Tim Chang

Zach Bloom   ECE153A Final Proposal

Purpose: Create a Piano Keyboard that has different octaves depending on a button - which is reflected on the color of the LED lights.

We propose to use the LPC microcontroller to create a functional piano. A breadboard with controls will be interfaced with the board in order to create keys to play an octave, with buttons to control which octave the keys are played in. A LED strip will also be interfaced with the board in order to determine which octave the keys are playing in which will be visually represented as different colors depending on the octave. To increase functionality, the use of a potentiometer and ADC on board will be explored in two possibilities. The first would be control of the amplitude, allowing the user to control the volume of the frequency. The second would be using the potentiometer to frequency shift the notes being played, so the frequency of a note can be changed by the user to play the range of an octave with one key, as well as the frequencies between each note that traditional pianos cannot play.

Peripherals
1. Push buttons on LPC Board
2. Trimpot on LPC Board
3. Custom piano keys sound breadboard.
4. LED lights.
5. Speakers (On Board Speaker)

Software Design:
       A while loop will continuously run to read inputs of keys which will be converted and recognized as different sounds and different corresponding LED lights. The signals which are sent into the board will recognize different frequencies (and also dependent on the trimpot) to play on the speaker. These frequencies are also converted into a usable value to output different colors into the LED light.
Goals:
1. LED strip light colors correspond to different octaves of the piano key.
2. Change octaves with push buttons
3. Trim brightness for controlling the volume or shifting the frequency.

Group Responsibilities.
Zach will be in charge of creating an external piano keyboard and making sure that the keys all produce a distinct input and making sure the output comes out of the speakers. Tim will be handling making the trimpot and LED lights and converting the input signals to a distinct sound and color.