Don Bosco Technical College
City of Mandaluyong
Mechanical Engineering Program

Basic Electronics (BELECS)
2nd Semester, AY 2022-2023

Laboratory Project Report
Laboratory Project - Simple Darkness Sensor

”We certify that we have worked on this activity and completed it on our own and that we have neither copied the work of any other student nor have we concealed any violation of the Honor Code. We will receive a grade of 5.0 (FAIL) for the course and be subject to disciplinary action if we fail to honor this code.”

2 - ME
Wednesday, 1:00-4:00pm

BERGONIO, Carl Patrick F.	(25%)	
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Date performed: May 3, 2023
Date submitted: May 10, 2023

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Instructor

To be filled up by the instructor

Comments	Particulars	
	Theory	:
	Date	:
	Analysis	:
	Conclusion	:
	Form	:
	RATING	:

I. Objectives

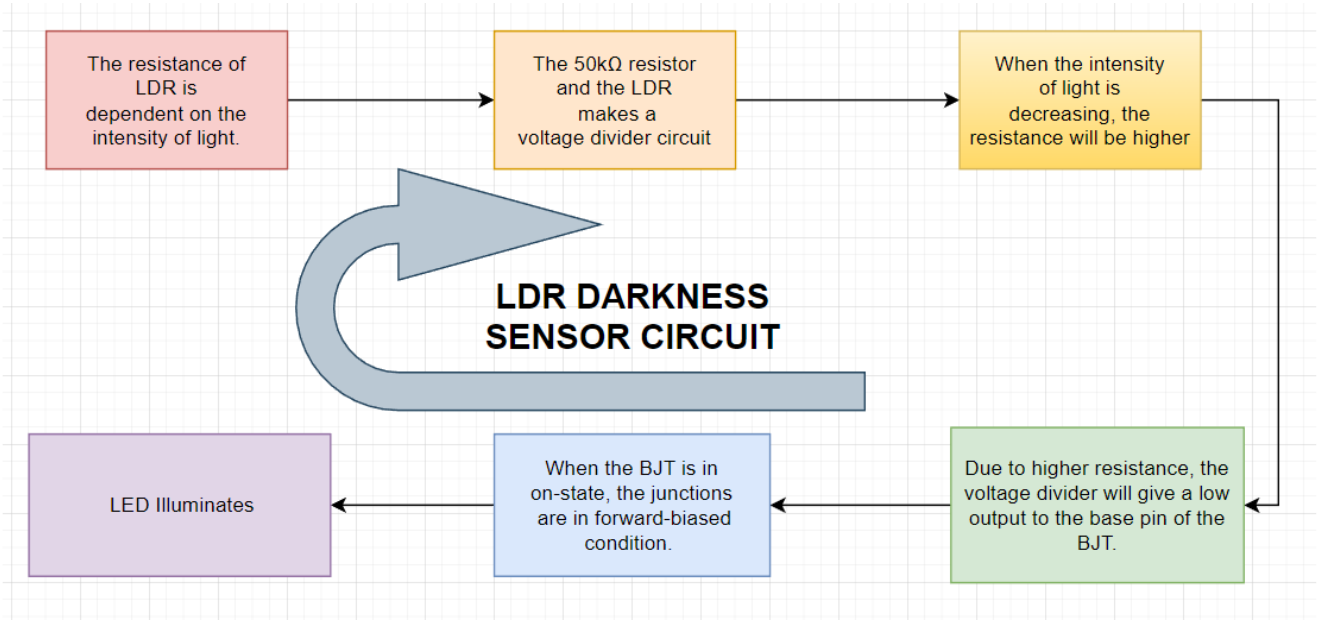
The main component of our project, Simple Darkness Sensor, is a photoresistor, also known as a light dependent resistor. This type of resistor is capable of detecting the presence and absence of light and also gauge the strength of the light. With the help of this and other circuit components, this project aims to show how simple circuits work using basic components. The project aims to show the capabilities of a LDR in a circuit. The project mimics everyday objects such as lamp posts used in communities due to the students aim to relate the project to real life situations.

II. Features

Light dependent resistor is a kind of resistor whose resistance changes depending on the quantity of light hitting it. The semiconductor in the LDR absorbs light photons as they strike it, which gives the bound electron the energy it needs for transport to the conductive band. Therefore, the LDR has more free electrons accessible, making it more conductive and causing a decrease in LDR resistance while when it lacks light, its resistance increases.

In this LDR circuit, the white LED will not produce light when light strikes on the LDR. It is because all the current is passing through from the two parallel 100k Ohms resistors and the LDR. The white LED will produce light when insufficient light strikes the LDR, or simply when it is dark or no light at all. In this state, the resistance of the LDR gradually increases causing the current to pass through to the BC547 Transistor which makes the LED light up.

III. Block Diagram



II. Equipment and Circuit Components

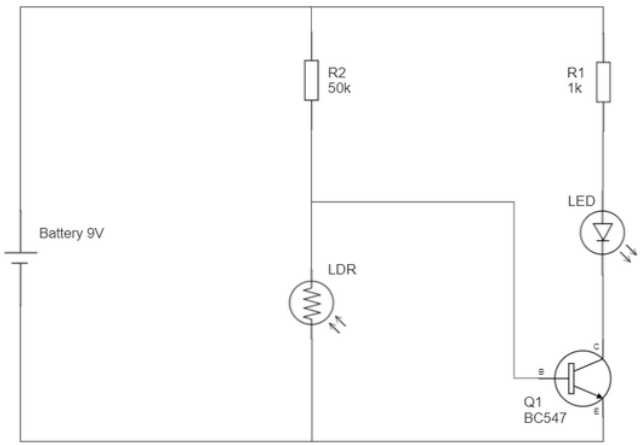
Equipment and Accessories

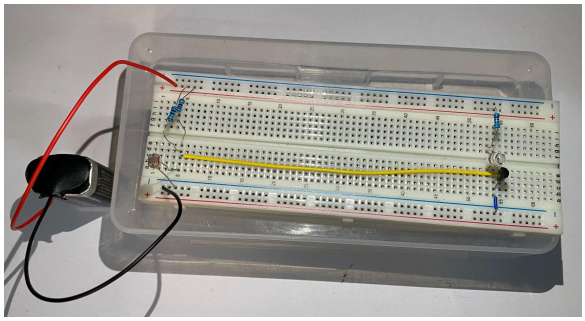
1. Breadboard
2. Connecting wires

Components

1. 2 x 100kΩ Resistors
2. 1kΩ Resistor
3. Light Dependent Resistor / Photoresistor
4. 9V Battery with Connector
5. BC547 Transistor
6. White LED

IV. Set-up/Schematic drawings

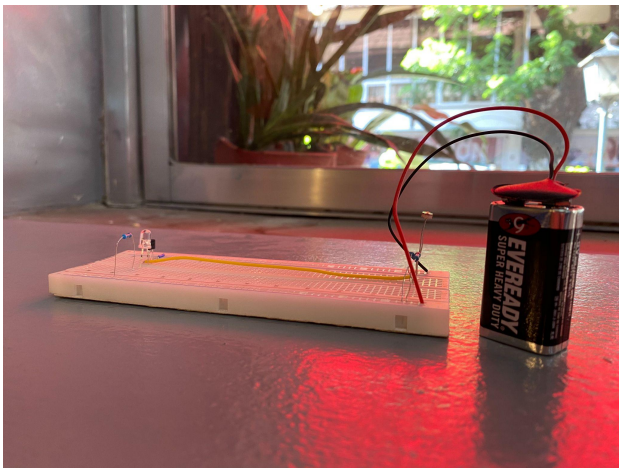


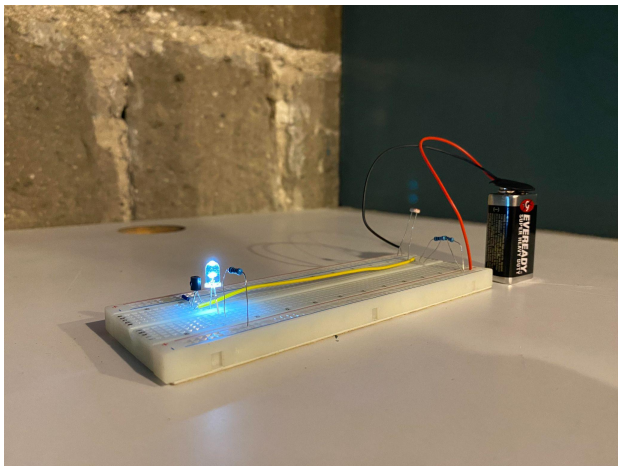


V. Procedures

1. Insert the Light Dependent Resistor on the Breadboard while one leg is in the negative side of the Breadboard.
2. Attach in the same row the 2 100k Ohm resistor and put them in parallel with each other. Attach their other leg in the positive side of the breadboard
3. Attach in the same row a connecting wire
4. Attach the BC547 transistor and connect the other end of the wire in the same row as the base of the transistor.
5. Attach the negative leg of the LED in the same row as the collector part of the transistor.
6. Attach the 1k ohm resistor in the same row with the LED and the same positive column as the 2 100k ohm resistor.
7. Attach a connecting wire at the same row as the emitter part of the transistor and the other end attached to the same negative terminal as the light dependent resistor.
8. Connect the black wire of the battery connector to the negative side of the circuit and the red wire to the positive side of the circuit.

VI. Results





VII. Analysis and Discussion

A Light Dependent Resistor(LDR) sensor circuit is used to detect and measure the intensity of light in its environment. The sensitivity of the LDR sensor is determined by the range of light that intensities when detected. The sensor also has high resolution and is able to detect smaller changes in light intensity. It is configured as a voltage divider with LDR and fixed bias resistor connected in series between the power supply and ground. The behavior of an LDR circuit can be complex and may vary depending on factors such as the properties of the LDR, the circuit configuration, and the application of requirements. However it is a powerful tool for detecting and responding to changes in light intensity.

VIII. Conclusion

Our LDR sensor circuit is a simple and inexpensive way to detect and measure the intensity of the light. It is a useful and versatile tool for detecting changes in light intensity and can be easily integrated into a wide range of electronic projects.

References:

Photoresistor. EEPower. (n.d.). Retrieved from https://eepower.com/resistor-guide/resistor-types/photo-resistor/#

Sandeep. (2021, March 13). *LDR Darkness Sensor Circuit*. Electric Diy Lab. Retrieved from https://electricdiylab.com/ldr-darkness-sensor-circuit/