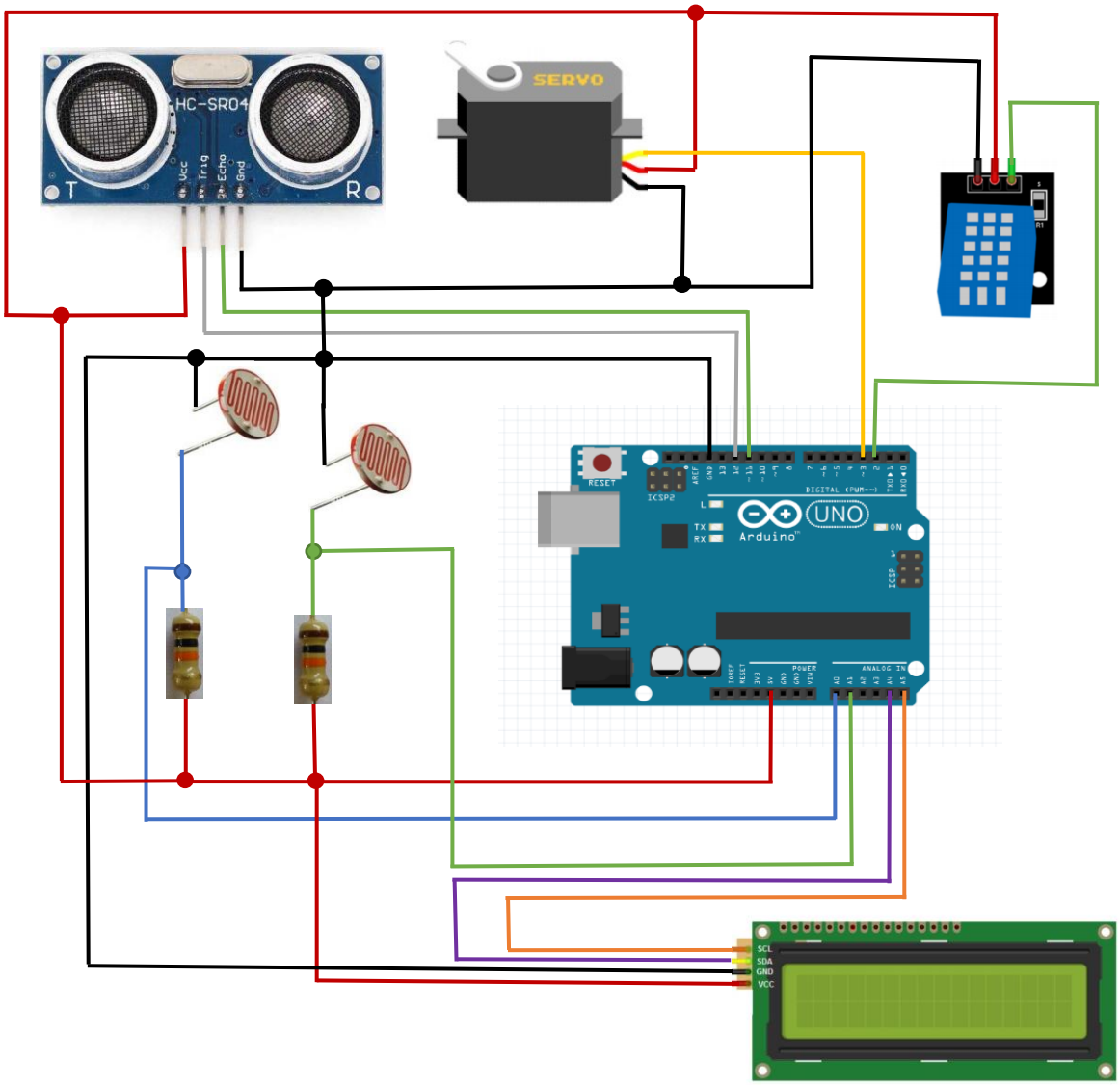
Arduino Project: “Smart-Solar-Panel”

For the source sketch code and more details of the project go to:

https://github.com/Alfredo-Vargas/smart-solar-panel

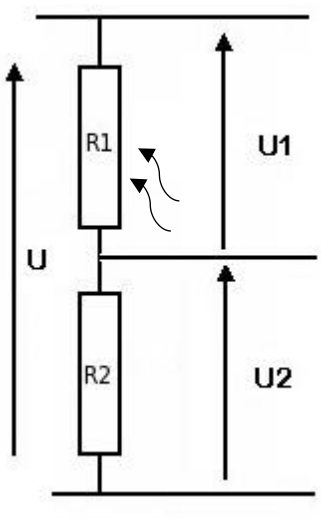
The circuit diagram of the project looks as follows:



Methodology: We need to characterize the LDR properties to proper reading of the lux:

1. First, we will build a lux meter to measure the light intensity in a room using the LDR sensor. We will follow a procedure mentioned in the following website: https://jxxcarlson.medium.com/measuring-light-intensity-with-arduino-a575765c0862
   1.1. To build a lux meter, we need to obtain the phenomenological parameters of our LDR sensor.
   The physical equation that relates the lux and the resistance of the LDR is given by:

   $L = B R^m$,
   where B and m are going to be determined empirically using a voltage divider such:



   where R1 is the LDR resistance and R2 is a constant resistor of 100 000 Ohms.

   By changing the light source intensity and using and app with your cellphone (to determine the light lux) we can determine the light lux (intensity) and the voltage U2. Then, with these two information's one can obtain the B and m values of logarithm equation:

   $\text{Log}(L) = B + m\ \text{Log}(R)$.

   Then using linear regression we would determine the coefficients B and m or our LDR sensor.
2. Integrate, the servo motor and a ultrasound sensor to the project will allow us to associate displacement changes to lux changes, and in this manner we will be able to determine the direction of the light source.

3. Relevant information such as lux average from the LDR's, temperature and humidity measurements from the DHT11 are being displayed in a LCD attached to the Arduino Uno.

LDR characterization:

4,9	120		3,30980392	2,079181246
4,89	105		3,352083826	2,021189299
4,87	79		3,426414391	1,897627091
4,85	66		3,49034952	1,819543936
4,79	43		3,641883781	1,633468456
4,7	27		3,805023397	1,431363764
4,66	22		3,863093	1,342422681
4,56	17		3,984487834	1,230448921
4,3	5		4,211629584	0,698970004