HW1 (100 points)

1.1. Determine the number of quantization levels needed if one wanted to make a digital thermometer that was capable of measuring temperatures to within 0.1 °C accuracy over a range from -50 °C to 150 °C. What resolution of ADC would be required? (25 points)

1.2. A digitally programmable signal generator uses a 14-bit DAC with a 10-volt reference to generate a DC output voltage. What is the smallest incremental change at the output that can occur? What is the DAC's full-scale value? (25 points)

1.3. (a) Use Superposition and Thevenin's equivalent circuit theory to verify the LSB of the following R-2R DAC is VDD/2^N. (b) If the digital input is 10101, find the analog output use Superposition and Thevenin's equivalent circuit theory. (50 points)