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Lab 4
Sound Sensor

In this experiment I used an Arduino Uno board, a Grove base shield, a piezo buzzer, a Grove sound sensor, and two 4-pin cables to create a sensor that would measure the sound intensity of a piezo buzzer at different distances away from the buzzer. In order to do so I programmed the buzzer to emit a tone at 220hz when any keyboard input was entered into the serial monitor. The code also turned off once any keyboard input was entered in the serial monitor again.

In order to test the buzzer I used the example provided in the Arduino software called toneMelody. The tones that were heard during this test were not very “pure” because the piezo speaker is only capable of emitting a single frequency at a given time and not a complex tone that contains overtones that help give sounds a more “pure” tonality to them. When recreating this same melody using only frequency input and not the pitches.h library the frequencies used were C4 = 262Hz , G3 = 196 , G3 = 196 , A3 = 220 , G3 = 196, 0Hz, B3 = 247, C4 = 262Hz.

In order to determine if the user wished to turn on the buzzer serialEvent() was used accompanied by a conditional that would either turn on or off the piezo buzzer depending upon the current state. The sound sensor was programmed using code created by Seeed Technology as cited in the references at the end of this report. A moving average was also coded into the program to help smooth out the display of the serial plotter. This code was taken from the example in the Lecture 15 slides. The final experiment was then run using a ruler and the buzzer taped down at the 0cm mark of a ruler as seen in Figure 1. The sensor was held 4cm away and every two seconds the sensor was moved 2 cm away from the buzzer as seen in the serial plotter in Figure 2. A graph of the relationship between distance at sound intensity is seen in Figure 3.

Figure 1:

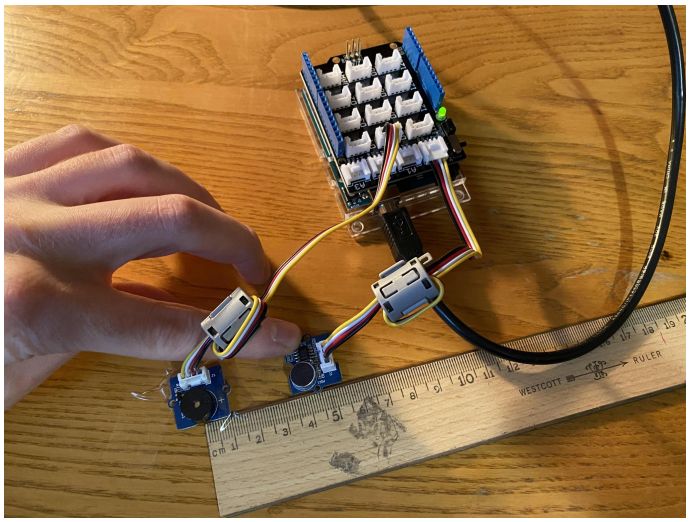


Figure 2:

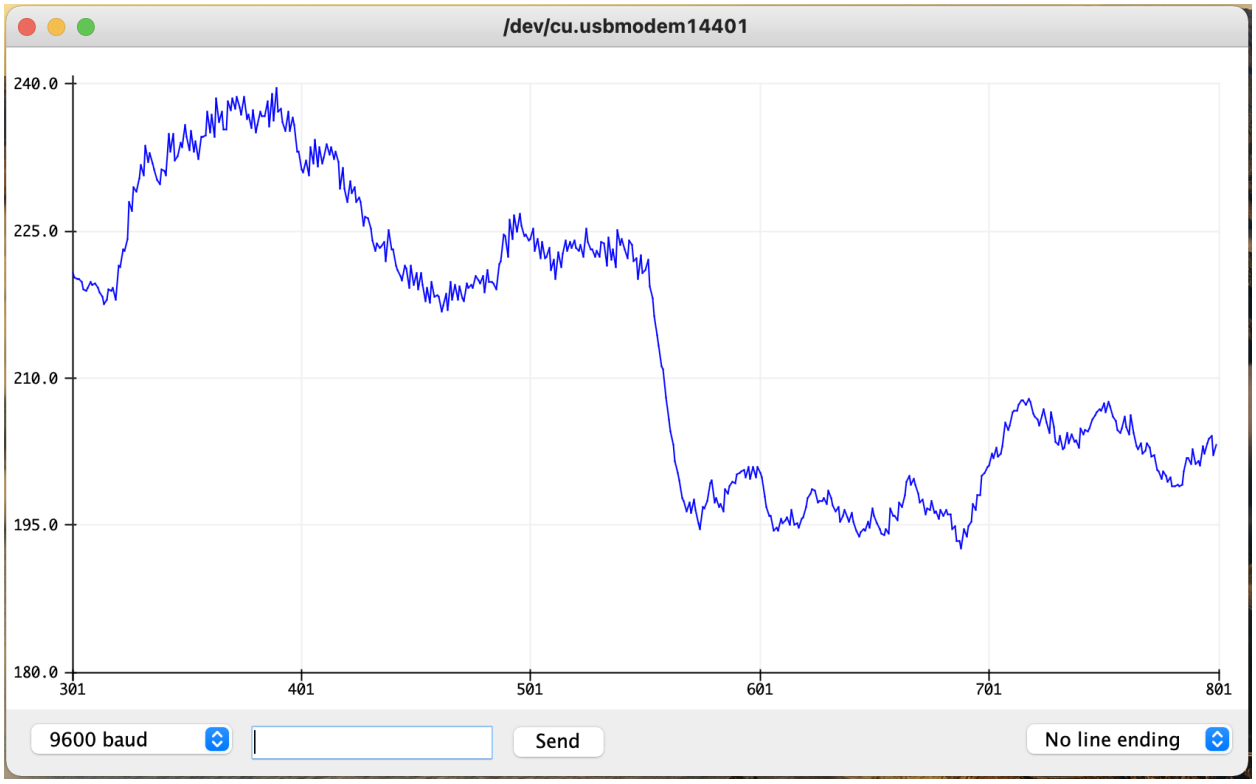
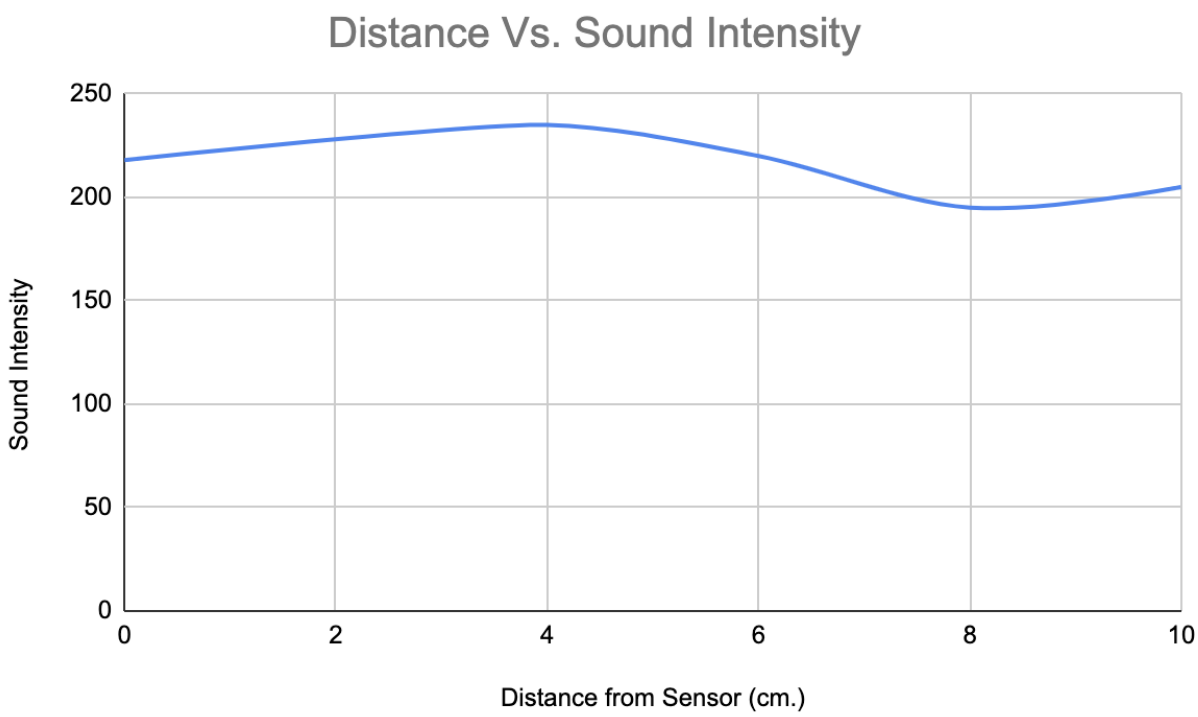


Figure 3:



Sources:
https://media.digikey.com/pdf/Data%20Sheets/Seeed%20Technology/Grove_Sound_Sensor_Web.pdf