

## Homework #1

LabVIEW

Dr. Pogo

Assignment is due on Tuesday, September 5, 2023

Assigned August 29, 2023

### Assignment #1: Voltage to Temperature Conversion

- Inputs:** One Floating Point Knob (with digital display).  
One Listbox (4 elements: Celsius, Kelvin, Fahrenheit, Rankine)  
One Stop Button
- Outputs:** One Floating Point (thermometer slider with digital display).  
One Boolean Indicator (warning light)  
One String Indicator (units for thermometer)

The floating point input represents a voltage. Although this voltage is set and adjusted by the user, it is supposed to represent an input from an external electric circuit. This imaginary circuit is supposedly designed so that this voltage changes in response to temperature according to this equation:

$$T (^{\circ}\text{C}) = 115.7V + 8.67V^2 \quad (-1\text{ volt} \leq V \leq +1\text{ volt})$$

As noted, this equation is only believed to be valid for a limited range of voltages. If the voltage is ever observed to be outside this range, we cannot determine the correct temperature.

The user input (the dial) should allow voltages between  $-2$  and  $+2$  volts, in steps of exactly  $0.01$  volts. If this input voltage ever falls outside the expected range, the output temperature must “peg” at the  $-1V$  or  $+1V$  value, as appropriate. If this happens, a warning light should also turn on while the voltage remains in the unexpected range. The warning light should have text labels “Normal”, and “Warning!” and change from green to red when activated.

The output should show exactly two decimal places correctly, regardless of which temperature unit the user has selected. The thermometer slider output should range from  $-200$  to  $+800$ . Your code may not use any rounded decimals to perform unit conversions.

Finally, you may not use the “coerce” or expression **nodes** (but it should go without saying that you **must** use coercion properties...). For this assignment, I want you to use simple arithmetic nodes like “+”, “×”, “>”, etc. You may not use  $x^2$ , or other more complex math tools.

Pay attention to the digital display: make sure that the increment tabs do something useful (e.g. , they don’t increment by ridiculously large or small amounts), and that the digital display (and the output temperature) always show the correct number of digits.

Here is an example of how your front panel might appear:

