Sacred Heart UNIVERSITY | ENGINEERING

MATLAB Ukulele Tuner

Abstract

The idea for this project is to create a program in MATLAB that will act as a tuner for a ukulele instrument. When the program is run, a buzzer will sound the frequencies for the notes and a button will trigger each frequency. This is a simple project that can be used by anyone.

Introduction

The tuner is programed using MATLAB and triggers a buzzer noise to tune the ukulele. The concept is relatively simple and easy to understand. People can use this for a quick and easy way to tune their ukule and get accurate results.

MATLAB®

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Methods and Materials

For this project, MATLAB was used along with a breadboard, arduino, and a couple wires to connect a buzzer and button. I also used a ukulele to test the tuner.

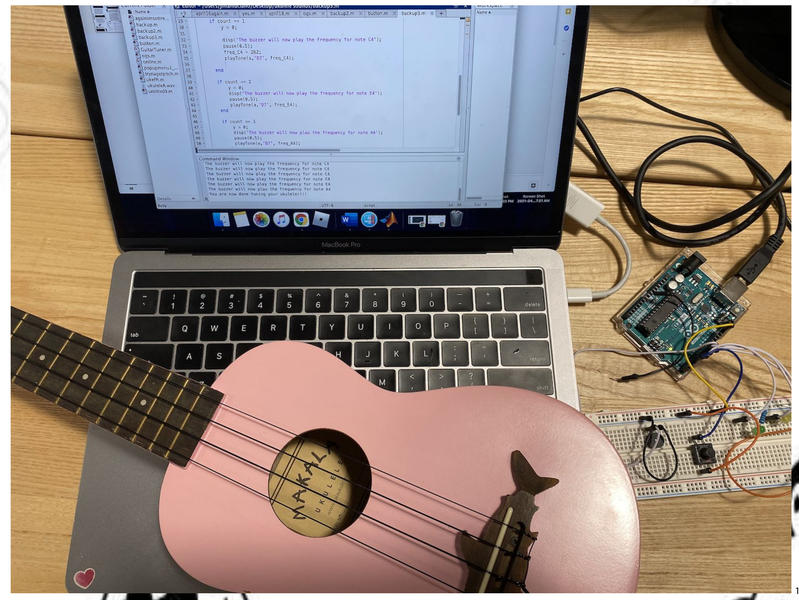
The first part consisted of me wiring up a buzzer and push button. Then I went into MATLAB to write a code that would allow for a buzzer to ring four different frequencies, as well as each note being triggered by pushing a button. Once the user walked through all four frequencies and matched the sound of their ukulele to the sound of the buzzer, the program displays how the ukulele is now in tune.

```
clear all;
close all;
a = arduino;
%prompt = 'If you are ready to tune your
%get_yes = input(prompt, 's')
buttonState = readDigitalPin(a, 'D2')
count = 0;
x = 1;
y = 0;
freq_G4 = 392;
freq_C4 = 262;
freq_E4 = 330;
freq_A4 = 440;

while x==1
    if count == 0
        disp('The buzzer will now play t
        pause(0.5);
        playTone(a,'D7',freq_G4);
    end

    if y == 0 %that is in place so when
        if readDigitalPin(a, 'D2') == 0
        count = count + 1;
        y = 1;
        end
    end
```

```
if count == 1
    y = 0;

    disp('The buzzer will now play the frequency for note C4');
    pause(0.5);
    freq_C4 = 262;
    playTone(a,'D7', freq_C4);

end

if count == 2
    y = 0;
    disp('The buzzer will now play the frequency for note E4');
    pause(0.5);
    playTone(a,'D7', freq_E4);
end

if count == 3
    y = 0;
    disp('The buzzer will now plau the frequency for note A4');
    pause(0.5);
    playTone(a,'D7', freq_A4);
end

if count == 4
    y = 0;
    disp('You are now done tuning your ukulele!!!!');
end
```

Results

When comparing the ukulele sounds to a tuner on an iphone, the ukulele was in tune. Therefore this proves that the ukulele tuner is an accurate tuner and can be used to tune your ukulele!



Conclusion

Next I would like to record analytics on the average time it takes to tune a string.