

Davidson Webtree Data

In lab 1 you worked with data from Davidson's registrar on class enrollments and webtree requests. For Assignment 1 you will continue to work with the registrar's data and learn more about class enrollment at Davidson.

scatter plot [20 points]

In lab 1 you built a bar chart looking at the average number of students requesting classes in each department. We will now transform our bar chart into a scatter plot. In NetBeans, create a copy your Lab 1 project and rename it Assignment 1. Make sure to save it in an appropriate location. Rename all of your files from `lab1.*` to the corresponding `assignment1.*`¹. Don't forget to change the file names that are called in `assignment1.html`.

Great, you now have another bar chart!

The bar chart is a great tool for group comparison or tracking changes over time, but it is not as good at looking at the relationship between two variables. For example, what if we wanted to compare the average number of seats in a class (`MAX_ENROLL`) to the average number of unique students requesting a class? Complete the following to convert your bars to dots.

- change `".bar"` to `".dot"`
- append a `"circle"` instead of a `"rect"`
- the location of your `"circle"` is (cx, cy) instead of (x, y) for a `"rect"`
- the `"circle"` needs a radius, `.attr("r", 5)` //This is a radius of 5

Update your bar chart to a scatter plot such that you have one dot for each subject plotted by the average maximum enrollment (x-axis) and the average number of unique students (y-axis). **Hint:** you will want to return multiple variables in your `.rollup`. See Figure 1.

Color Map

D3 scales are not limited to numbers. You may create a scale that goes through colors as well. Create a variable, `color` with a range that goes from red \rightarrow white \rightarrow blue.

```
var color = d3.scaleLinear().rangeRound(["red", "white", "blue"]);
```

¹In Unix based systems, the `*` wildcard has the broadest meaning of any wildcard, as it can represent zero characters, all single characters or any string. For example, `*.html` means any file with the `.html` extension.

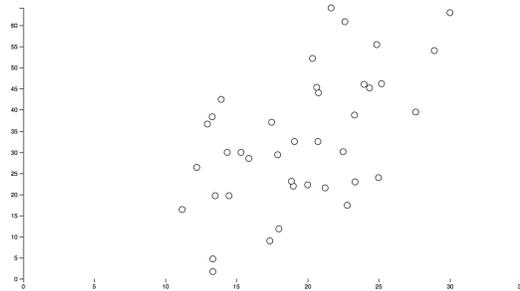


Figure 1: A scatter plot.

These colors were not chosen to be patriotic, but instead because they are a good divergent colormap. A divergent colormap is often used when you have an absolute zero or neutral condition (your middle color) and you want to be able to see what is “less than” the neutral condition and what is “greater than” the neutral condition. In our case our neutral condition (white) is when the total number of students wanting to take a class is equal to the number of seats in the class. Our negative (red) condition is when the class is not filling up and there are more seats than students who want classes in a department. Our positive (blue) condition is when we have a department with very popular classes.

We need to create the domain, `color.domain([min, neutral, max])`, such that we map “red” to the minimum students to seats ratio, “white” to our neutral condition, and “blue” to the maximum students to seats ratio. **Hint:** You will want to create a `ratio` variable in your rollup function.

Once you have created your color scale with domain, you may add a `.style` characteristic for each `.dot` such that the color is determined by the ratio. Use the following code that turns each dot green as your guide. `.style("fill", "green")`. See Figure 2.

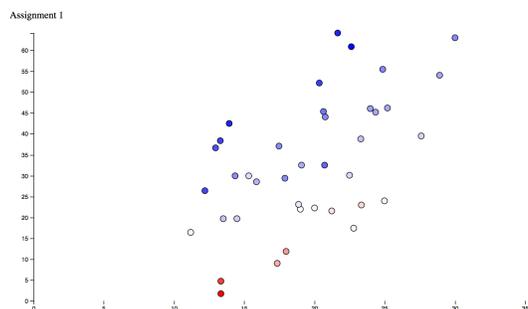


Figure 2: A scatter plot with color.

Transitions

Transitions enable animations of your d3 visualization. For example, you may want to enable the viewer to toggle the color on or off. Let's start by adding a button to the `.html` file:

```
<button id="color">Color</button>
```

You should now see a button on your webpage with "color" written on it. However, it currently doesn't do anything.

Add and complete the following code to toggle your color on and off.

```
d3.select("#color") //select the button by its label
  .on("click", function(){ //when the button has been clicked do the following
    //you need to keep track of the state of your button.
    svg.selectAll(".dot")
      .transition()
      .style("fill", function(d){
        return //the color for your dot based on button state
      })
  });
```

Finally, it is possible to double encode variables. That means, we can apply multiple visualization techniques to the same data to make it more apparent to the viewer. You currently have dots that are colored by the average ratio of the number of students who wanted a class compared to the number of seats in the class by department. Size is also a way to display this data such that larger circles represent a larger ratio, and smaller circles represent a smaller ratio. Update your code to add a working "radius" button that toggles between scaling the circles proportional to the ratio. **Hint:** You may want to create another scale named `radius`. In the plot below the radii range in size from 2 to 10. See Figure 3.

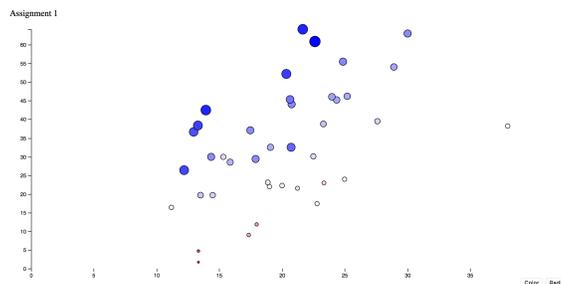


Figure 3: A scatter plot with color and radius mapped to ratio.

Build Your own [20 points]

You have now built two visualizations, a bar graph and a scatter plot with the same data set. Each of these visualizations answers different questions about the data. Remember that the “critical question (regarding making a visualization) is... to transform the data into something that people can understand for optimal decision making.” Have your visualizations helped you to formulate hypotheses? Have you started asking any questions about your data?

There are many questions that can be asked, and answered using Davidson’s webtree data. Define your own question about the data and design a new visualization, using the techniques you practiced in lab 1 and assignment 1 to help answer your question. Make sure your question is displayed on your webpage in an easy to find location.

You may use the bar graph or scatter plot as a starting point, or you may use a different technique. With any of these options, you must make significant changes to the code to help answer your question.

Submission

Add your completed visualizations to your Assignment 1 page on your Davidson Domain (you should create two webpages for Assignment 1 that are clearly labeled). Groups will be selected at random to present their visualization to the class on September 5. Presentations will count toward your homework grade.