CSE3442 (Spring 2020)
Lab #7

In this lab, you will add the ability to measure the intensity of light and the moisture of the soil in a container using the circuits given in class.

1. Configure the hardware as follows:
    a. Initialize the hardware to support ADC0 to make measurements.
    b. Configure the hardware to monitor the analog input for the light sensor.
2. Expose the ambient light sensor to full direct sunlight.
    a. Measure the voltage at the analog input for this sensor.
    b. Start a conversion and read the result. Verify that the value read calculates to match the voltage read above.
3. Expose the ambient light sensor to complete darkness.
    a. Measure the voltage at the analog input for this sensor.
    b. Start a conversion and read the result. Verify that the value read calculates to match the voltage read above.
4. Write a function, float getLightPercentage() that returns the percentage of light relative to full direct sunlight. Report this value, along with the volume from Lab 6, when the status command is issued.
5. Configure the hardware as follows:
    a. Initialize the hardware to support ADC0 to make measurements.
    b. Configure the hardware to monitor the analog input for the soil moisture sensor.
6. Expose the moisture sensor to saturated soil.
    a. Measure the voltage at the analog input for this sensor.
    b. Start a conversion and read the result. Verify that the value read calculates to match the voltage read above.
7. Expose the moisture sensor to dry soil.
    a. Measure the voltage at the analog input for this sensor.
    b. Start a conversion and read the result. Verify that the value read calculates to match the voltage read above.
8. Write a function float getMoisturePercentage() that returns the percentage of moisture relative to saturated soil. Report this value, along with the volume from Lab 6 and light level in step 4, when the status command is issued.
9. Configure the hardware as follows:
    a. Initialize the hardware to support ADC0 to make measurements.
    b. Configure the hardware to monitor the battery level making sure that the voltage in the voltage divider is less than 3.3V to prevent damage to the controller.

10. Write a function float getBatteryVoltage() that returns the battery voltage. Report this value, along with the volume from Lab 6, light level in step 4, and moisture level in step 8 when the status command is issued.

11. Demonstrate your code and e-mail the file to the grader.