**Introduction:**

* Overall, this lab was an exploration into external JavaScript libraries, specifically Bootstrap and Google charts. Beginning with Bootstrap, exercises were completed that showed how to import the external JavaScript library, and then use that library to quickly stylize HTML elements in a pre-defined manner. Following this, Google charts were explored. Students were tasked with using the Google charts API to create charts of their own in order to understand the simplicity and power of this tool. After learning of these two new libraries, students were then challenged to use the two in a webpage to dynamically display the results of coin flip data according to user specified filters.

**Summary:**

* I learned a great deal of new information in this lab. For starters I learned how to include external libraries in my HTML and JavaScript files. Next, I learned the ins and outs of using Bootstrap. I came to realize that Bootstrap is a very powerful tool for stylizing HTML elements that allows a programmer to quickly have an aesthetically appealing program. Next, I learned how to use Google visualizations to store and display data in JavaScript. The DataTable and the plethora of supported charts are great tools that allow a programmer to display professional level data in a few lines of code. However, I learned that there is poor documentation when it comes to fine level details of this library. I also learned that in both these libraries they have plenty of CSS styling happening in the background, so attempting to adjust this styling manually can be very difficult to get you intended results.

**Suggestions:**

* Include a PDF write up of the lab. This is because I enjoy checking off tasks as I go.
* Maybe try to include more links to trouble shooting Google Charts, I had a hard time finding good documentation on things like adjusting the axis’s and value labels.
* It could be nice to have all of the requirements in a single list at the end of the lab write up. After completing everything it would be nice to be able to quickly verify that your submission meets all the requirements.

**What I enjoyed:**

* I enjoyed the provided code, it allowed me to focus more on the external libraries and less on the minute details.
* I enjoyed learning about higher level libraries, it was cool to get such professional looking charts with minimal code.
* I appreciated the amount of detail in the lab write up, it was very easy to follow.

**Bootstrap Exercises:**

Graphical user interface, application

Description automatically generated

* What questions do you have concerning the use of Bootstrap components?
  + Is it common practice to use the generic *div* element in order to create Bootstrap elements, or is it preferred to use more concrete elements such as *li* or *table.*

**Google Charts Exercise**

* What other interactions (if any) can you make with the chart?
  + No other interactions were noted.