

# EE335 Advanced Microcontroller Engineering

## Oregon Tech Portland, Winter 2014

Lab Assignment #7 - *Scaled Integer Arithmetic*  
Due February 27

### Objectives:

Demonstrate the use of scaled integer arithmetic.

### Equipment Required:

Dragon12 board and one of the EE333 thermometer lab assignment programs. One will be provided if you don't have one from Fall 2013. A voltmeter or oscilloscope (voltmeter preferred).

### Background Information:

This assignment will use the Digital to Analog Converter (connected via SPI) to produce a voltage output. You could drive the DAC continuously as in Lab 4, but the reality is that with the voltage changing very slowly it could just as well be driven from the main idle task loop.

You will need to calculate the slope (scale factor) and offset needed to convert from temperature to voltage and implement the conversion. This should take a single multiply, divide, and add/subtract. Note that the value to the DAC needs to be clamped so that it doesn't go below zero or above 1023.

### Assignment:

Modify your thermometer lab assignment from last term so that it also produces an output voltage based on the temperature. Zero volts should represent 0°C and 5 volts should represent 40°C. This means that the each volt of output represents eight degrees of temperature.

Temperatures below 0°C must output 0 volts and those above 40°C must output 5 volts.

Don't forget the heartbeat monitor!

### To turn in:

- Program listing with comments
- Discussion of how you tested your program, and your test results.