The Process of Creating My First GUI and How I Can Apply What I Learned

By Sarah Lewis

I began this semester with some coding knowledge for coding basic hardware and I am ending this semester with a large amount of coding knowledge that will have both hardware and software applications. The GUI I created was such a wonderful way to present what this class has taught me. I went with the example project because I unfortunately did not have as much time to be creative as I would have wanted to. I would like to go over the design process, the difficulties I overcame, and ways that I think I will use GUIs in the future.

I initially began by looking at example GUIs provided in the class to see how I would proceed. This immediately made me feel overwhelmed, so I decided to take a different approach. I first wrote down all the requirements listed on the final project in the form of a list and check boxes. I then conceptually drew my GUI. Where do I want the buttons to be located? Where does it make sense to have the reset button? What should be included? Etc. Once I was able to visualize what I wanted to make, I was able to break everything down into smaller pieces. Once these pieces were created, I was able to work on what I needed to do to make them work together. Once they worked together, I was able to test my code by trying to break it in all ways I could think of. I added if, else statements and error dialog boxes. Once I could not think of any more ways to break my code, the design process was complete.

That nice little paragraph is not the most accurate summary of the process, because it does not include the obstacles I had to overcome. My first obstacle was

deciding what to do for callbacks. My brain defaulted to callbacks for each of the edit boxes and then I realized that is not recommended. I realized I would need to set a callback function for the “plot” button that included information from each of the edit boxes. It was a little difficult trying to figure out how to best extract the information from the edit boxes in a way that would allow me to add it to a plot. After some research, I found the proper functions to format the inputs correctly for my plot command. My favorite solution was when I problemed solved how to take the selections from the radio buttons. I made a separate callback for these two sets of options and each radio button had a “tag” written in the code. The callback function included cases based on each tag for defining a global variable for the marker color and marker character for plotting.

Another difficulty I faced was getting the information from the edit boxes to the callback function in the proper format. I struggled with this for a little bit testing different functions and seeing how they behaved. I had to look up MATLAB documentation and was able to find commands such as str2num and str2double that would get the information in the proper format to be plotted. After trial and error, I got the results that I desired.

I also struggled with the reset button. I thought the reset button was going to be the easiest portion of my code. I saw the instructions in the final project documentation and thought it would be a breeze. I realized a lot of the solutions I was attempted were opening a new window and not closing the old one. I also just did not see it as being efficient to close and open new windows to reset. What program that I use does that? (Answer: none). After using hold off and plot(0,0) I decided to essentially re add the values from the original function and this worked successfully.

Struggling through creating this GUI made me think of different ways I could be creative with creating one of my own. If I ever design a product, I can also create an app that the user of the product can use on their phone. For instance, I think it would be awesome to someday design and create a robot that I can control from my cell phone. The app would have all types of information and options. Battery percentage, options for changing colors of LEDS, a touch screen remote control for controlling the robot's movements, etc. The app could be very simple or could also be very user edit friendly. For example, the app could have an option for the user to code and save a specific type of movement for the robot. They could use it for applications that I as a designer did not think of or include as default options.

This was a long and intense final project, but I feel very satisfied with being able to complete it. This class has taught me so much this semester and it is going to benefit my career. I cannot wait to mess around with some ideas for other GUIs this summer and apply everything I have learned. The struggles have all been worth it.