CSE3442 (Spring 2020)
Lab #6

In this lab, you will add the ability to measure the amount of water in a container using the circuit given in class.

1. Configure the hardware as follows:
    a. Initialize the hardware to support comparator 0 with an internal reference of 2.469V and an external input, C0-, connected to the sensor capacitor as shown in the lecture.
    b. Configure the hardware to control the deintegrator (DEINT) pin on a GPO of your choice.
    c. Configure timer 1 to measure time in units of 25ns.
2. Set DEINT high.
    a. Measure the voltage across the liquid sensor capacitor. It should read around < 0.2V.
    b. Read the comparator output value register. Verify the bit is 1.
3. Set DEINT low.
    a. Measure the voltage across the liquid sensor capacitor. It should read around 3.3V.
    b. Read the comparator output value register. Verify the bit is 0.
4. To measure the liquid volume:
    a. To measure the capacitance, pull DEINT high for long enough to deintegrate the capacitor. The comparator output will read as 1.
    b. Write a 0 the timer value, set DEINT low so that the capacitor starts charging, and immediately start the timer.
    c. Poll the comparator output until the bit goes to 0 (Vcap > 2.469V).
    d. Immediately measure the timer. The value is proportional to the capacitance and the volume.
5. Put all this code into a function uint32_t getVolume() that returns the number of mL in the container.
6. Merge this function with the code from lab 5. Once the “status” command is entered, display the volume to the user.
7. Demonstrate your code and e-mail the file to the grader.