**ECE-231 Lab Assignment #8.2**

**Due: 11:59 pm, Saturday 4/27/24**

In this assignment, you will implement a digital thermometer that displays temperature in

degrees F or degrees C based on the position of a push-button switch. This lab assignment has substantially more complexity than our lab 8.1 assignment, so start early.

You will build two versions:

Version 1. Display on temperature on a serial monitor via a comm port. (The specific port pins

shown here are only for illustration. These are not necessarily the port pins you should use for

your implementation.)

Graphical user interface

Description automatically generated

Version 2. Display the temperature on the 4-digit, 7-segment display in your kit. (The specific

port pins shown here are only for illustration. These are not necessarily the port pins you should

use for your implementation.)

Graphical user interface

Description automatically generated

For both versions, use the following specification:

2.1 When a momentary push-button switch is pressed, display the temperature in degrees

Celcius. When the button is not pressed, display the temperatrue in degrees Farenheit.

2.2. Display the temperature to 3 significant figures with a precision of 0.1 degrees, followed by

the letter C or F. For example, with an ambient room temperature of 70.0 degrees F, or 21.1

degrees C, your display should read 70.0F or 21.1C, depending on the position of the pushbutton

switch.

2.3 Your thermometer only needs to display temperatures in the range from 32.0F to 99.9F and

0C to 37.7C (This eliminates the need to display a - sign or add a 5th digit to the display.)

**What to submit:**

• Video showing functioning of version 2.

• Copy of your version 2 source code.

• There is nothing to turn in for version 1.

Project components needed:

• TMP36 temp sensor

• 4 digit 7 segment display

• resistors (1kOhm resistors recommended)

• SPST switch

• jumper wires

• Arduino Uno

• 1 or 2 breadboards

TMP36 Temperature Sensor

Sparkfun TMP36 SEN-10988

You can find the datasheet for this device at the Sparkfun URL. See figure 4 of the datasheet for

the pin configuration. Note that a BOTTOM VIEW is given. The device only needs 3 wires: Vs,

ground, and Vout. Connect Vs to either the 3.3 or 5V pin on your Arduino Uno, connect Vout to an

analog input pin, PC0 - PC5. As noted in the datasheet, this device produces an output voltage

of 750 mV at 25oC, increasing by 10 mV/oC.

7-Segment Display - 20 mm (White)

Sparkfun 7-Segment Display COM-11408

This device has four 7-segment (+ decimal point) common-cathode display digits. See the

datasheet for the pin diagram. The recommended illumination strategy is to use 8 GPIO bits

activate led segments A-G and the decimal point, and 4 GPIO bits to enable each digit in rapid

sequence to take advantage of the retinal persistance effect.