Laboratory #07 ENEE 148A Fall 2016

In this lab you will work in pairs. You must divide up the code work and each of you indicate which routines you wrote or co-wrote. Complete the following tasks:

1. Build a circuit that uses the HC-SR04 ultrasound distance sensor.
2. Download and run the code ultrasound.c.
3. Change your code as follows:
	1. Record the distance measurement every second.
	2. Look for outliers in the data. If identified, document when they happened, what the outlier distance reading was, and what the actual expected distance was.
	3. Print out the elapsed time, the distance measurement and a simple moving average of the distance.
	4. Print out the message: “No object in sight” instead of the distance if the distance is > 40 cm.
	5. Print out the message: “Warning: Object too close” instead of the distance if the distance is < 5 cm.
	6. THE CODE IS TO RUN FOR ONLY 5 minutes. At the end of 5 minutes, the code must print out the total number of outliers, the percentage of outliers, and then list the outlier data.
	7. The code then terminates.
4. Have your instructor verify successful operation.
5. Test out your code by carefully moving an object towards and away from your sensor at different angles. Test out your code with different objects. Try to obtain some idea of the limitations of the usefulness of this sensor.

For the write-up of this lab, due 4 November 2016, you need to submit (1) a paper copy of the codes that you wrote and (2) an electronic copy of the codes that you wrote. You also need to draw a diagram of the circuit that you built. Finally, you need to write up a lab procedure documenting your calibration process and presenting and analyzing the results of your experiments.