Objective:
Using analog to digital conversion to create a temperature sensor and a light sensor.

Summary:
In part one, we used ADCON0 and ADCON1 registers to choose which pins to use and set them to analog instead of digital.

In part two, we created a routine that starts a conversation then shifts the ADRESH before adding the ADRESL to combine them into one variable called result. We then converted the result into a voltage by multiplying the result by four millivolts per step

In part three, we converted the voltage from the previous part into a celsius by using the equation, $T = \frac{V - 1035mV}{-5.50mV/℃}$ with V being the result of part two. We then converted the celsius temperature into fahrenheit.

In part four, we separated the two digits of the fahrenheit temperature. To accomplish this, we divided the temperature by ten for the upper digit and used the modulus operator for the lower digit. We then created an array of values to output to the seven segment display. We then use the digit value as the index for the array for both digits.

In part five, we set up teraterm to display the voltage of the photoresistor, the voltage of the temperature sensor and the temperature value. We used this to debug the code and ensure the hardware was working properly.

In part six, we programmed RGB LEDs to display colors based on the voltage level of the photoresistor and the temperature value. To accomplish this we used routines for every color and every RGB LED that would set the bits to match each color. We then used if else statements to set the RGB LEDs to the right color.

Data Collected:

Conclusion:
Analog to digital conversion is an effective way to interact with peripheral devices like a temperature sensor or photoresistor. Understanding how to leverage the ADCON0 and ADCON1 to set pins to be analog instead of digital is an important step to completing this lab. An

understanding of unit conversion is also very important to complete this lab. Using Teraterm to help debug the circuit was a very helpful strategy that helped us properly diagnose issues.