CS 3651: Photocell Sensing (Voltage Divider) Lab

Name(s): _____

Learning Objectives:
1. Measuring resistance
2. Applying knowledge about how voltage divider circuits work.
3. Develop familiarity with photoresistors.

Step 1: You have been given a photo-resistor with unknown (to you) specifications. A photo-resistor (also known as a light dependent resistor) changes its resistance based upon the amount of light it is currently receiving. Measure the minimum and maximum resistance of your photo-resistor.

Your Photo-Resistor Minimum Resistance: _____
Your Photo-Resistor Maximum Resistance: _____

Step2: You will now make a voltage divider using your provided photo-resistor and a standard resistor that you select yourself. You will tie the middle of your voltage divider circuit to an analog input pin on your USB Bitwacker, and you want the voltage levels to have a good range.

What general ohm rating should your resistor be?

Explain why?

Value of the resistor you chose to use:

Color Bands: _____

Rated Ohms: _____

Measured actual Ohms: _____

Step 3: Connect the top of your voltage divider to the Vcc pin on your UBW. Connect the bottom of your voltage divider to the ground (GND) pin. Tie the middle of the voltage divider to an analog input pin.

Step 4: Connect your UBW to your computer. Use a terminal to set your chosen pin to work as an analog input. Measure the minimum and maximum analog value that you are able to achieve using your photo-resistor as a sensor. (Cover it with your finger, and hold it up to a window for the best range.)

Smallest Analog Reading: _____   Largest Analog Reading: _____

Assuming that 4096 corresponds to 5v, and 0 corresponds to 0v, and the analog to digital sensing circuit in the PIC has a linear response curve, what voltage levels do the above readings correspond to? Show your work:

Low Voltage: _____   High Voltage: _____

Step 5: Measure (using your multimeter) the actual voltage level at the middle of your voltage divider circuit when you are covering the sensor and when you are holding it up to a window or a light.

Measured Low Voltage: _____   Measured High Voltage: _____

(You may want to confirm the analog readings using the "A" command at the same time you measure with the multimeter.)