First Project

In addition, I wanted to learn a lot of new concepts and programming frameworks throughout the experience of making the site. I kept these two goals in mind every time I worked on the website over the summer, and it helped me stay motivated and have a ton of fun.

Coming up with a specific idea for the site was the tough part because I wanted to put so much in it. I knew that I wanted it to be centered around basketball, but I wasn’t sure about the specifics. However, after perusing through some NBA and ESPN sites, I realized that if you are interested in predicting the outcomes of upcoming games, you have to go to each team’s individual pages and filter through hundreds of seemingly random numbers with no explanations given on the page. I also noticed that few websites gave graphs of the data, and I did not come across a single website that displayed grouped charts comparing data from multiple teams. These experiences sparked my idea for the game predictor website.

I am not a gambler, so I wanted to emphasize that through the first section of the site that I added. I used play FIFA a lot, so I was inspired by that game to allow the user to select their favorite team and update the layout and background images of the site through their choice. This, in my opinion, added a nice personalized touch to the site and allows the user to feel connected with it and not quickly search something else on the web, which I found myself doing often when trying to analyze the hundreds of random statistics given on team’s websites. In order to complete this portion of the site, I had to learn AngularJS, which, through research, I discovered was a great tool to use for animations. I went through the W3 Schools tutorial on AngularJS and got started with the animations after that; overall, I was happy with the result but ready and I was ready to move on to the actual data analytics portion of the site.

After completing the fun personalized touch to the site, I knew that I would have to look into some sort of graphing library in JavaScript, as a means of displaying the data that I found important. I wanted to compare the data of the two teams that the user chose that were useful for the algorithm that I was making. I ignored data such as average number of turnovers, for example, because usually these numbers are not much different from team to team, so displaying it in a graph is not very helpful. I decided to learn about the D3 graphing library in JavaScript in order to achieve my goal of displaying the data in grouped bar charts. However, I ran into one issue; how was I supposed to display the data if it is constantly changing? I had heard of web scraping, but I had never used it before. Thus, my final learning stage ensued, as I delved into a very interesting portion of the project.

Web scraping was tough for me because I had never worked with it before, and most of my friends were not too familiar with it either. However, the internet is an extremely useful resource in this day and age, so I was able to figure out that using Python and BeautifulSoup would help me accomplish my goal with relative ease. I was able to catch onto the syntax fairly quickly with a few bumps on the way, but in the end I chose the statistics that I found most useful from various sites, and I used that for the d3 grouped bar charts.

At the end of the site, I included my prediction of who would win the upcoming game based on the data that I scraped. I developed an algorithm, which I believe takes the most important data and weights the individual values appropriately. I added and subtracted these weighted values and compared the sums of the two teams.

Overall, I had a lot of fun with this project, which was my ultimate goal. In addition, I achieved my second goal of learning a significant amount, such as AngularJS, the D3 library, and web scraping with BeautifulSoup.

Second Project

Over the summer, I worked at Booz Allen Hamilton. I worked on a team that runs a web application for eighteen government agencies to help them with capital planning. During my summer at the company, the team was working on finalizing changes for the release of the updated site. The developers and UI/UX teams had made many changes during the year due to changes in government rules that required certain things to be displayed/hidden or general UI changes.

With this release came many confused and angry administrators of the site at the individual government agencies. Investments from the previous year had to be updated with new fields and edits to the site required complicated changes to be made. Thus, I was able to work on an interesting project from this issue. The team wanted me to create a website that essentially served as a long survey and determined what submission scenario the individual government agency was experiencing with their investment and give them information on how to resolve the issue. The task seemed fairly simple at first, but I realized that with many possible submission scenarios, it would not be easy to make it as efficient as possible. In addition, the team wanted me to make it quick, have help button options, and a restart option to aid the user throughout his/her perusal through the website.

In the end, my team loved the site and knew that the agencies would find it useful. I had a lot of fun working on it, and I learned a lot of HTML/CSS/JavaScript throughout the process.

3rd Project

During my data structures class, I learned a significant number of complex algorithms used with linked lists, stacks/queues, heaps, and graphs, and my final project gave me the opportunity to come up with my own algorithm to get Indiana Jones out of a crumbling building with as much gold as possible.

I was just as confused as you are when I first heard about the assignment. However, the goal of the assignment was quite simple. The professor provided the GUI display, and the students had to create their own algorithms to make the Indiana Jones character on the map of the GUI escape in time, while getting as much gold as possible.

This was not an easy assignment, as there were many ways to go about writing a solution. Thus, I spent a significant amount of time planning the algorithm without writing code, and then I went through a trial and error phase with writing code. It took me about a week and half to realize that my ideas were not working well and there was definitely something more efficient that I could implement. With a few days left before the project was due, I realized that rather than using a linked list with the amount of gold at each tile on the map stored as data within each node, it would be much more efficient to use a min heap and store the ratios of distance away from current position/amount of gold at tile, and iterate through this heap each time I made a move, checking to make sure that I had enough time to do so. My initial ideas were too simple and did not utilize a heap or a ratio system. In addition, I was struggling to complete Dijkstra’s algorithm, but in the end I successfully implemented it, making my algorithm complete.

I ended up with the third-best grade in the class on that project (a lot of people got the same grades, but I’ll take it), and I realized how much I loved software engineering through the experience. Although I spent many sleepless nights working on this project, I was continuously trying to find more efficient solutions and it was such a great feeling stumbling upon new ideas along the way.