PubHlth 540 - Introduction to Biostatistics

1. Summarizing Data
Illustration: Online Computing Resources

Introduction:
The world wide web has many resources for statistical description and analysis that are free and easy to use. This illustration includes demonstrations of the following:

Preliminary – How to Screen Capture (for PC Users and MAC Users)
(1) Numerical Summaries using the Vassar Stats Statistical Computation Website
(2) Bar Graph using the Vassar Stats Statistical Computation Website
(3) Stem and Leaf Diagram using the Shodor site
(4) Histogram using the Shodor site.
(5) Box Plot using the Shodor site

These are not the only sites of course. Have a look for yourself!

Data are from PubHlth 540 1. Summarizing Data, page 13.
This data set contains information on n=25 consecutive patients admitted to intensive care at a large urban hospital.

Coding Manual

Variable	**Coding**
• Age (in years)	• numeric
• Type of Admission	• 1= Emergency 0= Elective
• ICU Type	• 1= Medical 2= Surgical 3= Cardiac 4= Other
• Systolic Blood Pressure (in millimeters of mercury)	• numeric
• Number of Days Spent in ICU	• numeric
• Vital Status at Hospital Discharge	• 1= Dead 0= Alive

Data:

ID	Age	Type_Adm	ICU_Type	SBP	ICU_LOS	Vit_Stat
1	15	1	1	100	4	0
2	31	1	2	120	1	0
3	75	0	1	140	13	1
4	52	0	1	110	1	0
5	84	0	4	80	6	0
6	19	1	1	130	2	0
7	79	0	1	90	7	0
8	74	1	4	60	1	1
9	78	0	1	90	28	0
10	76	1	1	130	7	0
11	29	1	2	90	13	0
12	39	0	2	130	1	0
13	53	1	3	250	11	0
14	76	1	3	80	3	1
15	56	1	3	105	5	1
16	85	1	1	145	4	0
17	65	1	1	70	10	0
18	53	0	2	130	2	0
19	75	0	3	80	34	1
20	77	0	1	130	20	0
21	52	0	2	210	3	0
22	19	0	1	80	1	1
23	34	0	3	90	3	0
24	56	0	1	185	3	1
25	71	0	2	140	1	1

Frequency Table Summary of Distribution of ICU_TYPE

ICU_Type	**Frequency (“how often”)**	**Relative Frequency (“proportionately often”)**
Medical	12	0.48
Surgical	6	0.24
Cardiac	5	0.20
Other	2	0.08
TOTAL	25	1.00

Preliminary – How to Screen Capture

It is very handy to know how to "photo capture" your screen for pasting into a document elsewhere, such as a word document. A google search will yield several hits. These are from the Shodor website.

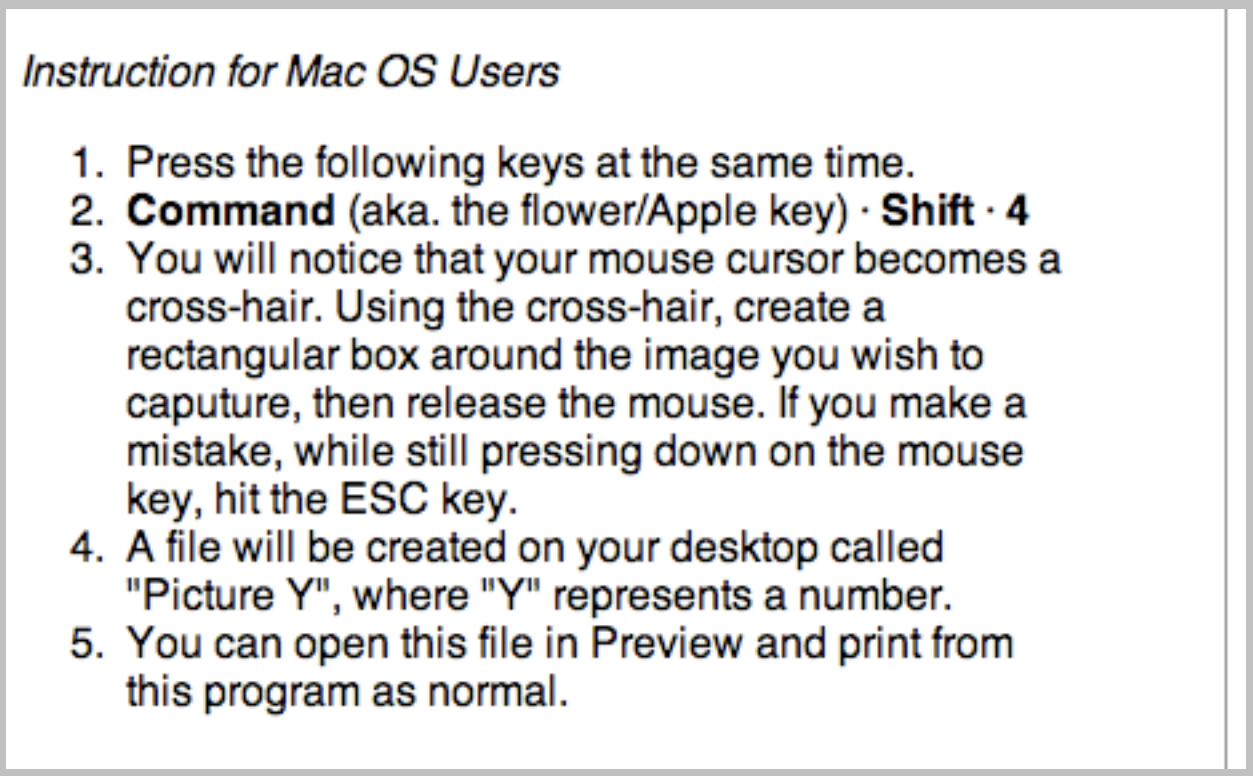
For PC Users

Instruction for Windows Users

1. Please make sure that the image that you wish to print is visible on the screen.
2. Hit the "Print Screen" key on your keyboard. *(This copies an image of your screen onto your computer's clipboard)*

3. Open a writing or drawing program (such as Microsoft Word or "Paint")
   - Paint can be found at: start · All Programs · Accessories · Paint
4. "Paste" the image from the clipboard into the application (Edit · Paste).
5. If you're using "Paint": you can use the "crop" tool to keep only the part of the image you wish. To use the crop tool: select the part of the image you wish to keep, then select the "Cut" option from the file menu and open up a new window and select the "Paste" option.
6. Now you may print the file using File · Print.

For MAC Users



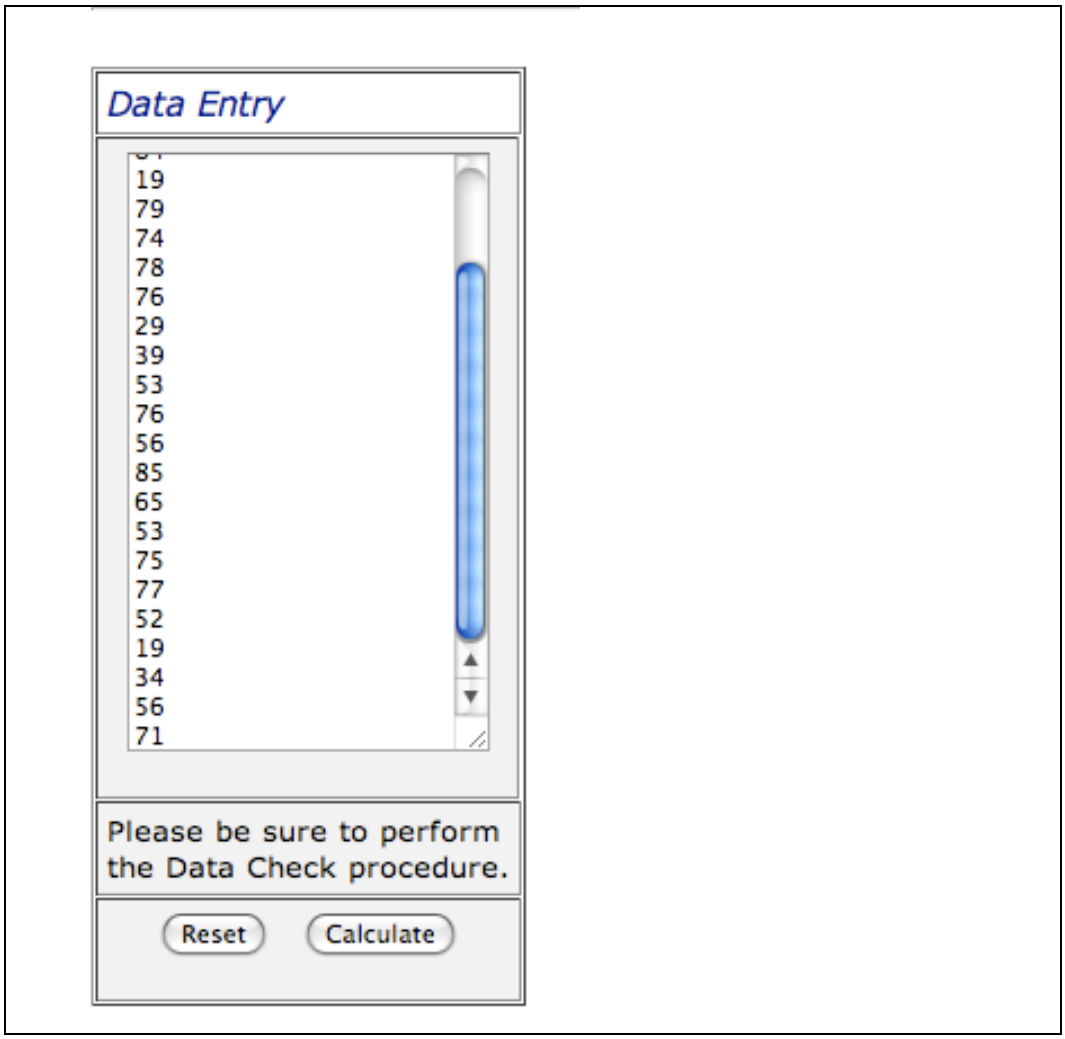
Instruction for Mac OS Users

1. Press the following keys at the same time.
2. **Command** (aka. the flower/Apple key) · **Shift** · **4**
3. You will notice that your mouse cursor becomes a cross-hair. Using the cross-hair, create a rectangular box around the image you wish to caputure, then release the mouse. If you make a mistake, while still pressing down on the mouse key, hit the ESC key.
4. A file will be created on your desktop called "Picture Y", where "Y" represents a number.
5. You can open this file in Preview and print from this program as normal.

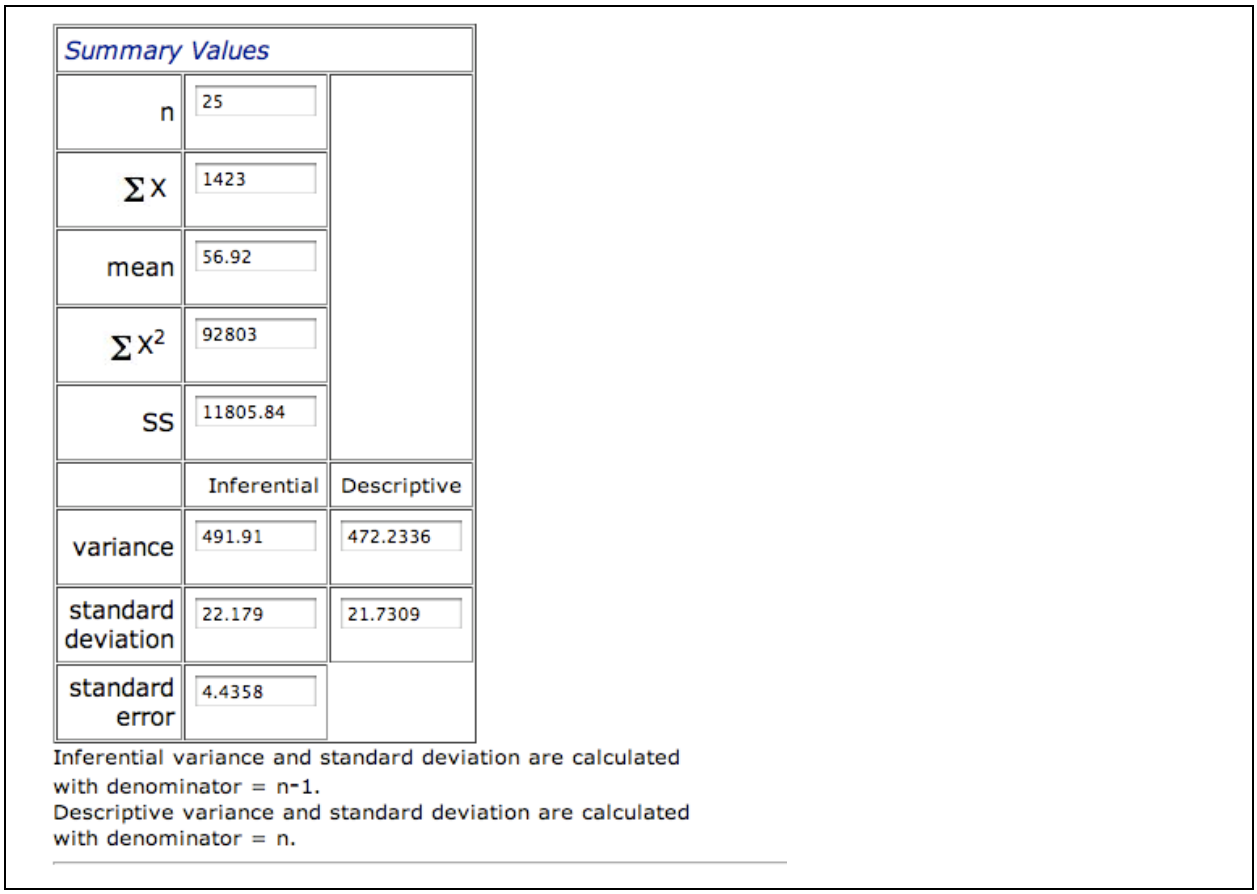
(1) Numerical Summaries using the Vassar Stats Statistical Computation Website
Illustration for variable: AGE

1. Launch http://faculty.vassar.edu/lowry/VassarStats.html
2. At menu bar on left: **Miscellanea**
3. From selections, choose: **Basic Sample Stats**
4. Enter the 25 values of AGE into the data entry box.

Tips (1) Press the enter key after each data item, except for (2) do NOT press the enter key after the last data item.



5. Click: **calculate**. You should then see:



Summary Values

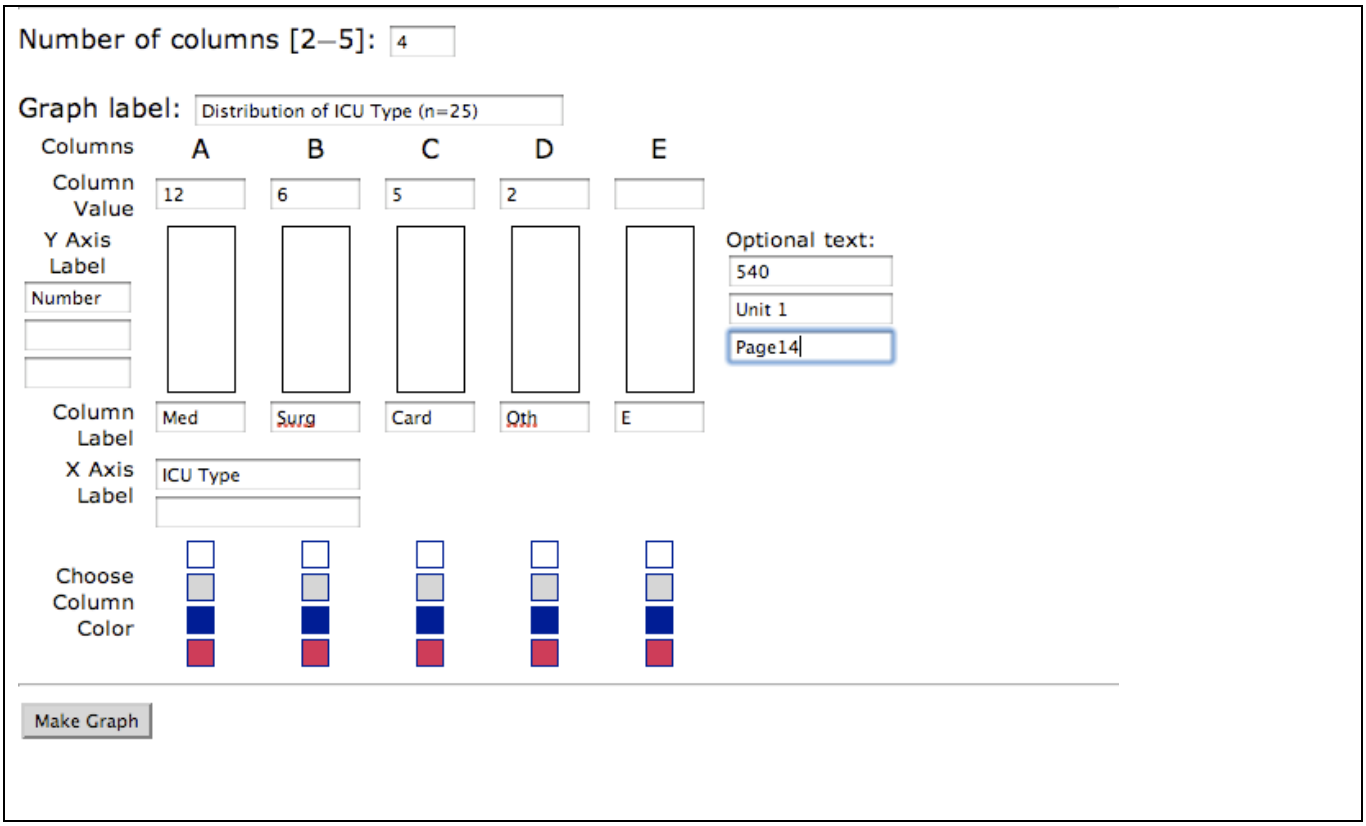
n	25	
ΣX	1423	
mean	56.92	
ΣX^2	92803	
SS	11805.84	
	Inferential	Descriptive
variance	491.91	472.2336
standard deviation	22.179	21.7309
standard error	4.4358	

Inferential variance and standard deviation are calculated with denominator = n-1.
Descriptive variance and standard deviation are calculated with denominator = n.

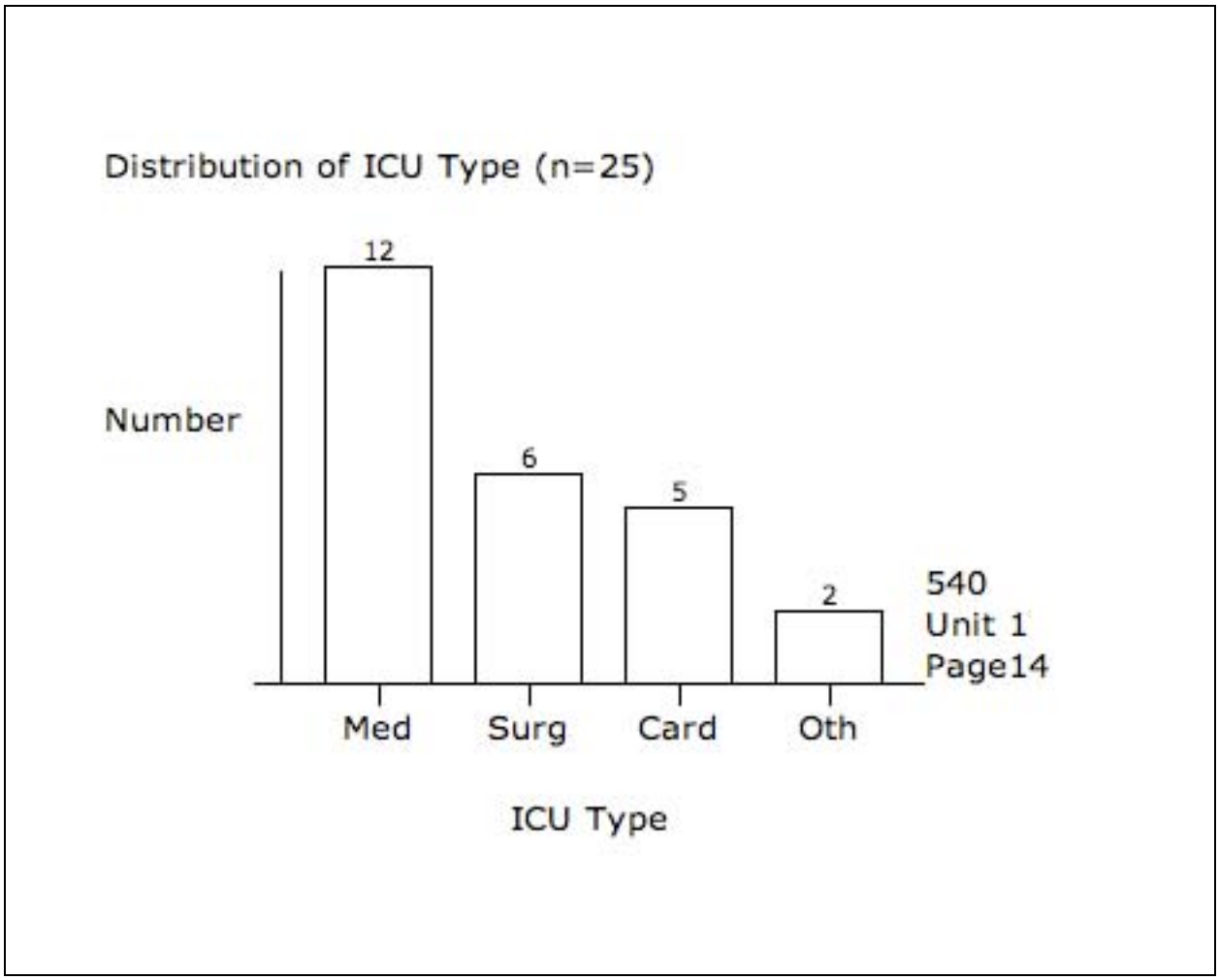
(2) Bar Chart using the Vassar Stats Statistical Computation Website
Illustration for variable: ICU_TYPE

1. Launch http://faculty.vassar.edu/lowry/VassarStats.html
2. At menu bar on left: **Utilities**
3. From selections, choose: **Simple Graph Maker**
4. To make a bar chart, scroll down and provide entries for

Columns: Set this equal to the number of possible outcomes
Graph label: Provide a title of your bar chart
Y axis label: Indicate what is being plotted (# or %)
Column Value: Enter frequencies
Column Label: Enter abbreviated value codes for the ICU_TYPE
X axis label: Be sure to define the variable you are summarizing

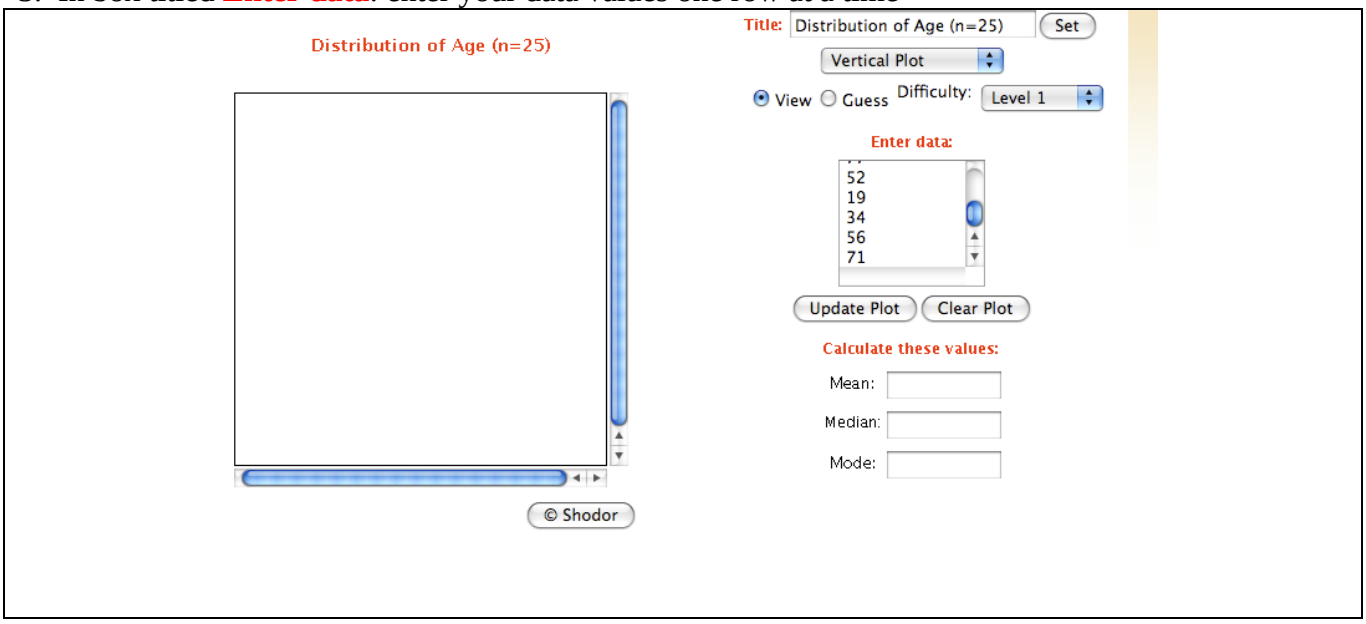


5. Click: **make graph**. You should then see:

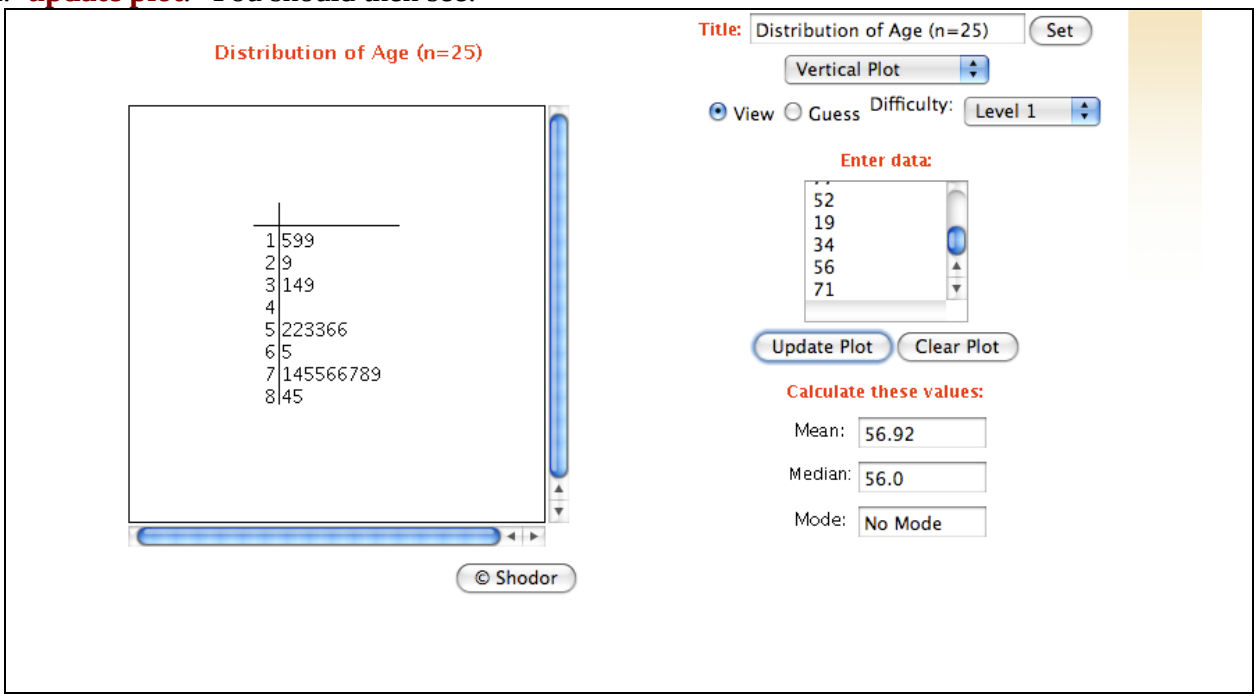


(3) Stem and Leaf Diagram using the Shodor Website
Illustration for variable: AGE

1. Launch http://www.shodor.org/interactivate/activities/StemAndLeafPlotter/
2. At box titled **title**: Enter title. Then click on **set**
3. In box titled **Enter data**: enter your data values one row at a time



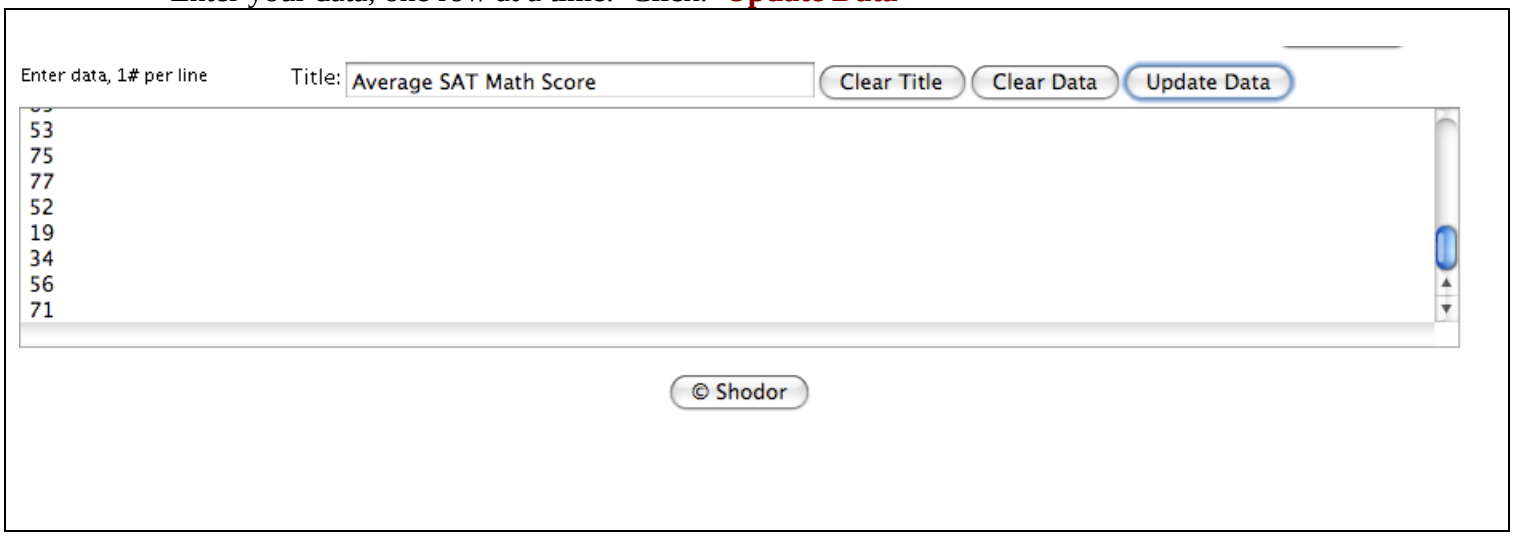
4. Click: **update plot**. You should then see:



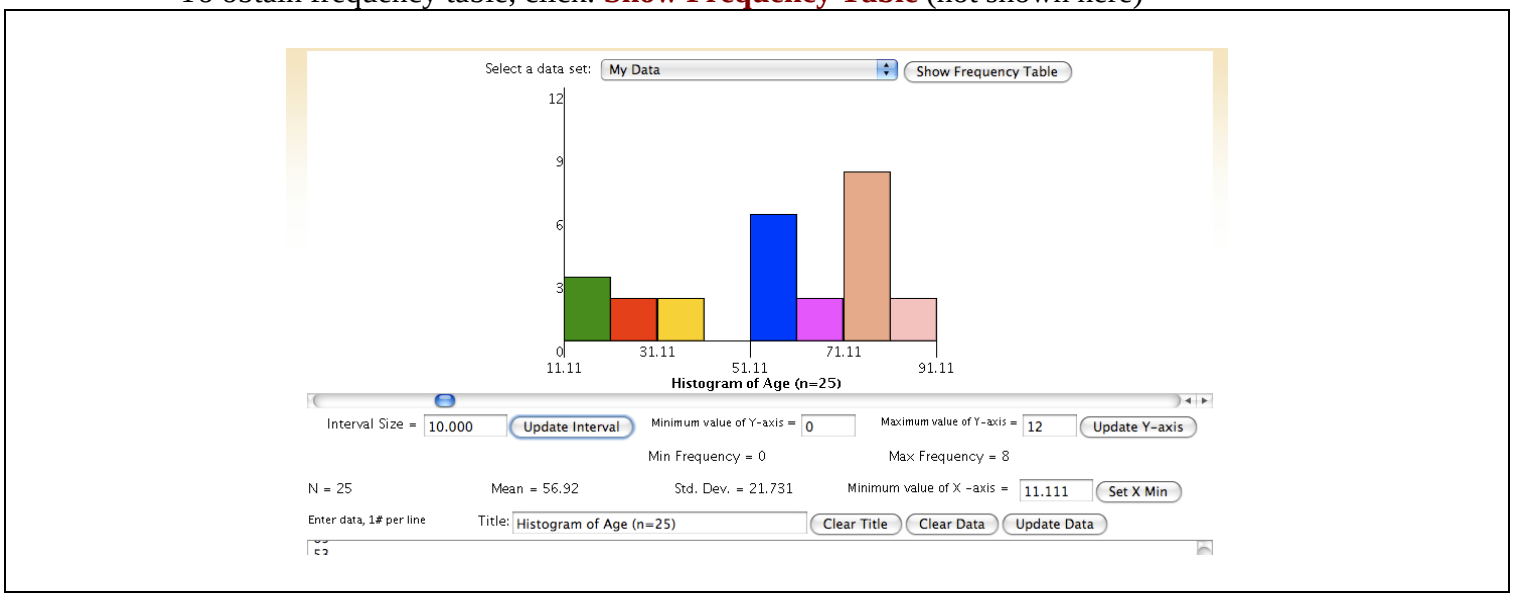
(4) Histogram using the Shodor Website
Illustration for variable: AGE

1. Launch http://www.shodor.org/interactivate/activities/Histogram/
2. At middle of the screen, click: **Clear Data**

3. Don't change any settings yet. You'll just get error messages.
   -- Instead, position your cursor in the large now-empty data box.
   -- Enter your data, one row at a time. Click: **Update Data**



4. Now you can play with options.
   -- In the box titled **Title**: enter new title. Click **Update Data**
   -- In the box titled **Interval Size**: enter 10. Click **Update Interval**
   -- To obtain frequency table, click: **Show Frequency Table** (not shown here)

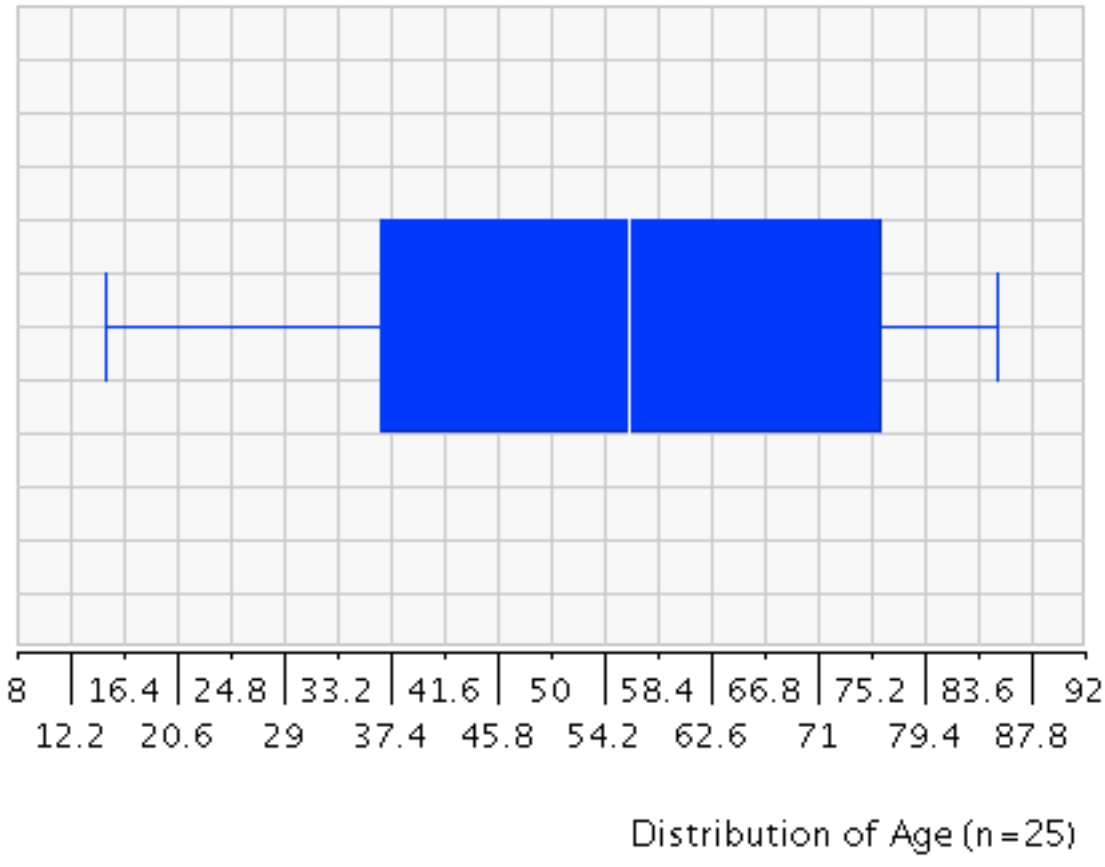


(5) Box Plot using the Shodor Website
Illustration for variable: AGE

1. Launch http://www.shodor.org/interactivate/activities/BoxPlot/
2. At middle of the screen, click: **Clear**

3. As with the histogram applet in Shodor, don't change any settings yet. You'll just get error messages.
   -- Instead, position your cursor in the large now-empty data box.
   -- Enter your data, one row at a time. Click: **Update Box Plot**

4. Again, you can play with options.
   -- In the box titled **Describe your data**: enter new title. Click **Update Box Plot**
   -- Strongly recommended. Click the box that says **Uncover Outliers**
   -- To obtain numerical summaries, click: **Show Statistics** (not shown here)



5. For the advanced user (not shown)
   It is also possible to obtain side-by-side box plots for sub-groups defined by another variable. To do this:

   -- In the data entry box, enter your data in the following format: value, subgroup. For example:
   15, female
   31, male
   75, male
   Etc.

   -- Then toggle the button for: **Graph by category**

Your turn!