Gilberto Croes
Marla Gracia
Maria Talavera
Cassandra Trimon

Parameter: Luminance

Luminance (lux)

The lux is the international system of unit derived of illuminance and luminous emittance, measuring luminous flux per unit area. When it increases means there is more light. When it decreases means there is less light. It is important to measure light for safety reasons with road lighting. In order to determine adequate brightness of lighting along roads precisely, instruments such as luminance and illuminance meters are used. [1] [2]

[1] http://sensing.konicaminolta.asia/2015/04/why-measure-light-and-color/
[2] https://en.wikipedia.org/wiki/Lux

Standard Values LUX [3]

Illuminance (lux)	**Surfaces illuminated by**
0.0001	Moonless, overcast night sky (starlight)
0.002	Moonless clear night sky with airglow
0.05 - 0.36	Full moon on a clear night
3.4	Dark limit of civil twilight under a clear sky
20 - 50	Public areas with dark surroundings
50	Family living room lights (Australia, 1998)
80	Office building hallway/ toilet lighting
100	Very dark overcast day
320 - 500	Office lighting
400	Sunrise or sunset on a clear day
1,000	Overcast day; typically TV studio lighting
10,000 - 25,000	Full daylight (not direct sun light)
32,000 - 100,000	Direct sunlight

[3] https://en.wikipedia.org/wiki/Lux

Code

```
/* Photocell simple testing sketch.

Connect one end of the photocell to 5V, the other end to Analog 0.
Then connect one end of a 10K resistor from Analog 0 to ground
```

```
Connect LED from pin 11 through a resistor to ground
For more information see http://learn.adafruit.com/photocells */

int photocellPin = 0;     // the cell and 10K pulldown are connected to a0
int photocellReading;     // the analog reading from the sensor divider
int LEDpin = 11;          // connect Red LED to pin 11 (PWM pin)
int LEDbrightness;        //
void setup(void) {
  // We'll send debugging information via the Serial monitor
  Serial.begin(9600);
}

void loop(void) {
  photocellReading = analogRead(photocellPin);

  Serial.print("Analog reading = ");
  Serial.println(photocellReading);     // the raw analog reading

  // LED gets brighter the darker it is at the sensor
  // that means we have to -invert- the reading from 0-1023 back to 1023-0
  photocellReading = 1023 - photocellReading;
  //now we have to map 0-1023 to 0-255 since thats the range analogWrite uses
  LEDbrightness = map(photocellReading, 0, 1023, 0, 255);
  analogWrite(LEDpin, LEDbrightness);

  delay(100);
}
```

Lux levels at the University of Aruba

01. 1012	21. 1012	41. 1018
02. 1012	22. 1013	42. 1018
03. 1012	23. 1014	43. 1018
04. 1012	24. 1015	44. 1018
05. 1012	25. 1017	45. 1018
06. 1012	26. 1017	46. 1017
07. 1011	27. 1018	47. 1018
08. 1012	28. 1018	48. 1018
09. 1011	29. 1016	49. 1016
10. 1012	30. 1018	50. 1018
11. 1012	31.1017	51. 1017
12. 2012	32. 1017	52. 1018
13. 1012	33. 1018	53. 1018
14. 1012	34. 1018	54. 1017
15.1011	35. 1017	55. 1018
16. 1011	36. 1016	56. 1018
17. 1011	37. 1017	57. 1018
18. 1011	38. 1018	58. 1018
19. 1012	39. 1018	59. 1016
20. 1011	40. 1018	60. 1012

61. 1012	65. 1012	69. 1013
62. 1012	66. 1012	70. 1012
63. 1012	67. 1012	71. 1013
64. 1010	68. 1013	72. 1013

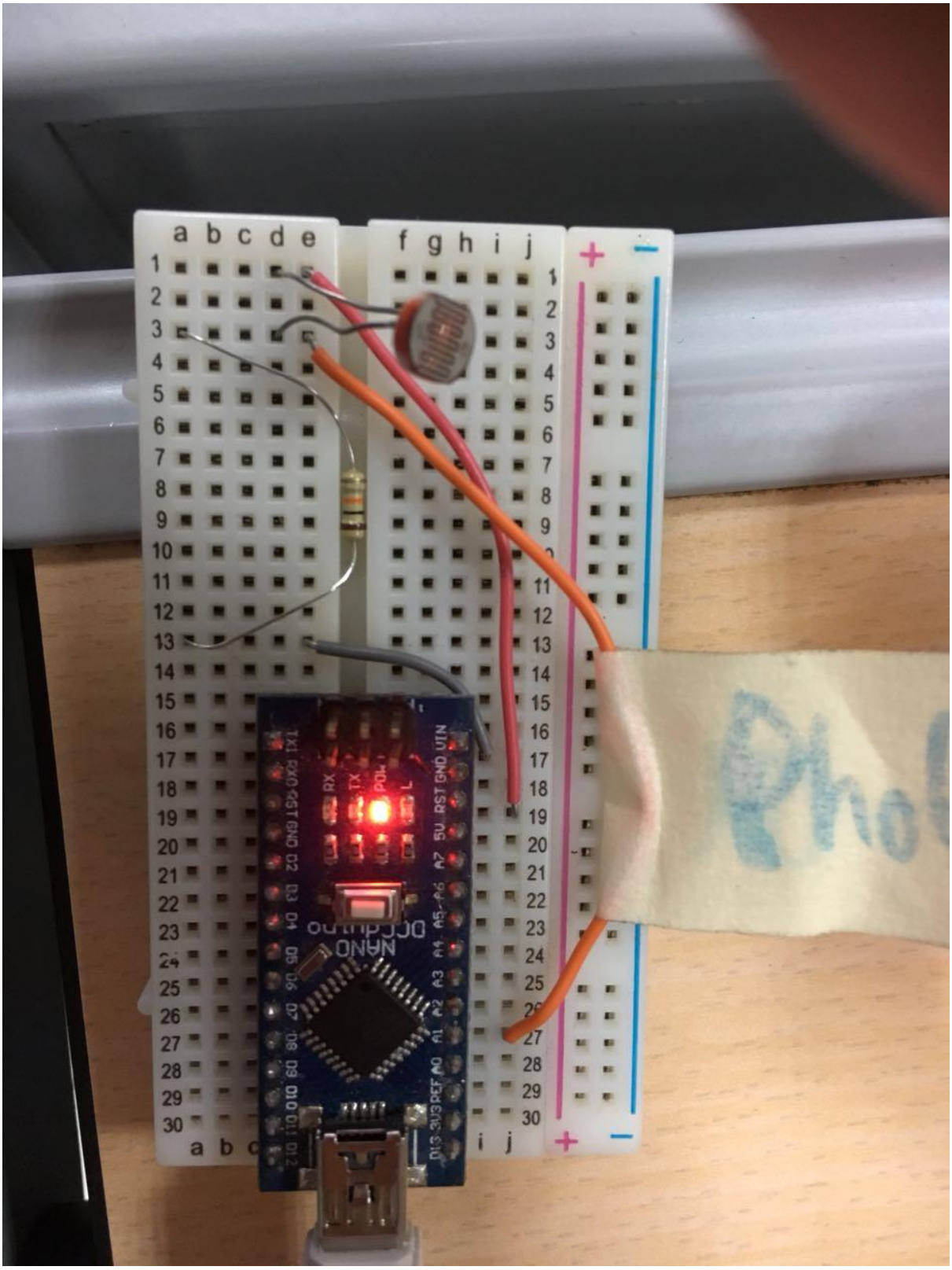
The Sensor

How we used the sensor.
We turned on the Arduino after the sensor was programmed, we plugged the sensor into the computer and ran the arduino software, then pressed tools, and we pressed serial monitor, and a tab opened and the measurements started coming in.

How our sensor works. [4]
Photocells are sensors that allow you to detect light. They are small, inexpensive, low-power, easy to use and don't wear out. They are often referred to as CdS cells (they are made of Cadmium-Sulfide), light-dependent resistors (LDR), and photoresistors. A photocell's resistance changes as the face is exposed to more light. The less light the photocell receives the lower the lux and more it receives the higher the lux. Photocellsare not sensitive to all light. Therefore, they shouldn't be used to try to determine precise light levels. Because photocells are basically resistors, they are non-polarized. That means you can connect them up 'either way' and they'll work just fine! Photocells are pretty hardy, you can easily solder to them, clip the leads, plug them into breadboards, use alligator clips, etc. Photocells are important because their versatility allows them to detect all kinds of light in all kinds of conditions. They can be used to convert light energy into electrical energy. Measuring lux is the only way to know if the lighting fixtures are performing as expected in anyway. Light measuring is a must do both in general and horticultural lighting.

[4] https://learn.adafruit.com/photocells/overview

Simulation link: https://www.tinkercad.com/things/kkPQQ7xxdIi-stunning-hango-albar/editel?tenant=circuits


a b c d e
f g h i j
NANO