I chose to measure out sound frequencies as I was curious to what would usually go on during midnight, midday, morning, and evening. Due to me being up at certain times of the day, I wanted to see how my sleep schedule affected the sound levels within my house. Throughout the experiment, I will measure out two different graphs (placed at the end of this document) that will compare the differing sound levels between a set time frame.

First off, I started off with the simple idea of how to get an LED to sync up with a microphone, then expanded from there. Each LED would indicate a certain sound level/Threshold based upon the environment that it is in. For example, the red LED would light up during very low levels of sound, where as the yellow LED would light up during extreme levels. In order to set this up, I consulted the Arduino Lab book for pass exercises as well as the freetronics website guide on how to set up the microphone and print out the Threshold values. This helped immensely with setting up the general project.

<https://www.freetronics.com.au/pages/microphone-sound-input-module-quickstart-guide#.XLs3eOgzZPY> This was a great guide for printing out the Threshold, as well as a great way to determine how to set up the general jumper wires. There were times when I had to improvise the set up due to not being enough yellow wiring or ground(black) wires, this proved to make things difficult as the set up if done incorrectly produced inaccurate data outputs. For example, I could be playing music on my laptop at max volume level but the microphone would only produce a sound level of say 400, whereas based on my code it should produce levels above 3000.

One of the most frustrating concepts during this project was ensuring that the sensitivity of the microphone would have to be adjusted to sync up with the environment that it is in. To put it simply, it would need to be reset every time it was used as it would produce inaccurate levels (i.e. -20000, 0, etc) on start up before it adjusted to the correct sensitivity settings. This proved to greatly reduce some of the data ranges that I first intended to have set up, thus much of my data would differ depending on certain factors. These factors included: Time that I would get up vs Time I would have to leave for work, scheduling, sound interference from laptop fan and other items, etc. Thus in order to counteract these factors, a strict schedule had to be followed in order to get a rough estimate range for each dataset measurement. This way, I would have a decent range to work off even if it exceeded 3 hours.

Below you will see a sample of the Threshold measurements that I carried out for the first week. These sets of data had to be placed in two sperate csv files as the data ranges were too large to accommodate within one file, week 1 contains measurements compared between morning and evening, whereas week 2 contains measurements that compares between midday and midnight.



























