CpE 4010 Lab 7

- Objective: To have the student experiment with Liquid Crystal Display (LCD). A water level detector will be used to generate data to be displayed on the LCD screen.

- Procedures will be highlighted in red boxes; some procedures require you to collect data for your report. Enter all required data in the appropriate field within the accompanying Datasheet. Also, be sure to enter your name at the top of the Datasheet

- Once you have completed all of the following procedures and filled in your Datasheet, upload your complete Datasheet to the "Lab 7" folder under "Assignments"

1) Browse to the following website and connect the I2C LCD1602 Module to your microcontroller.
https://docs.sunfounder.com/projects/vincent-kit/en/latest/arduino/2.9_i2c_lcd1602_module.html

2) Download the Arduino library for the I2C LCD module from D2L and add the library to your IDE.

3) Within the downloaded zip file, go to the HelloWorld folder. Copy and paste the sample code into your IDE code window, then compile, upload, and run the program. **Take a picture of the displayed text on the LCD screen and attach the image to the associated section in your Datasheet**.
Note: The brightness of the LCD backlight may have to be adjusted by manipulating the potentiometer on the I2C chip attached to the back of the LCD.

4) Modify the code to display your name on the first line and up count from 0 to 9 (reset to 0 after 0) every second and display the current count to the second line.
For references, you can check the link below for details of the LCD library:
https://www.arduino.cc/reference/en/libraries/liquidcrystal/

5) **Take a picture of the LCD screen running the modified code, and insert it into the associated section of your Datasheet.**

6) Modify your circuit by adding a Water Level Detector. For the connections VCC will be 5V and the signal will be connected to an analog input. **Take a picture of the modified circuit and insert it into the associated section of** sheet.
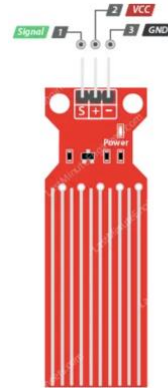
7) Modify your code to read water level value by placing your sensor inside a cup with water. Obtain measured values to determine threshold for each 1/3 of the whole sensor length to label ("Low", "Medium", "Full").
Note: Do not insert the sensor too much in water. I can cause the electronic circuitry on the sensor PCB to become shorted.)
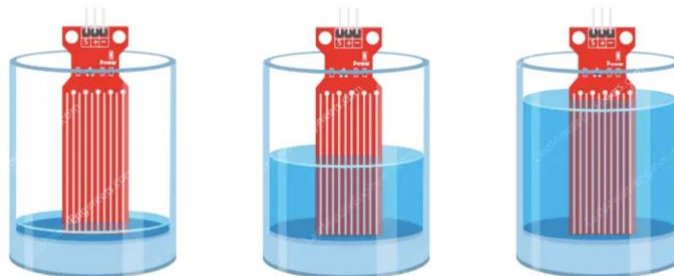
8) Update the LCD every second for the status of the water level detector. Display the corresponding label for water level in the first line of the LCD and water level reading in the second line of the LCD. If the reading is 0 (sensor is completely out of the water), display "Dry" in the LCD.

9) **Take a screenshot of your modified circuit showing readings on the display for different water levels and insert it into the associated section of your Datasheet.**

10) **Take a screenshot of your IDE code window showing your modified source code and insert it into the associated section of your Datasheet.**

11) **Write a conclusion in the "Conclusions" section of the Datasheet explaining your observations and lessons learned.**