CPSC 446/546
Assignment 4
Due 11/4/2019, 11:59 pm

Upload to Canvas as a zip file named *yourfirstname_yourlastname*_4.zip.
SERIOUSLY, use that name for the zip file (NOT Assignment4.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. You can find this on Canvas, under files, in the d3-book-2.0.3.zip file.

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. Radial Paths (25 pts)

(CPSC 446 and CPSC 546) Chapter 11 illustrates how a "path" in D3 can be used to generate a rectilinear line plot for time series data. Paths can also plot the same data in a radial layout by interpreting the data as an angle and the average as a radius. By using the relationships $x = r \cos \theta$, and $y = r \sin \theta$, x,y coordinates can be computed for the radial plot.

As shown in lecture on Oct 9, if we consider the Mauna Loa data as one cycle we get one radial plot, and if we consider each year as a cycle we get a different plot. Write code MLsingle.html to produce the plot with a single cycle with annotations showing the years, the center of the plot, and the radial scale used for averages. Write code MLyear.html to produce the plot with a cycle for each year with similar annotations.

2. Plotting Flow (25 pts) :

(CPSC 446 and CPSC 546) As shown in lecture on Oct 9, using "polygon" we can define arrow shapes. By placing arrows, rotating them and scaling them according to vector values we can visualize flows. Write code flow.html that shows the vector **direction** and **magnitude** at points sampled every 0.5 units in x and y on a grid that runs from 0. to 10. in both the x and y directions. The vector at each point in the field is given by:
((y-5)+(5-x)/2), ((5-y)/2 +(5-x)). That is, at x = 5, y =5 the vector is (0, 0), and at x= 10, y=10 the vector is (2.5,-7.5).

(CPSC 546 ONLY) Create the same plot as above, but use jittering. Instead of placing the vector on a regular grid, jitter the location by a small random distance in the x and y directions.

3. Selections and Filtering (25 pts):

(CPSC 446 and CPSC 546) Using D3 create a visualization of the data in the files auto-mpg.csv Create a scatter plot where horizontal position is horsepower, the vertical position is mpg, size is weight. Create a slider that selects a acceleration value, and highlights the data points with that acceleration or higher. You can choose the method for highlighting.

In your visualization include a list of the names of the cars in a column on the right. When a range of acceleration values is selected all of the car names should be black, except the cars that are in that range should be listed in red.

4. Force Layouts (25 pts):

(CPSC 446 and CPSC 546) Create a JSON file encoding the data given in the file SupremeCourt_net .txt This file lists cases, judges and how judges voted on each case.

Make a force layout court.html with judges and cases as nodes (color code nodes by whether they are judges or cases) and create a link between a judge and a cases for the instances where they voted yes.

(CPSC 546 ONLY) Find another network data set and create a force layout for it. Describe any insights about the relationships that are evident in the visualization.