

CPSC 446/546

Assignment 3

Due 10/9/2019, 11:59 pm

Upload to Canvas as a zip file named *yourfirstname_yourlastname_3.zip*.

This assignment requires you to develop visualizations using D3. Do your own coding using examples given in the Scott Murray textbook. **Do not use any code from the internet that you may find that creates visualizations similar to those required in problems.** If we find that code you use for a solution is taken from an internet source, you will receive a zero for the entire assignment.

Be sure to edit your files to include the version of d3.js that is used in the examples in the Murray book.

As in previous assignments do not worry about getting pixel accurate results to match examples. You may use <https://developer.mozilla.org/enUS/docs/Web/JavaScript/Reference> to do tutorials and look up syntax.

Note that some parts of the questions are for all students. **Questions 2 and 4** have additional work for **CPSC 546** only.

1. Colorblindness (10 pts)

(CPSC 446 and CPSC 546) Browse the visualizations that have been contributed to <https://public.tableau.com/en-us/s/gallery>

Find at least two visualizations that use color coding that would be difficult to interpret for someone who is color blind (excluding Monochromacy/Achromatopsia). Include cut and pasted versions of the visualization in your response. You can use <https://www.color-blindness.com/coblis-color-blindness-simulator/> to examine images.

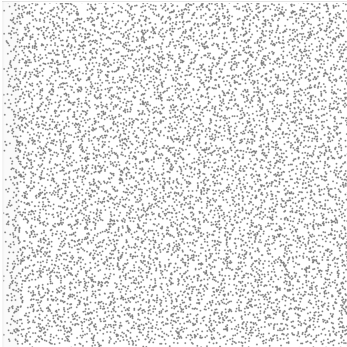
2. Pre-attentive Effects (25 pts) :

(CPSC 446 and CPSC 546) Using D3 create two different scatter plots for the data in testp2.csv (you can just do this by appending circles to the svg.) In each scatterplot use the given x and y values to position circles for each data point, and then use another attribute to encode the third value p. In one of your scatter plots use color, in the other use size. In both cases make your visualization interactive so you can click on circles and see the data that they are encoding. You should examine your two results to find:

- Three distinctly different regions. What are the shape of the boundaries between them?
- Three outlier points. Where are they, and what are their values?

- c) Which encoding (color or size) was most useful for answering a) and b)? What decisions did you need to make for each plot to get good results?

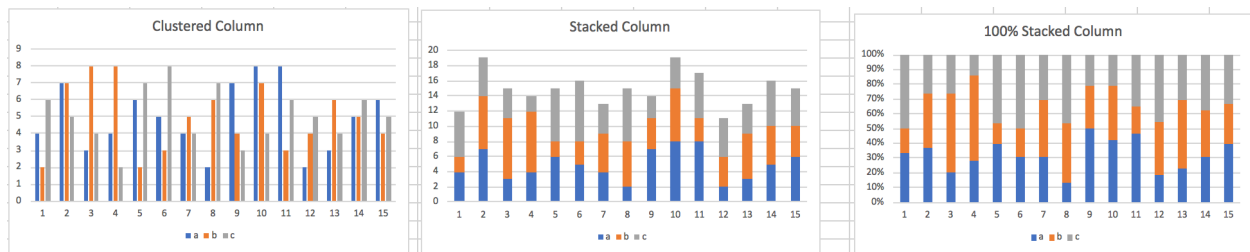
Here is a plot with the data plotted with uniform circle size and color. The two regions and outliers are not visible.



(CPSC 546) Use a third type of encoding (other than circle size or color) to encode the value of p . Show your results and comment on whether the two regions and the outliers are more or less visible with this third encoding.

3. Transitions (25 pts):

(CPSC 446 and CPSC 546) Using D3 create a visualization of the data in the file `barinput.csv`. Your visualization should transition from a clustered column, to stacked column, then to 100% stacked column when a user clicks on the page. You should include scales. The goal of these transitions is to make it clear to the viewer how the representation of each data element in one visualization maps to its representation in the next. Set your timings to make these mappings clear. Here are examples of what the column visualization styles look like (these were made in Excel).



4. Nobel Prize Winners (40 pts):

(CPSC 446 and 546) The file `Jones_Weinberg_2011_PNAS.csv` contains data that accompanies the paper “Age dynamics in scientific creativity” by Jones and Weinberg. Without recreating the plots used by the author, develop at least three visualizations in D3 of the data that examine some of the issues discussed by the authors – the age of the researcher when they did prize winning work as a function of when the prize was given, the field they work in and

whether the work was experimental or theoretical. Your visualizations should be interactive so that additional detailed data is available in each visualization.

Women who have won Nobel prizes *in these fields* are listed at

<https://www.nobelprize.org/prizes/lists/nobel-prize-awarded-women-3-2/>

Create a visualization to show whether these women were outliers with respect to the age effects found for winners overall.

For each visualization, explain:

1. What question(s) are you trying to answer? (Domain situation)
2. What data do you need to answer the question and did you need to perform any data transformations? (Data/task abstraction)
3. How did you choose to display your attributes? (Visual Encoding and Interaction Idiom)

(CPSC 546 only) There are two anomalies in the given data set. One has to do with the years of birth and death of a prize winner, and one has to do with the time elapsed between when the work was done and the prize was given for another. Find these anomalies.