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Final Project Design and Layout

For my final project, I decided to make a GUI that could serve as an introductory to chords in music. I have been involved in music for as long as I can remember and took inspiration from that to create this introductory GUI, which was approved by Ms. Quinn Lanik.

My project consists of introductory text, toggle buttons, radio buttons, and push buttons that use callback functions to complete various tasks relating to building chords. The text serves as a guide to the user to inform them of what the GUI is designed to do. The toggle buttons serve as a way to select two separate notes and compare them to create a chord. By using toggle buttons, the user can select two buttons that can each be activated simultaneously instead of just one single time. Push buttons were used for the more single-use tasks such as displaying information or resetting the activated buttons. Finally, I used radio buttons to display an image of the note to distinguish the buttons from the other toggle and push buttons.

The coding process itself wasn't terrible. Though I was taught everything I needed to know about the structure of GUI coding, it took me some time in order to figure out how to implement it. The hardest part was figuring out a way to change the buttons' activation status from on to off and vice versa, depending on the circumstance. At first, the buttons would just stay activated, no matter which button was pressed next. Because the buttons were always activated, only a certain display message would show up, no matter if it was a different chord. Eventually, I discovered how to change the

status by changing the value of each button's variable. I utilized this information to create a 'reset' callback function.

Another issue was discovering a way to filter the notes based on the various chords. Each note creates a different chord with a different note, whether in order or out of order and I needed to account for all of them. But some of the chords repeated and I needed to find a way to recognize that though these are different notes, they are creating the same chord and should display the same information. I eventually settled on a callback function that corresponds to another function, each with their own if statements. The callback function is used to recognize which notes were being selected and send the interval between them to the second function. The second function matches the correct interval and then displays the correct information needed on a modal message box. After exiting out of the message box, the code will then call the 'reset' function to clear the choices and begin selecting again.

After some consideration, I decided to include an image of the place of each note on the musical staff to better visualize what was being created. I utilized my previous knowledge of exhibiting images in MATLAB to show the note after selecting the radio button of the corresponding note. I downloaded the image, used *imread* so that MATLAB could read it, and then used *imshow* so that MATLAB would display it.

In the future, GUI's could be used for teaching students about new topics as demonstrated by my project. Or it could be used to solve formulas such as differentiation. I could also easily compare data gathered in the field or laboratory and create a prediction based on that.