🏆 A.1.2 Photo Resistive Sensor

Objetive

Make a light meter sensor (lux) through an electronic circuit, using a simulator, and an LDR (Light dependent Resistor).

✏️ Development

1. Use the following list of materials to do the activity and add in the sources consulted column your bibliographic link.

Quantity	Description	Reference source
1	2M LDR Photoresistance Sensor	Photoresistance
1	1K Resistance	Resistance
1	5v power supply	Power supply

2. Considering that the LDR element is a photoresistive sensor, that is, its resistance varies based on the amount of light that falls on it, what do you see in the following graph?


Grafic

A: it's seen that the resistance in the photoresistor:

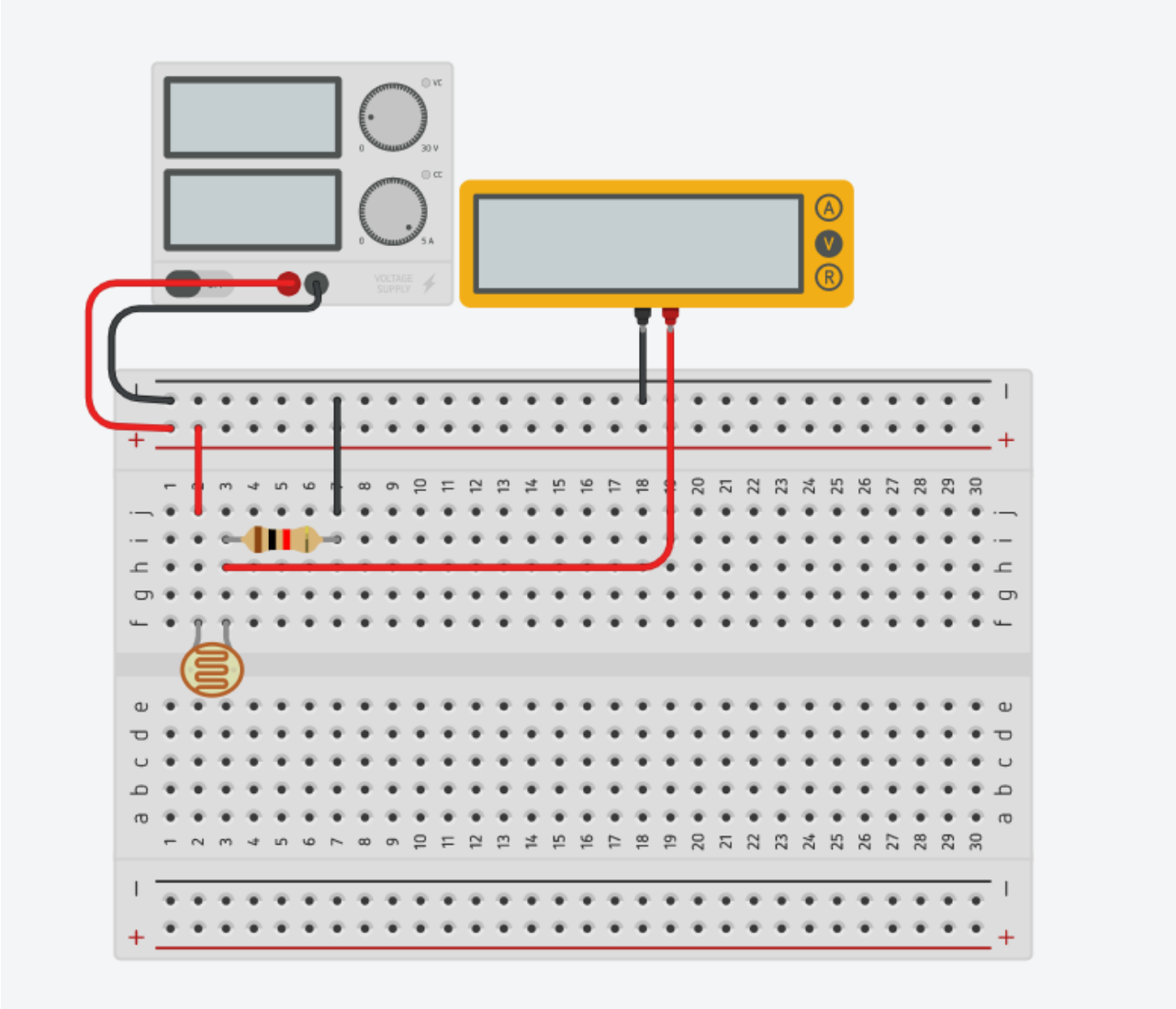
- **decreases as the light level increases**
- **increases as the light level decreases**

That is to say, the more light the photoresistor receives, the less resistive it becomes

3. Assemble the circuit shown using the simulator of your consideration, placing the photoresistor in the LDR position and the resistor according to the schematic:


Grafic2

4. Place the obtained image of the assembled circuit inside your simulator.



5. ~~Measure the **resistance** of the photoresistor with the ohmmeter under the following conditions: absence of light or darkness, ambient light, intense light.~~

6. ~~Calculate the **theoretical Vout voltage value** for each condition.~~

7. Measure the Vout voltage value for each condition;

8. Calculate the accuracy value of voltage between the theoretical estimation and the measured value for each condicion, consider including in this section an explanation of the obtained calculations.

A: For each condition, we divided the voltage we measured using tinkercad by the theoretical value we obtained using the voltage divider formula and then we multiplied that result by 100 to get a percentage instead of a decimal value.

9. Measure the resistance of the photoresistor with the ohmmeter under the next conditions: absence of light or darkness, ambient light and intense light, register the measurements in the corresponding table.

10. Calculate the theoretical Vout voltage value for each of the conditions mentioned before just as the measured Vout voltage value, and register the results in the corresponding table.

11. Calculate the accuracy value between the theoretical and measured values for each condition, register the results in the corresponding table.

Condition	**Impedance in photoresistor**	**Theoretical Vout voltage**	**Measured Vout voltage**	**%Measured V. / Theoretical V.**
Absence of light	180K Ohms	0.027 V	0.027 V	100%
Ambient light	944 Ohms	2.57 V	2.66 V	103.5%
Intense light	506 Ohms	3.52 V	3.52 V	100%

12. Plot a graph using the values registered in the previous table, where the x axis is the measured Vout voltage, and the y axis represents the impedance of the photoresistor LDR, insert the graph here.

13. Insert photo evidence of the team meetings during the elaboration of this activity.
14. Write an individual conclusion and observed results during the elaboration of this activity.

Conclusions

Edgar Regalado

In this activity i learned that the behaviour of resistance in a photoresistor is exponential, in a decay maner, so the highest resistance point is very high, it was 180,000 Ohms in the simulator, but then the lowest point was weirdly low at only 506 Ohms, that's almost 400 times less than the highest point, i would never have imagined that the behaviour was exponential and not linear. I would also like to add that the accuracy is weirdly high, i think this is because the simulator calculates values using math with zero randomness, while in real life the accuracy must vary more.

Erick García

With this practice I understood how LDR works, the more light there is, the less resistance there's in the light dependent resistor. It is a interesting way to interact with electronic components and see how it varies.

Mauricio Navarro

With the development of this practice it can be evidenced what was known theoretically, that the photoresistor is an electrical component whose resistance varies according to the light conditions it is exposed to. Carrying out this activity collaboratively represents a challenge due to the learning curve when

using new tools that allow us to work in this way, however it can be concluded that the objective of the activity was met.

Jose Gerardo Ramirez

In this practice we used a photoresistor as a main component, while it detects less light, more resistance opposes in the circuit. In the beginning i thought it would work in reverse, we included the theoretical calculations using the marked formula in the document. Finally we compared the results with the new results that we got from the circuit and we chart it.

💣 Rubric

Criteria	Description	Score
Instructions	Is each of the points indicated in the Instructions section met?	10
Development	Was every solicited point answered in the development of the activity?	60
Demonstration	Is the student present during the explanation of the functionality of this activity?	20
Conclusions	A personal opinion of the activity is included for each of the team members?	10

My Github