EE335 Advanced Microcontroller Engineering
Oregon Tech Portland, Winter 2014
Lab Assignment #9 - *Floating Point*
Due March 13

Objectives:

Demonstrate how floating point can be used instead of integers in calculations

Equipment Required:

Dragon12 board, your working lab 7 assignment, and either a voltmeter or oscilloscope.

Background Information:

Because of performance and size constraints, floating point is infrequently used in embedded programming. But as microcontrollers have become more powerful and on-chip memory has expanded more applications are using floating point.

You will need to add the code in fp.asm to your lab assignment 7 and perform the scaled arithmetic calculations using floating point.

If you have been using C, the provided C library supports floating point but the size of the package is such there isn't enough available RAM to complete the assignment. For that reason you will need to do this assignment in assembly language. A working Lab 7 assignment in assembler will be provided to you.

Assignment:

Modify your lab assignment 7 to do the two scaled arithmetic calculations to use floating point. Your assignment 7 program should have one calculation where it converts the ADC voltage to a Celsius temperature, and a second which converts something (most of you are probably using a running sum that is 256 times the Celsius temperature) to the voltage output. Each of these calculations are to be replaced with: a call to fpFloat, a call to fpMultiply, (perhaps) a call to fpAdd, and a call to fpFix. This implements the classic linear equation y=mx+b, but *b* is probably 0, so you may not need the addition. The arguments to the multiply and add operations, *m* and *b*, can be calculated in advance and floating point literal values be used in the program and pushed on the stack.

To turn in:

- Documented program listing
- Discussion of what you did