

# Assignment 4: Interaction & Multiple Views

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Due Date: March 15, 2024 11:59pm

## Description

In this assignment, you will create 2 side-by-side, interactively linked scatterplots of the Calvin College Scores dataset from HW 1 and 2. The goal of this assignment is to practice implementing interactions in individual plots as well as across multiple plots.

## Submission Requirements

### Provided Template

In the GitHub repository, you will find six files: `index.html`, `plot.js`, `scores.js`, `d3.v7.min.js`, `README.md`, and `spec.pdf`. The `index.html` provides a minimal HTML outline to set up your webpage and structure your responses. It includes two `<div>` tags, one for each of your scatterplots. It also contains a `<table>` that you will interactively update through plot selections. The `plot.js` file contains a basic template for your JavaScript code and is where you should write your plotting code. You are not required to use the template code but *must* contain a `makeScatterplot()` function, as described below. The `scores.js` file contains the data for your scatterplot (the same data from HW 1 & 2). `d3.v7.min.js` is a copy of the d3 library. You will need to load this before any other scripts that use d3. `README.md` provides a template to use for documenting your repository as described below. Finally, `spec.pdf` contains a copy of the assignment specification (this document).

### Submitted Files

You will create your visualizations in `index.html`, it should be the only HTML file in your submission. You should write your main plotting code in `plot.js`, but may add any additional JavaScript and CSS files as you see fit. You must add appropriate documentation via commenting to all JavaScript code. Finally, you should include a `README.md` file (using the given template) that provides a text description of what is in your repository, how to run your program and any parameters that you used. Also, document any idiosyncrasies, behaviors, or bugs of note that you want us to be aware of. **When updating the README, please remove/update the instructive text in parentheses - that is only there to guide you.** When you have completed your assignment, please submit the link to your GitHub repository on Canvas.

You must use `d3.js` to create your visualizations. However, you may also use any other external libraries that you see fit. If you opt to use additional libraries, please document which libraries and how you used them in your `README.md` file.

## Creating Linked Scatterplots in D3 (100pts)

Using the provided template, you will create two scatterplots of the scores data, with interactions linking them.

### Step 1: Scatterplots

You should start by implementing your two scatterplots. The first scatterplot should be created in the `scatterplot1` div and the second in `scatterplot2`. Note, in past assignments we started with an SVG element in our template. This time (and from now on), you will create the appropriate SVG's in your code. Your scatterplots should have the following encodings:

1. Scatterplot 1: should have SATM and SATV on the axes.
2. Scatterplot 2: should have ACT and GPA on the axes.

Additionally, for both scatterplots, the default colors of your circles should be `steelblue`. You must also add axes, axis labels, and titles to each of your plots. For creating your scatterplots, you must define a single function `makeScatterplot()` that you use to create both of your scatterplots. You will need to pass parameters to tell it which attributes in the data to show (or functions to access those attributes). The goal here is to create a re-usable function for drawing scatterplots to eliminate repeated code (which is good practice in programming!).

### Step 2: Interactions

In this second step, you will add some interactions for selecting and brushing. In these selections, when a dot becomes "selected", it should be colored `red`. All other unselected points *in that plot* should be colored `gray` (the colors of the dots in the other plot should not be affected). You will implement two modes of selection:

1. If we click a dot, the dot in either scatterplot, this dot becomes selected. Additionally, the information for that student is displayed in `table` in the template. When a dot is clicked, any selected dots in *either* plot should no longer be considered selected.
2. If we click and drag our mouse in either scatterplot, a rectangular brush is created. All points inside of the brush are considered selected. The `plot.js` file provides some guidance on creating brushes but further information can be found here: <https://github.com/d3/d3-brush>.

Additionally,

1. If we click an empty area in the plot, all selections in that plot are removed.
2. Linking: If we select dot(s) in one scatterplot (through either interaction), the corresponding dots in the other plot should be emphasized by increasing the radius size.

### Extra Credit (5 pts):

If we create multiple selection boxes (i.e. one in each plot), the selection should be created using the logical AND. That is, if we have a brush active in each plot, the points highlighted in red should be the ones that are selected in *both* brushes.

# Grading

Your submission will be graded on how well it fulfills the specified criteria. Additionally, points will be deducted for lack of documentation (i.e. commenting your JS code and filling out the README.md file). The below rubric describes the point values for individual components.

Implementing the scatterplots as instructed	25
Selection (click) interaction	15
Brush interaction	25
Removing selections (clicking nothing)	10
Linked interactions	20
Proper documentation (code comments and README.md)	5
EC: Multiple brushes	5