EE 311 **February 6, 2017**
Assignment 04 **Due: February 15, 2017**

My old piano is badly out of tune and has not been tuned in at least 20 years. The file "PianoScale.wav" is a sound file which records the eight white keys beginning with middle-C on the keyboard. There is a pause of about 1 second between notes and the scale is played twice. The recording is also in stereo so there are two channels. Analyze the data and determine how far out of tune the piano is for these notes. You can get piano key frequencies from the chart in the back of KC 135 or see http://en.wikipedia.org/wiki/Piano_key_frequencies

Because each note has overtones that overlap later notes in frequency, you will have to use MATLAB®, Goldwav or some other audio editing tool to pull out each note into a separate sound file. You will need to create eight sound files from the original and each will have just a single note. Do the FFT on each file and use the *data cursor* under Tools in the figure to find the frequency of the fundamental.

Create a table with four columns and eight rows. The first column should have the note (1, 2, …), the second should have the assigned frequency from the frequency table in KC 135, the third should have your measured frequency from MATLAB®, and the fourth should have the signed error.

Turn in the following:

1. Cover sheet with your name, assignment number, and the date turned in.
2. A page containing a paragraph or two describing the procedure you used to determine the piano frequencies.
3. Time and frequency plots of the data you analyzed. These can be scaled to fit on one or two pages.
4. A table containing the exact frequencies, the measured frequencies, and the difference for each note.
5. The MATLAB® code you used to do this assignment.