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**Final Project Report**

I decided to use the provided example idea for my final project. I started my design process by writing down all the requirements on paper, as well as whatever else I wanted to add personally. I drew up a few layout ideas on paper to get a sense of how I wanted the figure to look. Then I made a rough outline of what I wanted the code to look like, including taking note of any functions or callbacks that I thought would be necessary. I usually always do this for bigger assignments because I found that having a solid plan makes writing the code much quicker.

My next step was to get the layout that I wanted onto the figure. Before spending time coding right away just to have to shift and resize everything again, I used App Design to quickly test if my paper layout would be acceptable on screen. After confirming that my design looked suitable then I started coding the layout. About half my time spent on this project went into this first function to get the spacing right. I feel like getting the desired layout is the most important thing to work on first before moving on to any callback functions.

Once I was satisfied with the setup I moved on the my “Graph” function, which was the heart of this project. This function graphed the user imputed data, as well as set x and y limits edited by the user. This function was also the callback function to enter the new y-label text edited by the user.

The next function I wrote was the “Reset” function. This was a simple function that triggered when the “Rest” pushbutton was pressed. It just closes the current figure and then calls the main function. This opens up a fresh figure for the user, with all the default values back in their positions.

The last two functions I wrote were the “radioSelect” functions. These were incredibly similar and are essentially the same code just with different variables. I saved these for last because I thought that they would give me the most trouble. They turned out to be reasonably easy. They just check which radio button is on and then set a global variable to the appropriate line/color modifier, then they call the “Graph” function.

The biggest issue I had during this project was making sure that the y-label was editable. I wanted the y-label to be vertical but found out edit boxes cannot be vertical. Then I tried to have whatever the user inputs into an edit box become a text box near the y-label. However, uicontrol text boxes cannot be rotated either. I attempted to use a regular text command (which can be rotated) but that resulted in the y-label moving with the plot which usually put it out of view any time the limits were changed, or when user moved the plot. So I opted to use a uicontrol text box (edited by the user using an edit box near the bottom of the figure) instead of a regular edit box because I thought it looked better.

Another issue I had was that my radio buttons’ variables would not refresh when I ran the main function. If I closed out of the figure while any radio buttons other than the default ones were on (say red line color) then when I opened a new figure the graph would use red for the line color even though that radio button was not selected. The solution was simple; I just needed to add two lines of code in the main function stating which default modifiers to start with. This straightforward solution took me awhile to figure out though.

Early on in this project I thought I might never be able to get my GUI to look and work how I wanted it to. There always seemed to be a new problem when I came up with a solution to a different one. However, this project helped me build my confidence in using GUIs and improved my understanding of them. I believe that I will use GUIs in the future to help with engineering work. I have heard MATLAB starts to replace engineering students’ calculators as their experience in engineering grows. I especially like the App Design feature. I assumed we could not use that for this project, but I did experiment with it a lot while in the early stage of my design process. It looks like it would be a lot quicker to design and code as opposed to the programmatical approach took during this project. If that is the case, then I will definitely be making Apps to help with schoolwork.