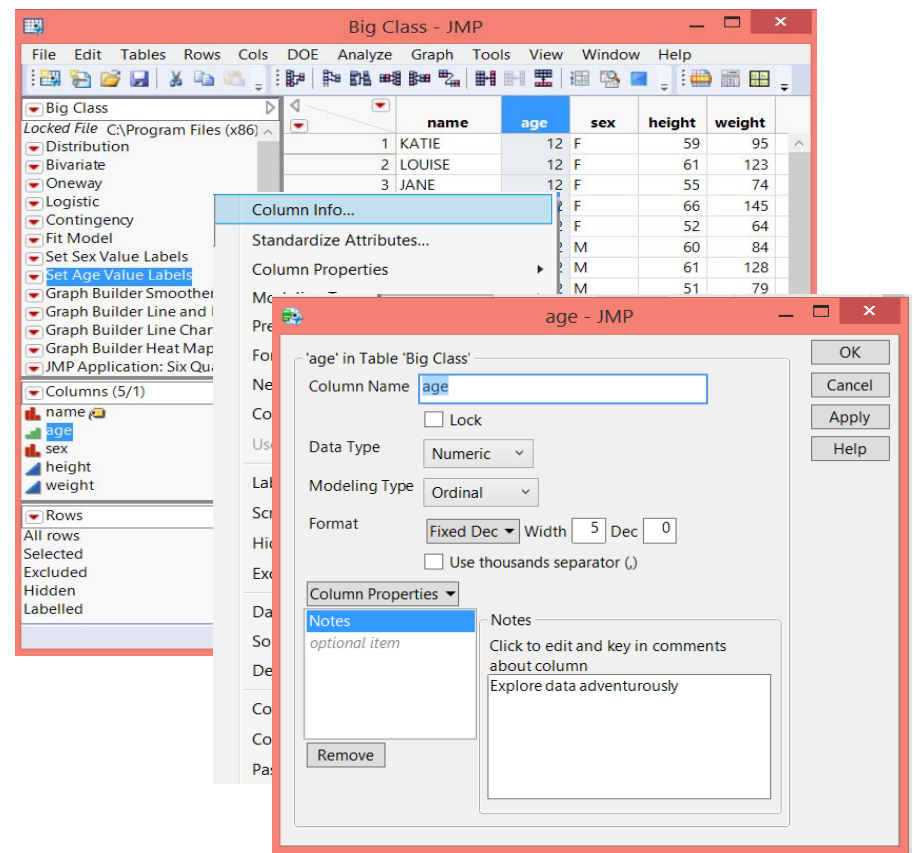
Manipulating Data

Formatting – Cleaning up data format

- Double-click area above an existing column name



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



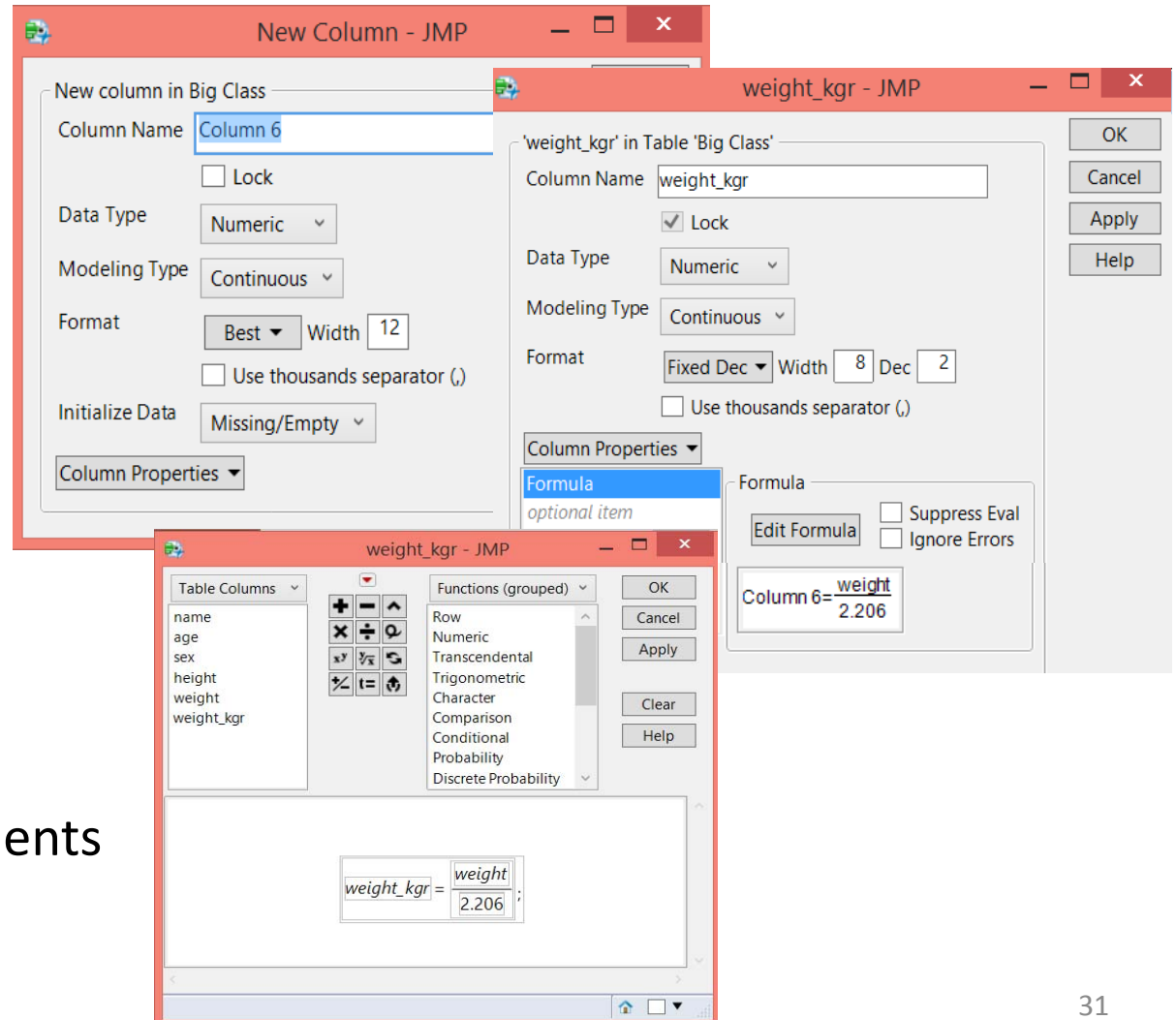
Manipulating Data Formatting

- 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

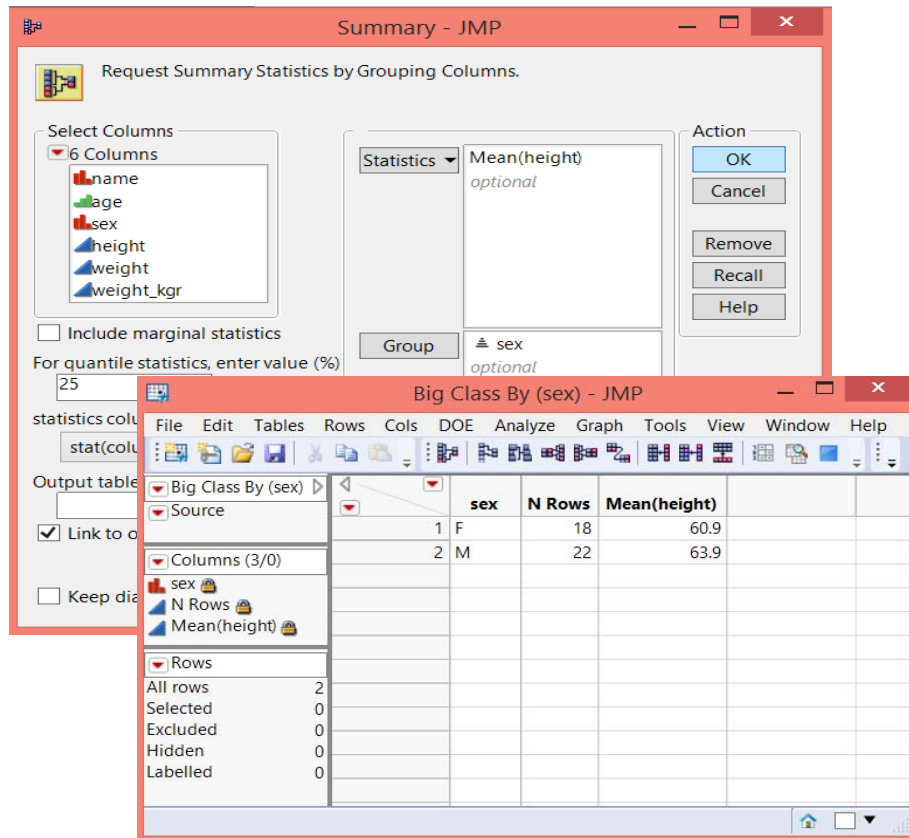
Manipulating Data Tables

- 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
 - 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

The image shows two screenshots from the JMP software. The top screenshot is the 'Missing Data Pattern - JMP' dialog box. It has a title bar with a minus, maximize, and close button. The main text says 'Find the patterns of missing values in the data and make a table of each pattern and its frequency.' There are two sections: 'Select Columns' and 'Add Columns'. Under 'Select Columns', '5 Columns' are selected: name, age, sex, height, and weight. Under 'Add Columns', the same five columns are listed. There are 'Add Columns' and 'Remove' buttons. To the right, there are 'Action' buttons: 'Create', 'Cancel', 'Recall', and 'Help'. At the bottom, there is a checkbox for 'Count Missing Value Codes' and a text field for 'Output table name:' with the value 'Missing Data Pattern'.

The bottom screenshot shows the resulting data table in JMP. The table has columns: Count, Number of columns missing, Patterns, age, sex, height, and weight. The data is as follows:

Count	Number of columns missing	Patterns	age	sex	height	weight
1	35	0000	0	0	0	0
2	2	1000	0	0	0	1
3	1	1010	0	0	1	0
4	1	2110	0	1	1	0
5	1	1000	1	0	0	0

The table is displayed in a window titled 'Missing Data Pattern - JMP' with a standard JMP menu bar (File, Edit, Tables, Rows, Cols, DOE, Analyze, Graph, Tools, View, Window, Help) and a toolbar. The left sidebar shows the 'Missing Data Pattern' table selected, with a tree view showing 'Source' (Treemap, Cell Plot), 'Columns (7/0)' (Count, Number of columns missing, Patterns, age, sex, height, weight), and 'Rows' (All rows, Selected, Excluded, Hidden, Labelled).

Contents

- Introduction
- Launching JMP
- User Interface
- Getting Data into JMP
- Examining Data
- Manipulating Data
- **Graphing**
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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

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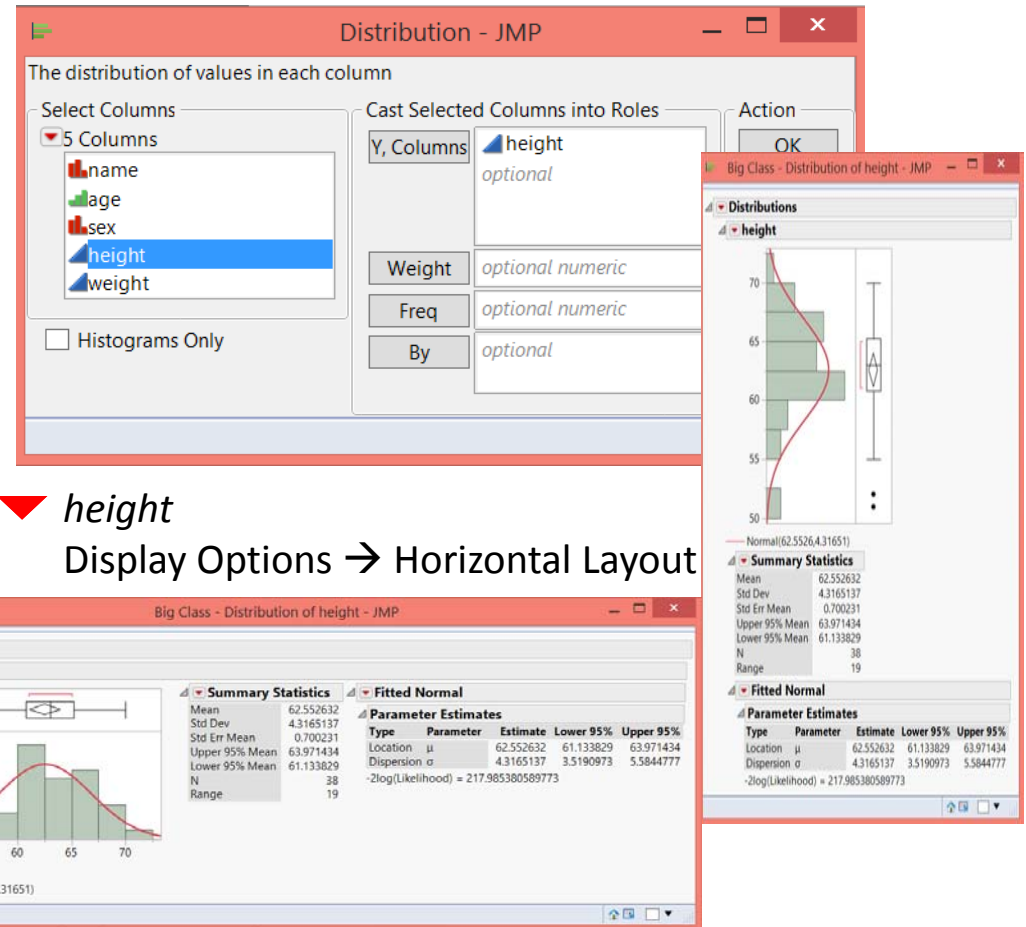
Graphing

One Column - Distribution

- Continuous
 - Shape
 - Range
 - Data density

Analyze → Distribution
Select Columns: *height*

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



Help → Sample Data → Examples for teaching → Big Class

Graphing

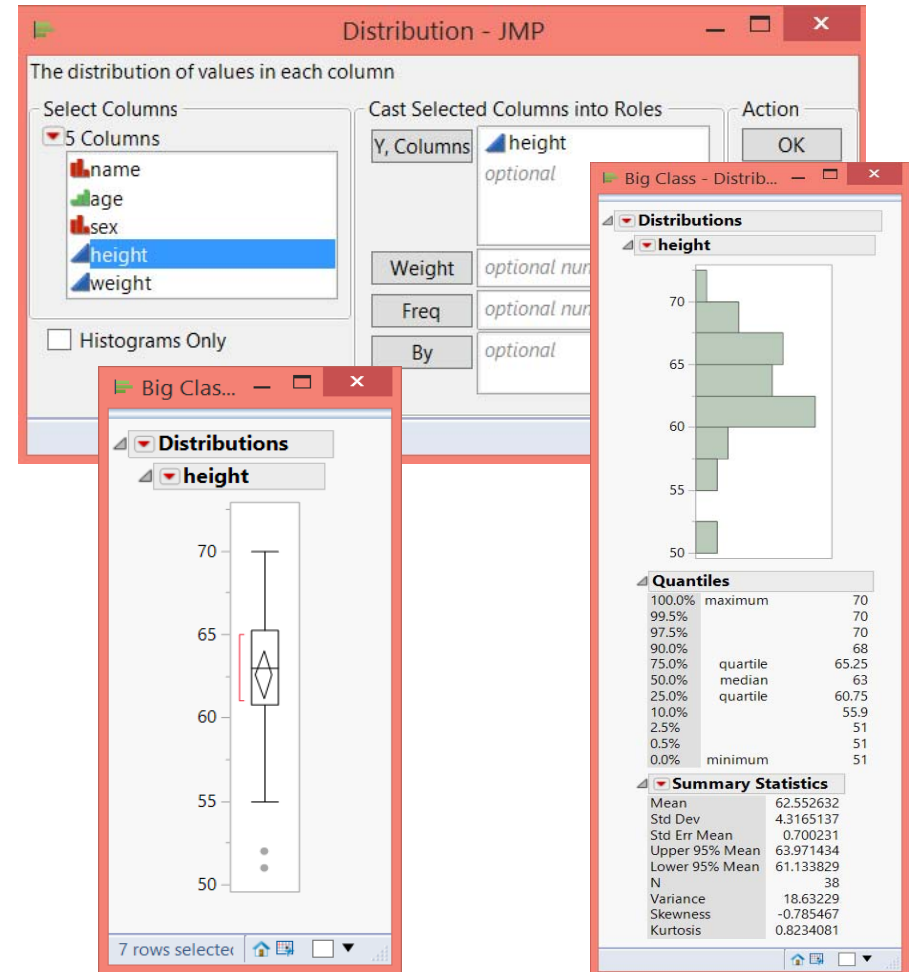
One Column - Distribution

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

Analyze → Distribution → height

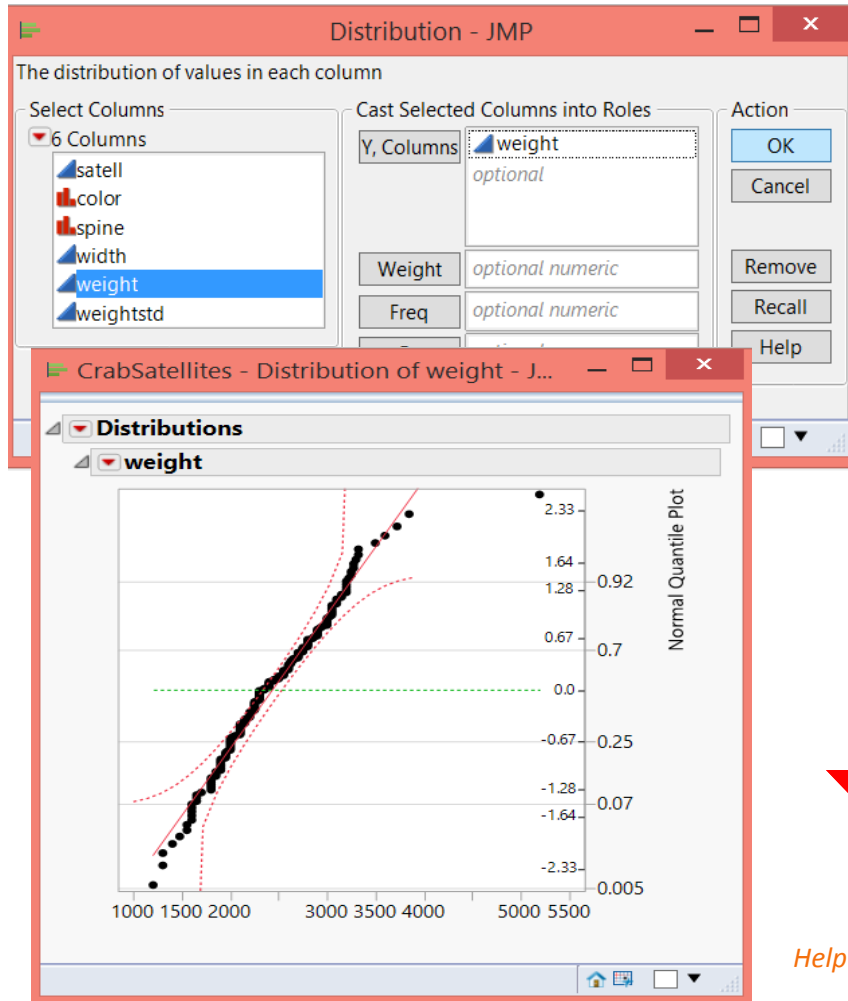
▼ *height → Outlier Box Plot*

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*

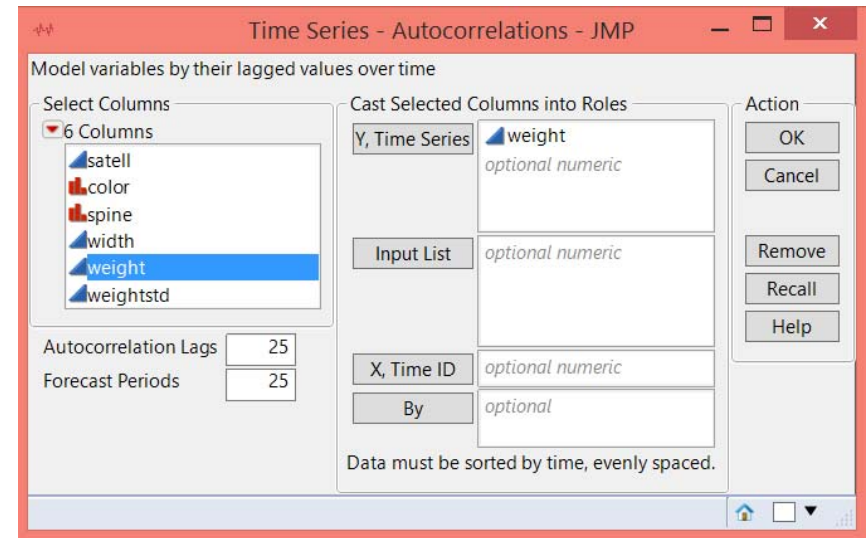
▼ *Weight* → Normal Quantile Plot

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

Graphing

One Column – Time Series

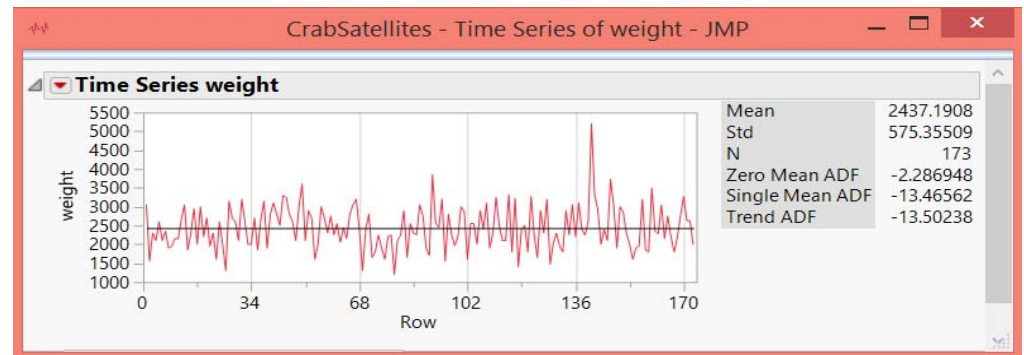
- Separate platform
 - Forecasting techniques
 - Statistical Results
- Graph of numeric variable
 - Random sample from population
 - Independent and identically distributed (i.i.d.)
 - Check: Time Series
- View and fit
 - variability over time
 - potential seasonality of a variable over time



Analyze → Modeling → Time Series

Select Columns: *Weight* →

Y, Time Series: *Weight* → Action: OK



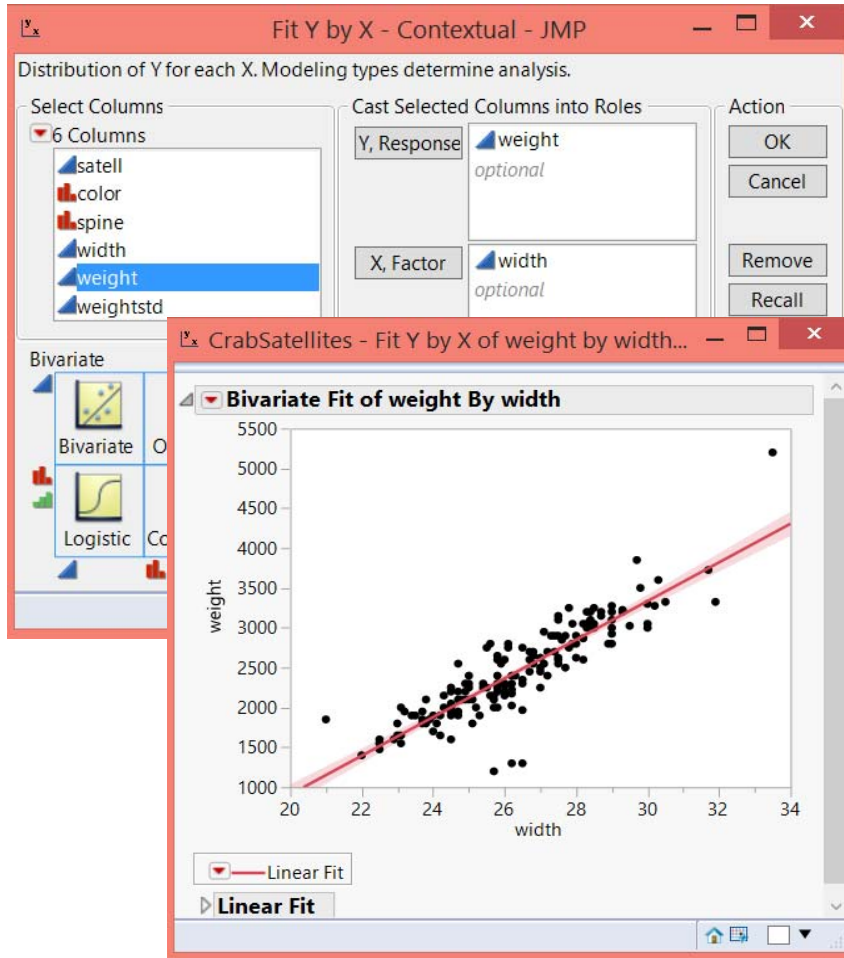
Help → Sample Data → See an Alphabetical List of all Sample Data Files → CrabSatellites

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*

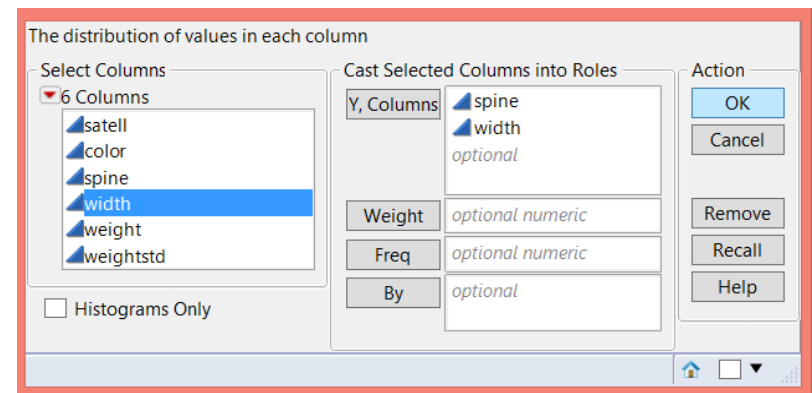
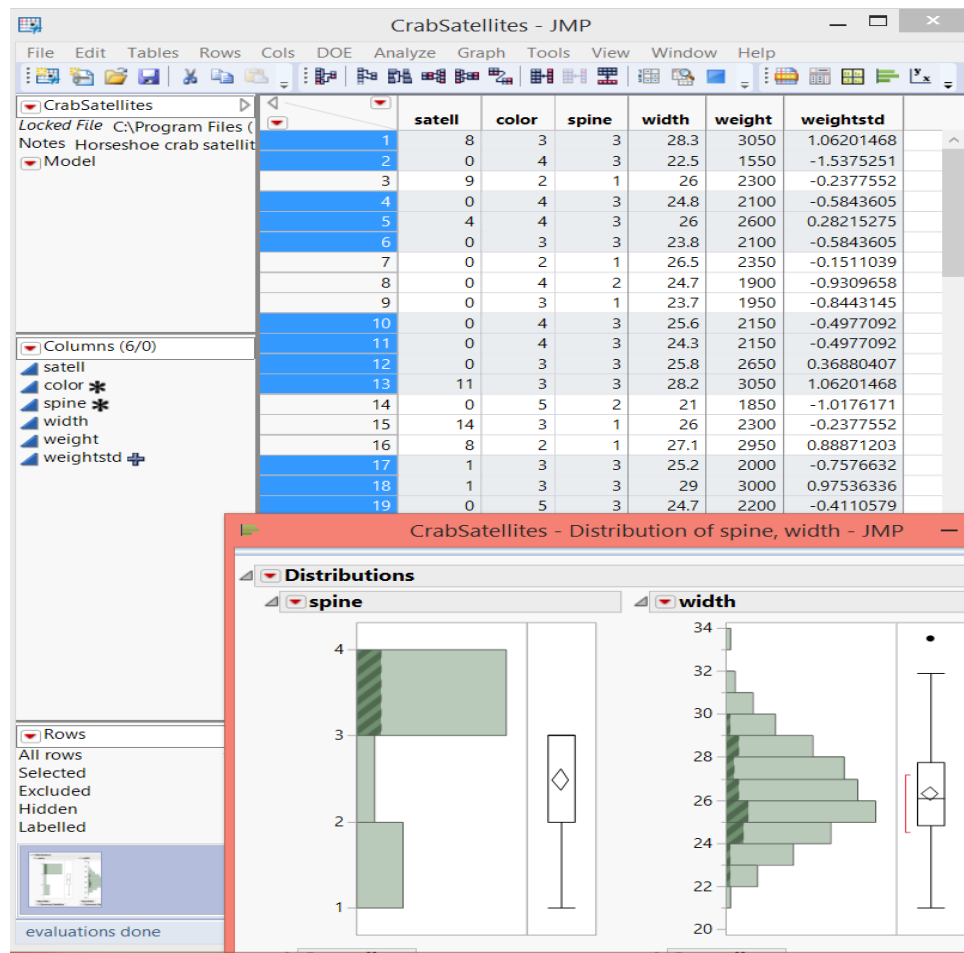
[Help](#) → [Sample Data](#) → [See an Alphabetical List of all Sample Data Files](#) → [CrabSatellites](#)

Contents

- Introduction
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Bivariate Statistics

Comparing One Column to Another



Analyze → Distribution

Dynamic Link of Graphs and data

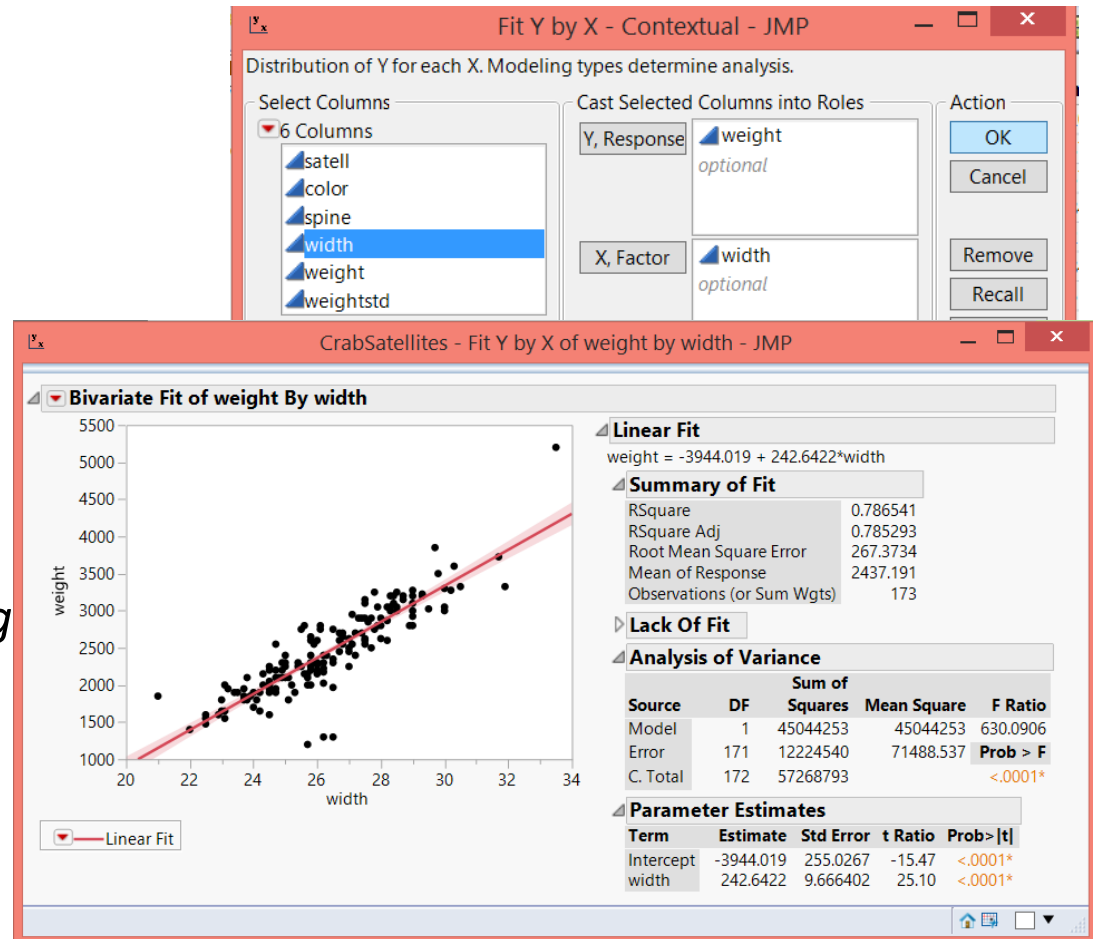
[Note: check value display of 'spine']

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.*



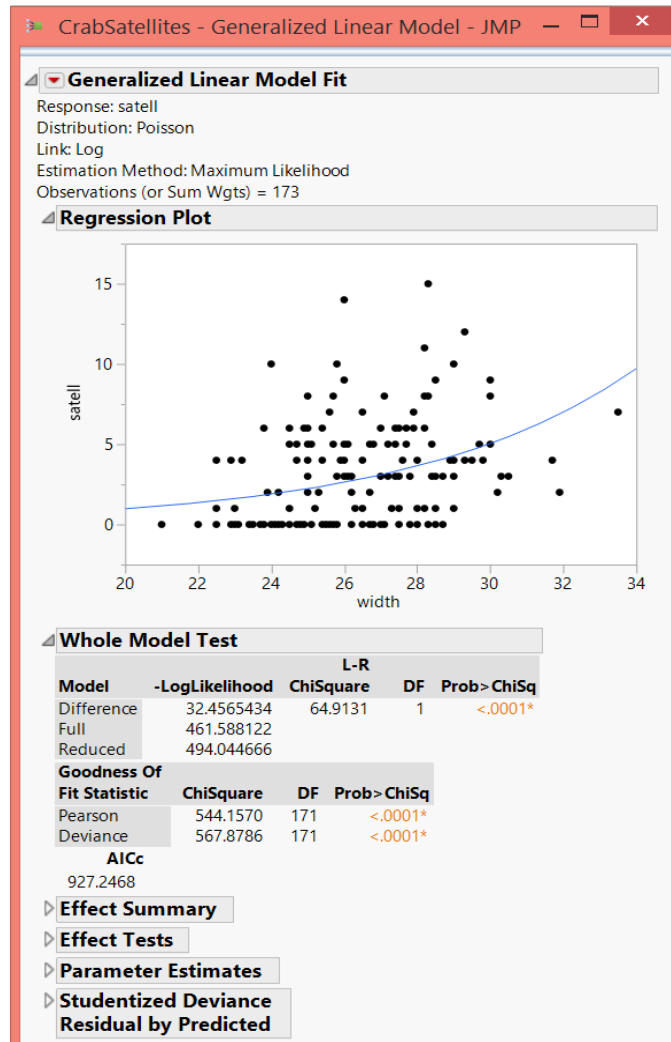
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Generalized Linear Model

Poisson



Analyze → Fit Model

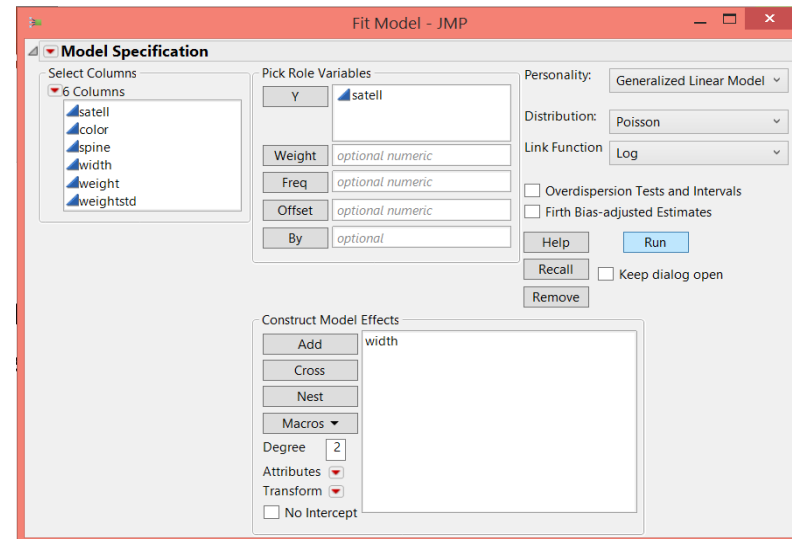
Pick Role Variables: Y → satell

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

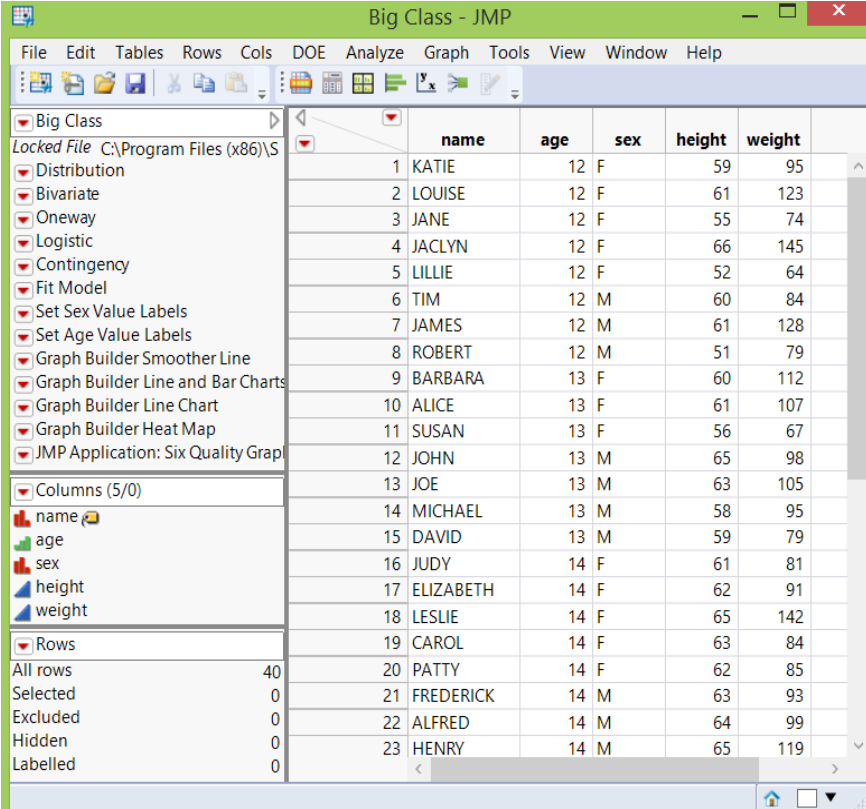
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- Introduction
- Launching JMP
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Script - JSL

- *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 named 'Big Class'. The table has columns for 'name', 'age', 'sex', 'height', and 'weight'. The data is organized into rows, with the first row being KATIE (age 12, sex F, height 59, weight 95) and the last row being HENRY (age 14, sex M, height 65, weight 119). The interface includes a menu bar at the top with options like File, Edit, Tables, Rows, Cols, DOE, Analyze, Graph, Tools, View, Window, and Help. On the left side, there is a sidebar with various analysis options such as Distribution, Bivariate, Oneway, Logistic, Contingency, Fit Model, Set Sex Value Labels, Set Age Value Labels, Graph Builder Smoother Line, Graph Builder Line and Bar Charts, Graph Builder Line Chart, Graph Builder Heat Map, and JMP Application: Six Quality Graphs. Below these options, there is a section for 'Columns (5/0)' listing the columns: name, age, sex, height, and weight. At the bottom, there is a section for 'Rows' showing the total number of rows (40) and the number of selected, excluded, hidden, and labelled rows (all 0).

	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

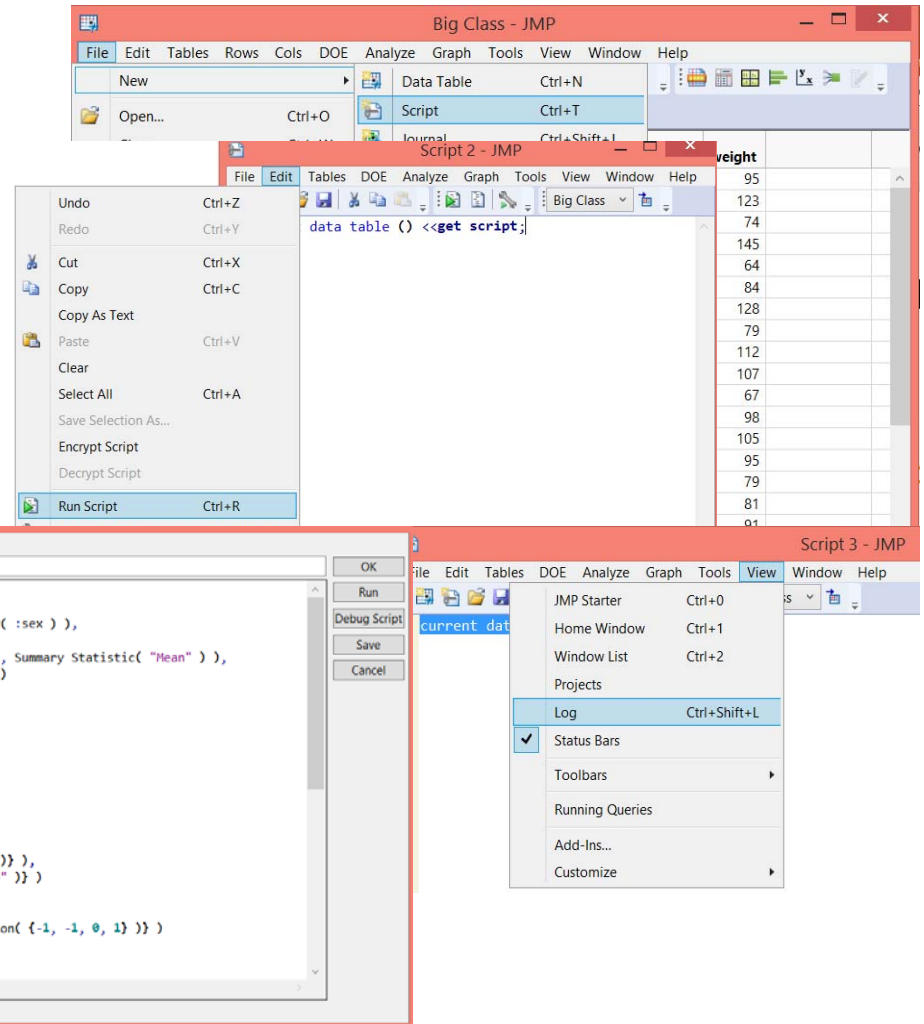
Type:

current data table () <<get script;

Select text:

→ Edit → *Run Script*

→ View → *Log*



Help → Sample Data → Examples for teaching → Big Class

QUESTIONS



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