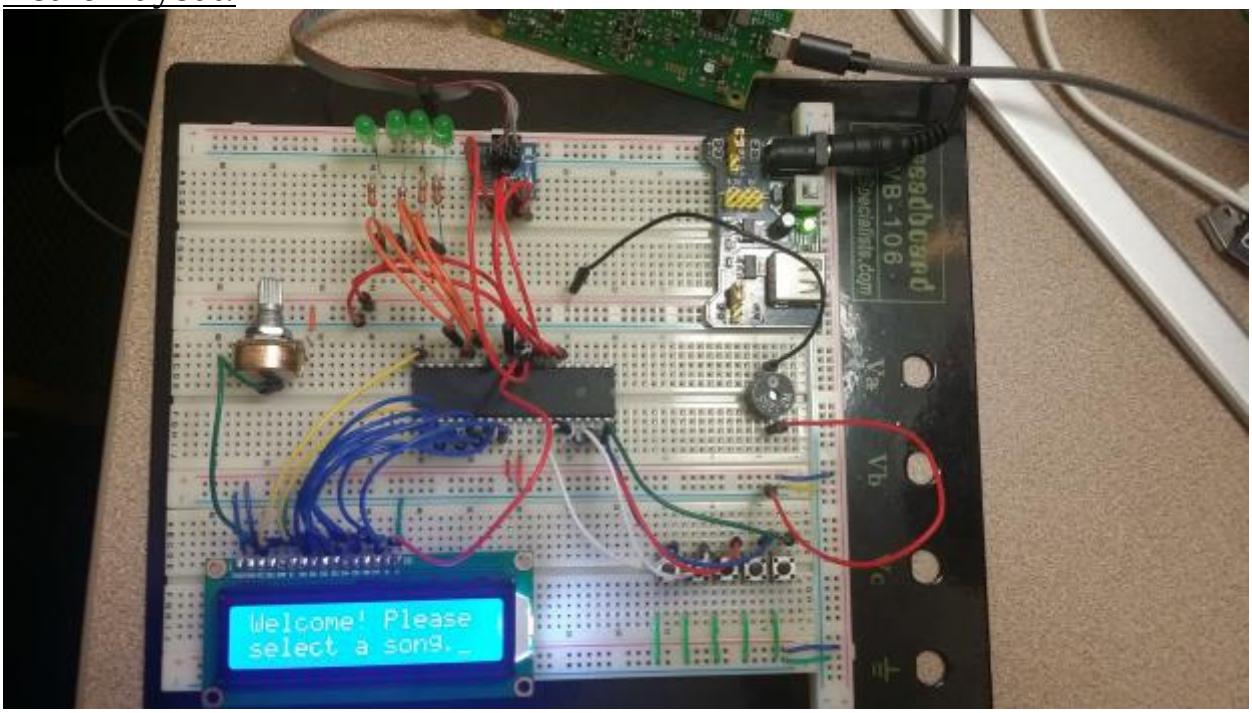
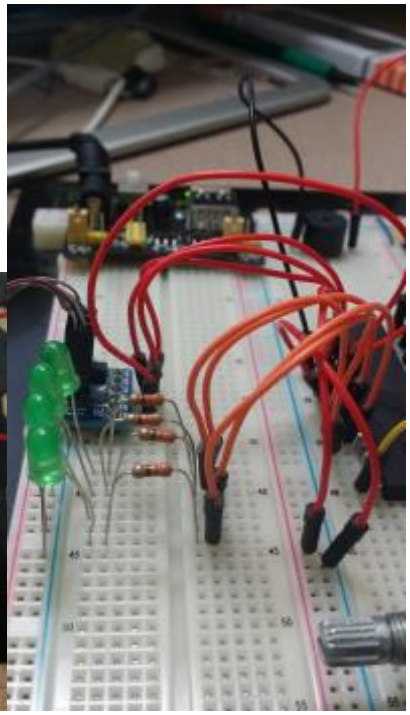
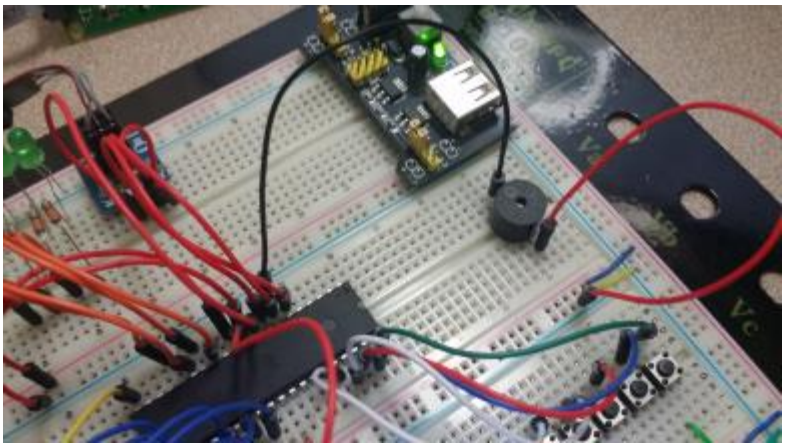
CS/EE120B Final Project: Juke Box
by Douglas Tran

Board Layout:







Purpose/General Description:

This board was designed to output simple or complex songs through square waves generated on a WT-1205 speaker. A welcome menu is displayed on the screen by default (seen in the picture). The user should be able to cycle through the playlist of three songs (represented by the buttons connected to the blue and red wires) and play the song (represented by the button connected to the green wire). Notable connections on the microcontroller are as follows: C;LCD display, A;button inputs, B;speaker, D;LCD-RS and LED displays. When the user navigates to the song and presses the play button, the song will play and the LED lights connected to port D on the microcontroller will turn on.

Challenges:

For me, the main challenge of this project was being able to output onto the speaker (my old speaker was broken and I had to replace it) and keep track of the timing for button inputs (i.e. how long to press to advance states). In addition, I had to work with music frequencies without intervals while designing the songs for the jukebox, so there was a very long trial and error period in which I had to figure out how long to play notes and when to take pauses in the songs. As a result, my songs sound slightly off in a few parts, but are mostly accurate. My io.c and io.h files were not included correctly either for some reason, so I pasted the code inside of the main file.

Bonus Work:

I implemented the bonus feature, which was the blinking of LED lights when a song is playing. Since I only implemented 4 lights, I was extremely limited to the range of values that each light would represent. The LEDs stay on while the LED range is 0-200(D0), 200-400(D1), 400-60(D2), and 600-1000(D3).

Sources:

https://onedrive.live.com/?authkey=%21AHvj2Xng4OIKzUE&id=7F117ACF491CB98A%215325&cid=7F117ACF491CB98A
https://pages.mtu.edu/~suits/notefreqs.html
http://courses.ischool.berkeley.edu/i262/s13/content/jenton/lab6-chiptune-musicbox.html

Video:

https://www.youtube.com/watch?v=zIkpb3F13rY

Github:

https://github.com/dtran08/EE120B_Final

Conclusion:

The project was mostly a success. I didn't have the time to implement the speed up/down button functions, however. Every other function should work in adherence with the project guidelines.