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Painting with Numbers

- or -

Creating Graphs and Charts Online with Plotly

ISC1057

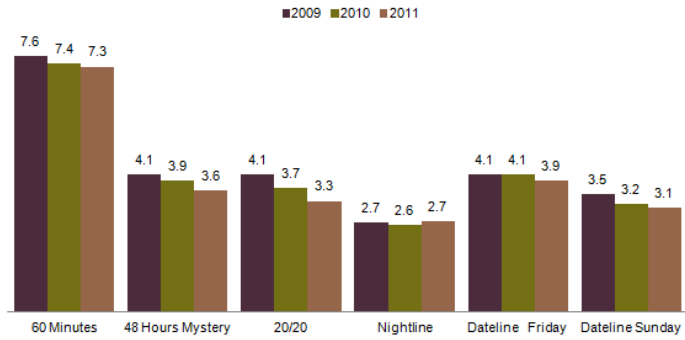
Janet Peterson and John Burkardt

Computational Thinking

Fall Semester 2016

News Magazine Ratings Decline for All but Nightline

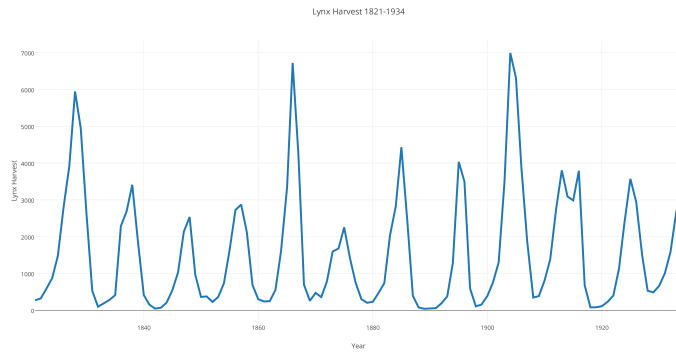
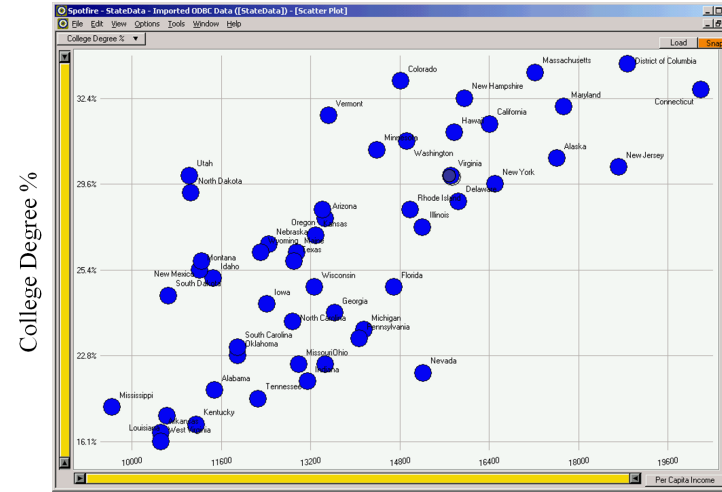
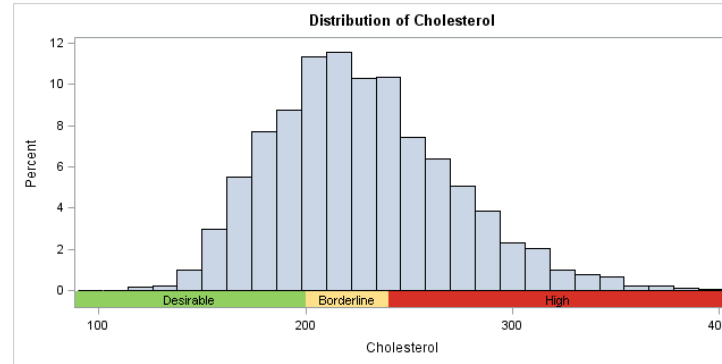
Year-to-Year Average Nightly Ratings



Source: Nielsen Media Research, used under license

PEW RESEARCH CENTER'S PROJECT FOR EXCELLENCE IN JOURNALISM

2012 STATE OF THE NEWS MEDIA



Per Capita Income

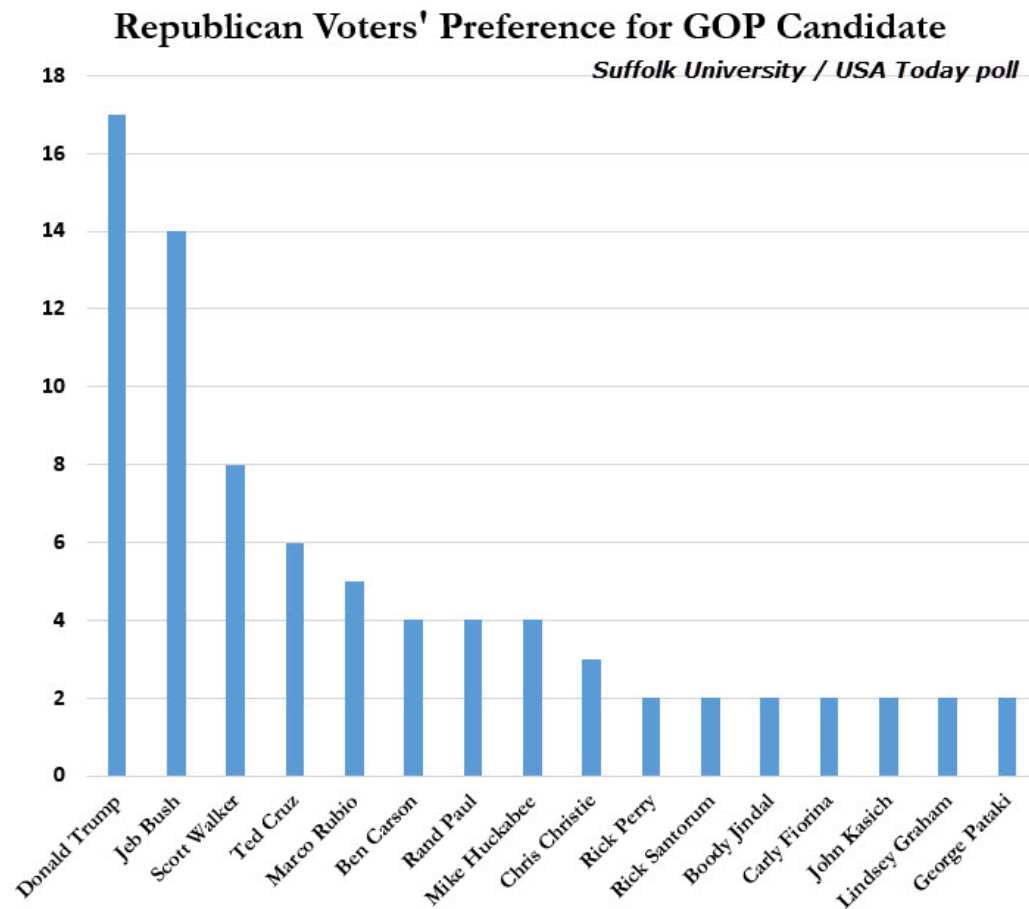
Plotly is a program, available on the Internet, that allows you to create graphs of formulas and data.

After you create your Plotly account, the data and plots you create are saved; you can terminate the session at any time, reconnect later, and continue old work or start something new.

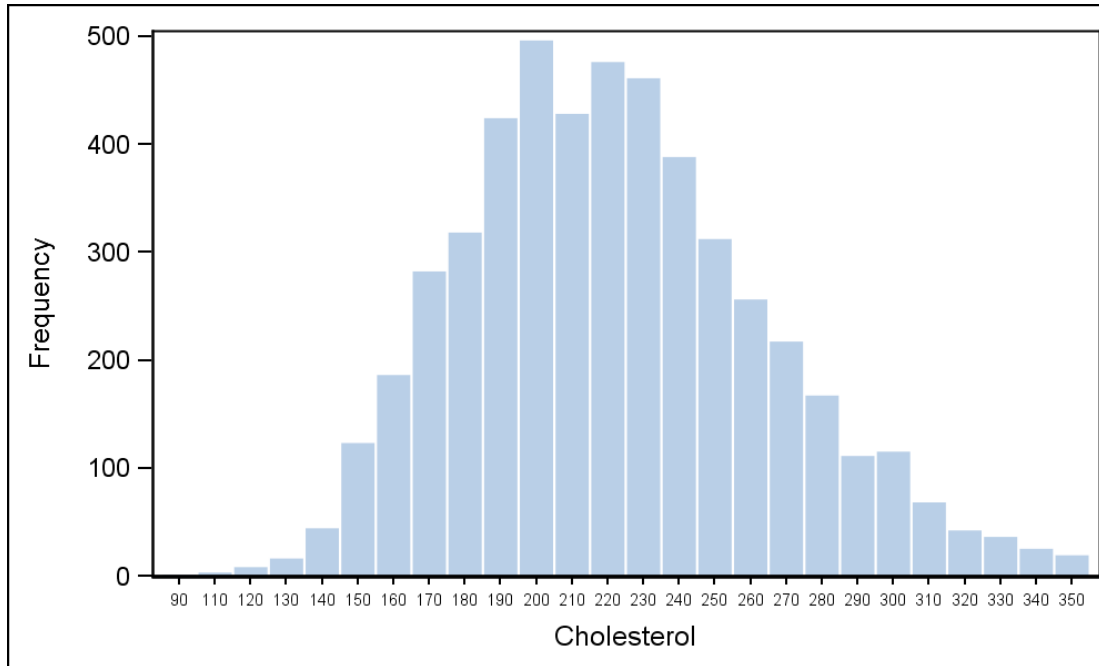
Plotly helps you make many kind of plots, including bar charts and histograms, line plots, scatterplots, and plots of formulas.

Some of your work in this course will require you to create and submit charts. We recommend using Plotly to do this.

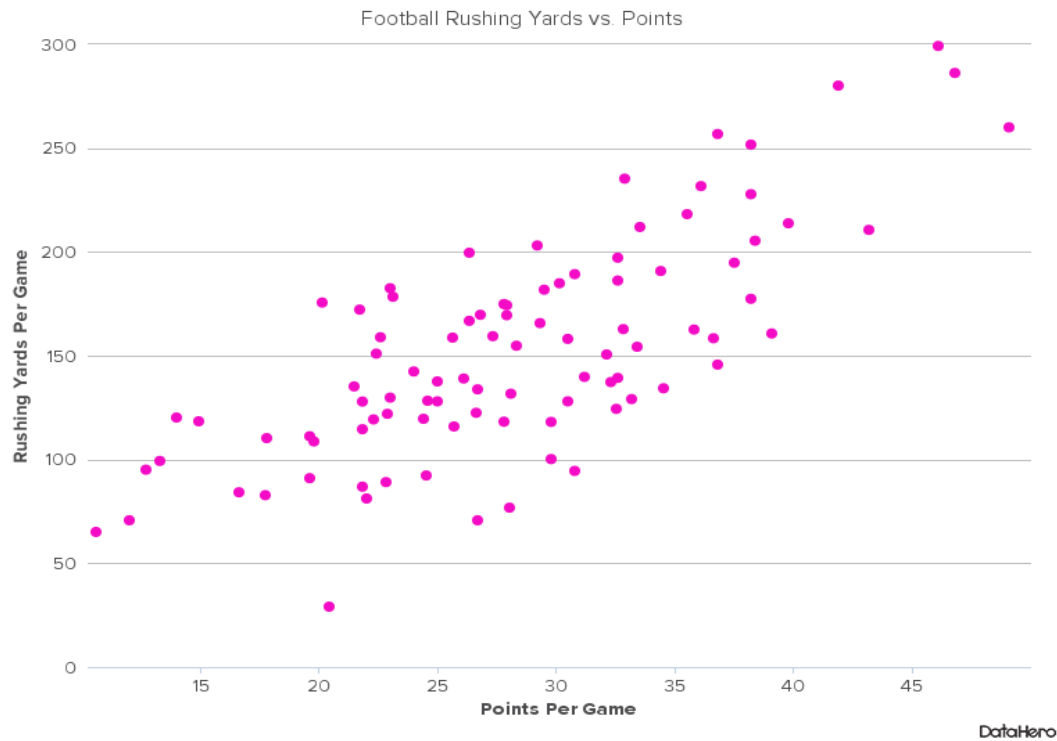
The data for a **bar chart** is a list of categories (often just names), and an associated size or count or frequency or percentage.



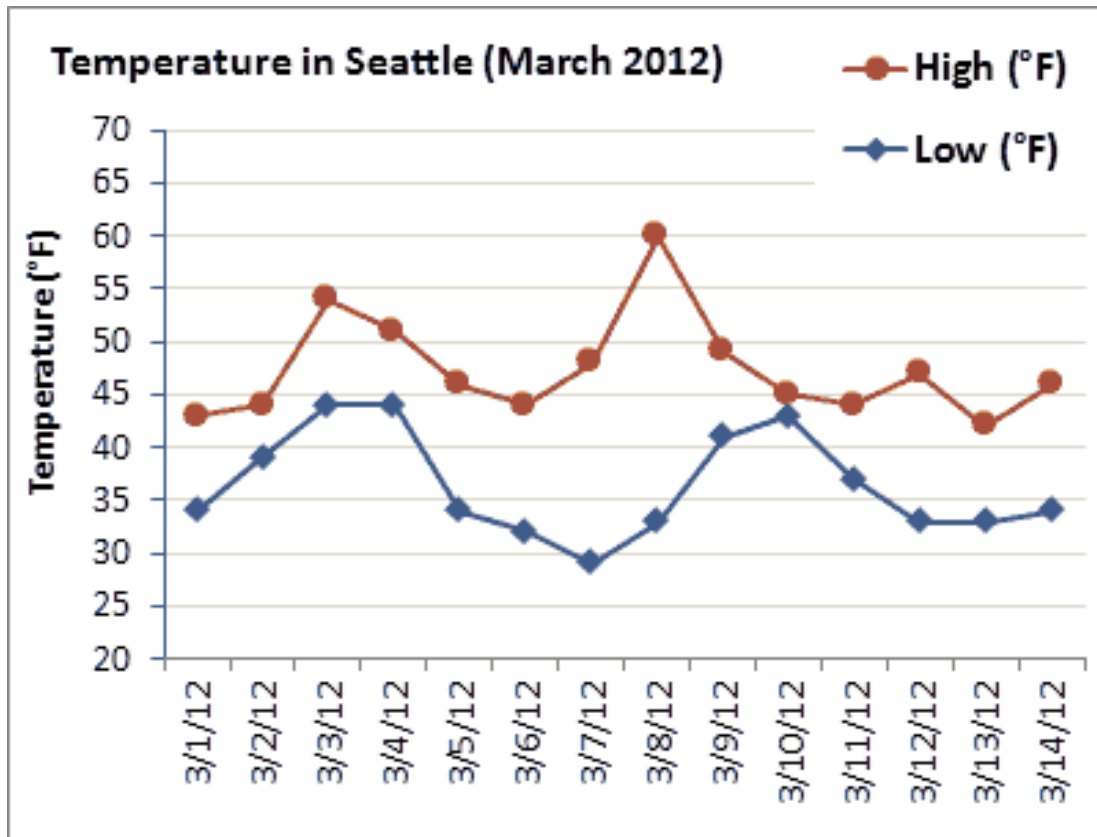
A **histogram** is similar to a bar chart, except that instead of categories we choose use numeric ranges. Using very wide or very narrow ranges will result in useless plots.



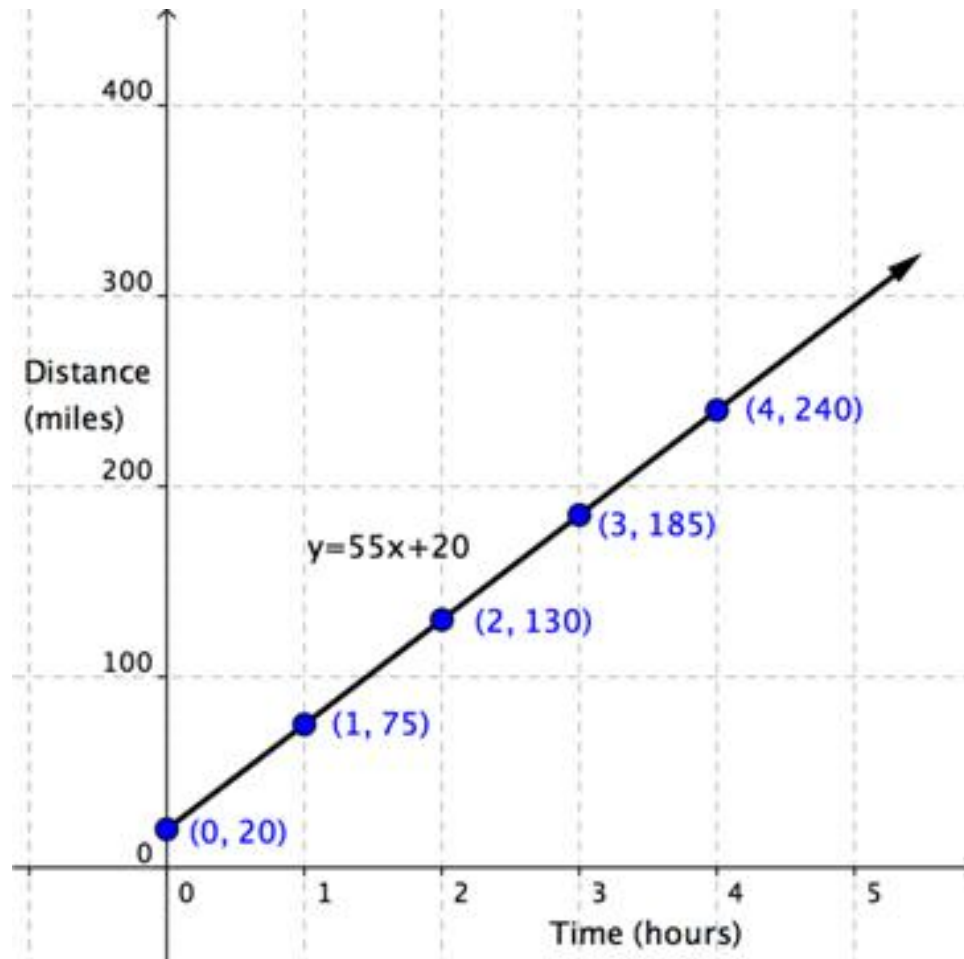
The data for a **scatterplot** is many measurements of pairs of data which are thought to be related. Often a scatterplot can suggest an approximate mathematical formula relating the two quantities.



A typical **line plot** connects dots representing a series of measurements of data over time, or some other range.



A **formula plot** displays data that satisfies a mathematical relationship such as $y = 55x + 20$;



Type your x data in column 1, your y data in column 2:

plotly make charts and dashboards online My Charts **Workspace** Try Plotly 2 Help P

savannah + NEW GRID ↑ IMPORT

ADD DATA SAVE COPY EXPORT UNDO REDO CHOOSE PLOT TYPE DATA TOOLS ANALYSIS

LINE PLOT

Click the column headers to choose x and y columns to graph. Use the different colors to match x columns with y columns.

Line plot ▼

OPTIONS

Error Bars

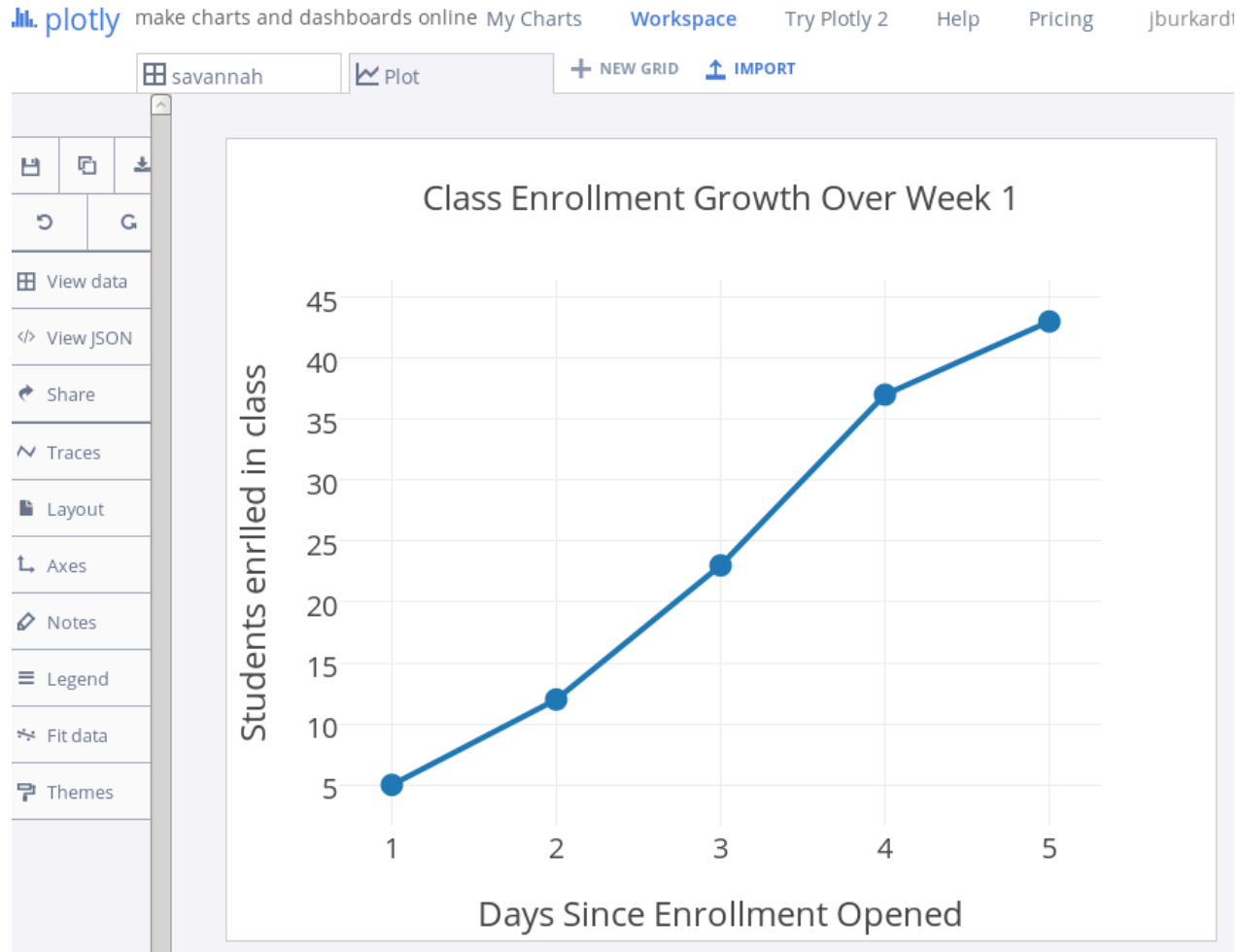
Asymmetric Errors

Group By

Text

	Col1	Col2	Col3	Col4	Col5	Col6	Col7
x	choose as x	choose as x	choose as x	choose as x	choose as x	choose as x	choose as x
y	choose as y	choose as y	choose as y	choose as y	choose as y	choose as y	choose as y
1	1	5					
2	2	12					
3	3	23					
4	4	37					
5	5	43					
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							

Press **LINE PLOT** to plot the data.



Every time you enter data into a PLOTly grid, it is saved. You can retrieve it at any time during your session, or a later session. Just go to **My Charts** and browse around.

The screenshot shows the Plotly web interface. On the left is a sidebar with a '+ NEW' button and navigation links: Home, Shared with me, Recent, Favorite, and Trash. The main area is titled 'Home' and features a 'SHOW' filter with tabs for Plots, Grids, Folders, Private, Public, and Notebooks. A 'SORT BY' dropdown is set to 'Created'. The interface displays a grid of data tables, each with a lock icon in the top right corner. The tables are arranged in two rows. The top row contains three tables: 'savannah', 'taxables_scattered.csv', and 'taxables.csv'. The bottom row contains four tables: 'Beds', 'Spring 1 (m)', and 'Eruption wait'. The 'Spring 1 (m)' table is highlighted with a blue background. A 'TRY PLOTLY 2.0' button is visible at the bottom of the grid.

Col2	Col1
5	1
12	2
23	3
37	4
43	5

Total	Index	Cost
8.57	1	7.97
3.19	2	2.97
1.39	3	1.29
16.08	4	14.96
7.83	5	7.28
7.18	6	6.68
10.75	7	10
9.65	8	8.98
2.28	9	2.12

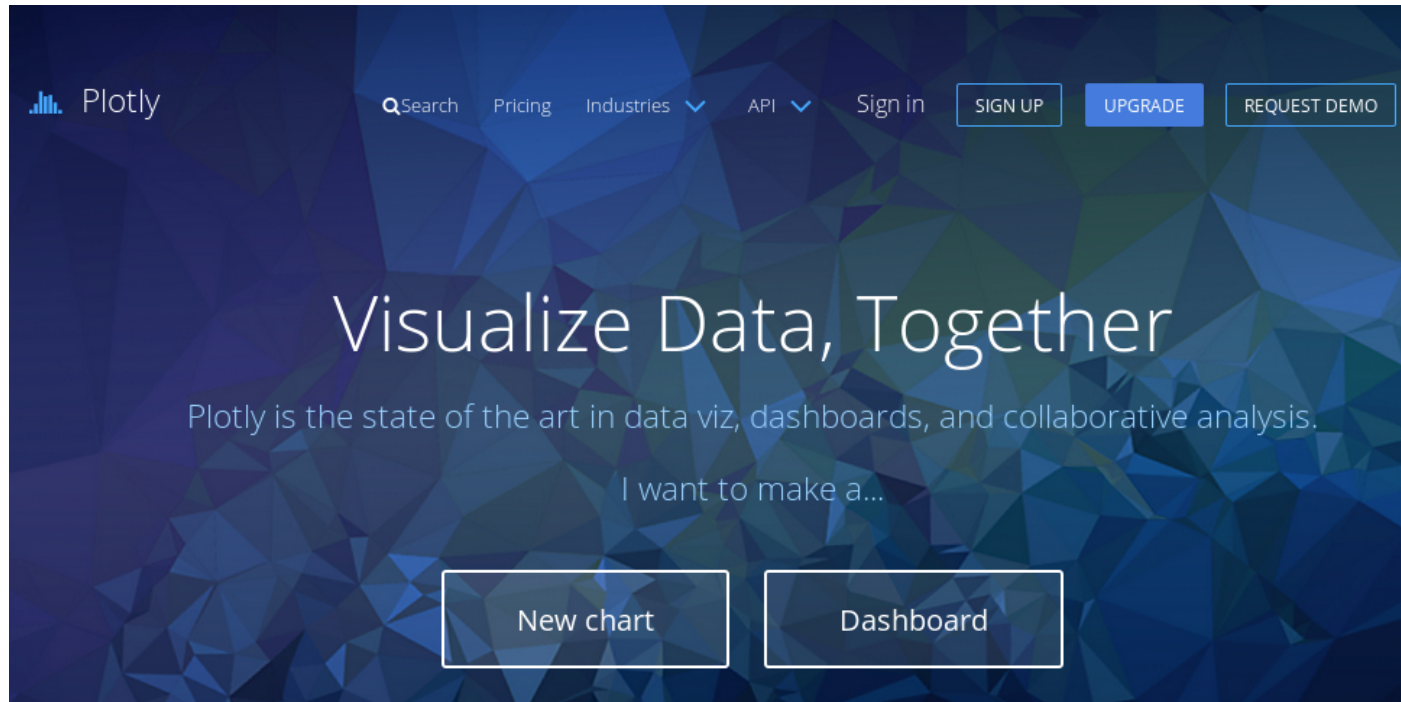
Total	Index	Cost
1.39	1	1.29
2.28	2	2.12
3.19	3	2.97
6.65	4	6.19
7.18	5	6.68
7.83	6	7.28
8.57	7	7.97
9.65	8	8.98
10.75	9	10

Beds	Index	Sq Ft
3	1	2222
3	2	1628
5	3	3824
3	4	1137

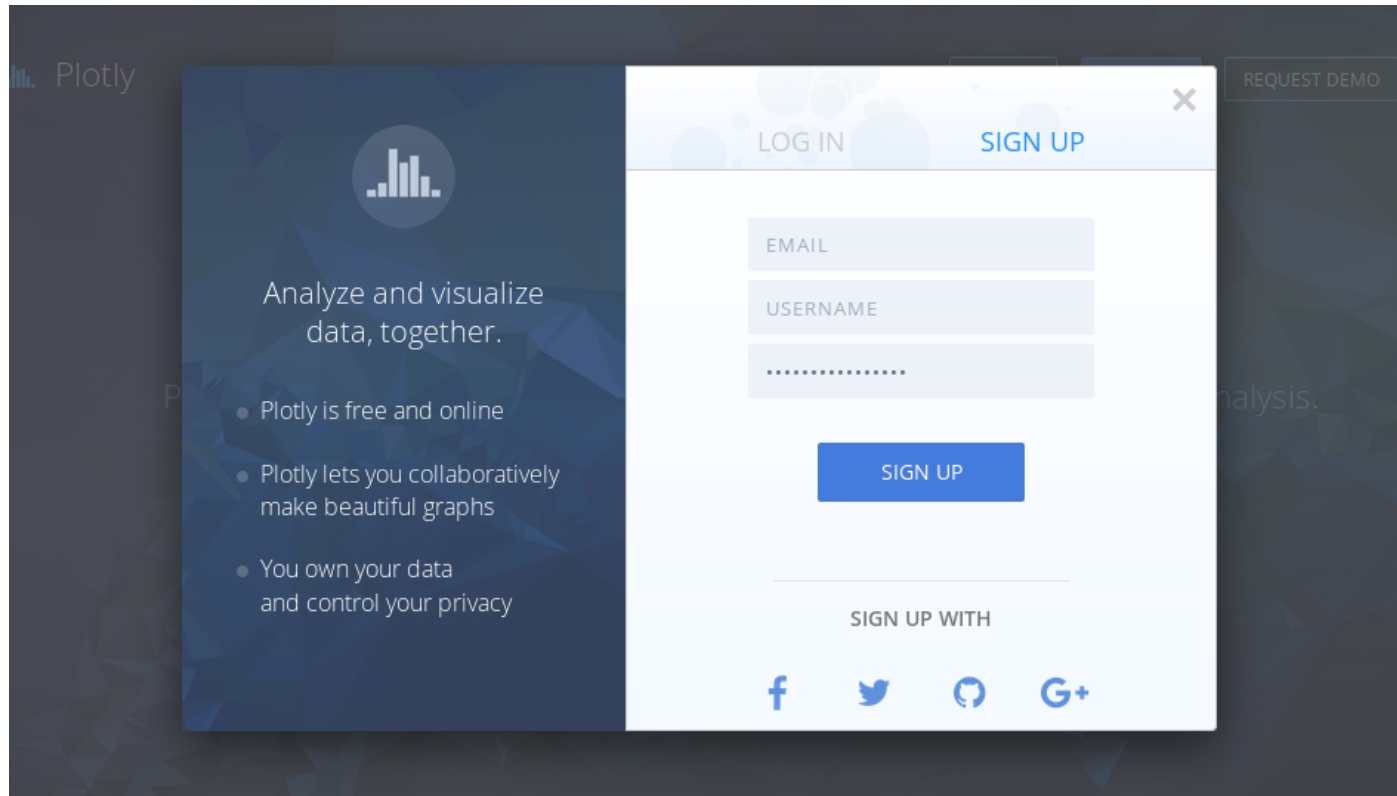
Spring 1 (m)	Index	Mass (kg)
0.05	1	0
0.066	2	0.49
0.087	3	0.98
0.1	4	1.47

Index	Eruption wait	Eruption length
1	79	3.6
2	54	1.8
3	74	3.333
4	62	2.283

Before you can use Plotly, you must create an account by choosing **SIGN UP**.



The signup screen will take a username and password so Plotly can save your data for you.



There will be several times during our course when we will need to use Plotly to create graphics for assignments, homework or projects.

How you use Plotly depends on what kind of plot you're making, so when it's time, we'll show you the specific steps needed to make scatterplots or histograms or bar charts or line plots or any other plot that we need.

The biggest advantage for our class usage is that you don't have to install any programs on your own computer; all your work with Plotly is done through any browser on any computer.