

Smart Home Automatic Alarm and Light Switch

Electronic Circuit Lab Final Project

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Presentation Outline

- Introduction
- Theoretical Background
- Research method
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- Discussion
- Conclusion



Introduction

BACKGROUND

Many of us **struggle getting up** in the morning after a long night

Many of us also like to **forget to turn on our alarms** for the morning

which in turn, makes us come late at classes and messes up our schedule

Hence, there is a necessity for a solution capable of waking us up by acting as **an automatic alarm and light switch.**

RESEARCH PURPOSE

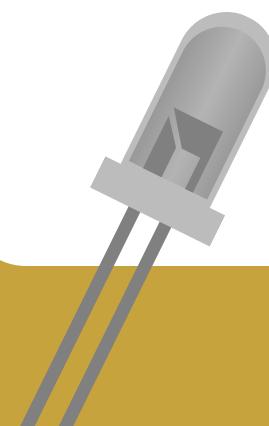
During this project we researched on the **practical use of Operational Amplifiers, Bipolar Junction Transistors, Diodes, as well as Photodiodes to implement it on our circuit**

Theoretical Background

Diode

Implementation: Serves as room lighting in the form of a white LED

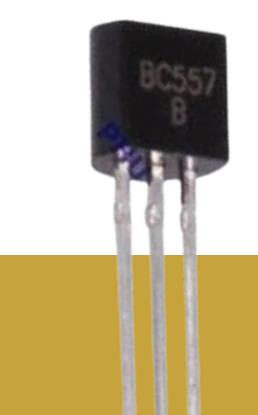
Role: Illuminates the room upon circuit activation in response to detected external light



BJT

Implementation: Acts as an amplifier

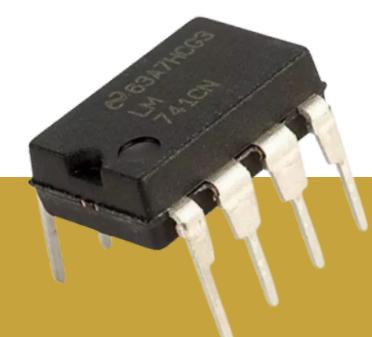
Role: Amplifies the signal from the Light Dependent Resistor (LDR) upon detecting external light, the amplified signal is then continued to the Op-Amp for switching



Op-Amp

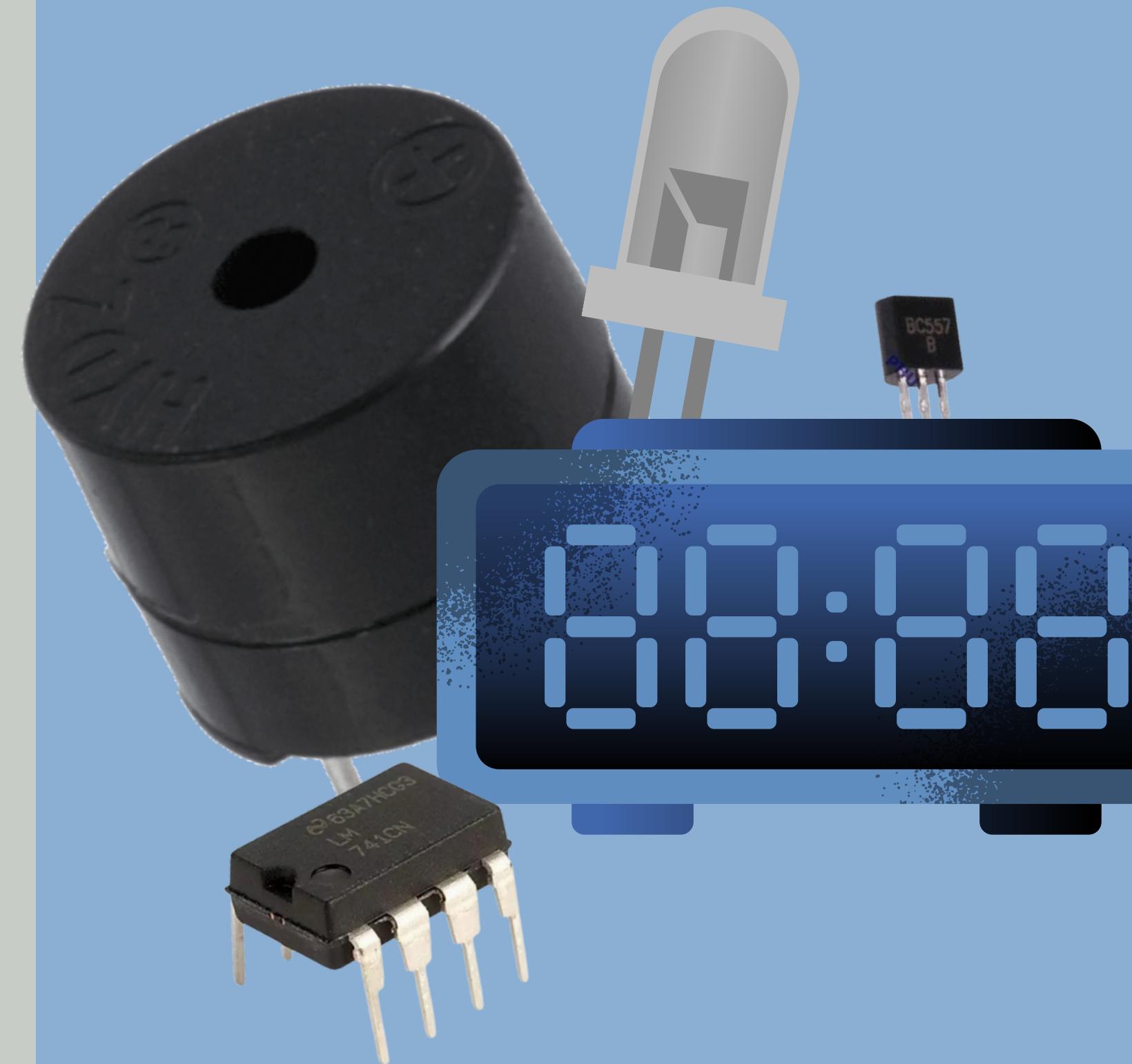
Implementation: Functions as a comparator and switch

Role: Compares the voltage from the LDR with a reference voltage, serving as a switch that triggers the activation of both the LED for room lighting and the alarm in response to detected light



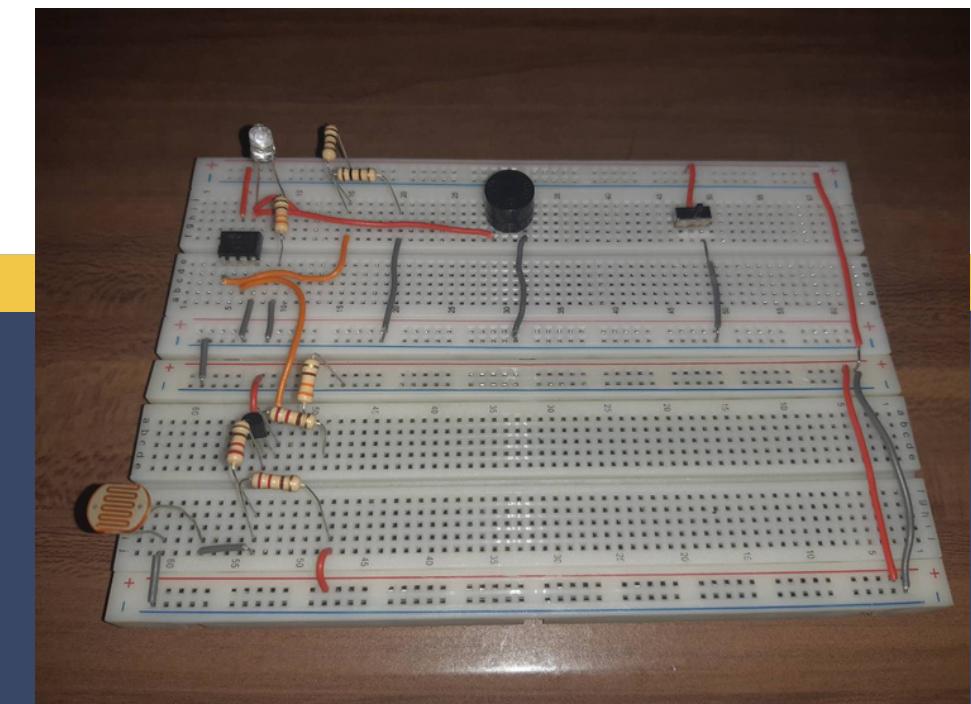
RESEARCH METHOD

The methods we use in this research are **development research methods** and **experimental research methods**. We use developmental research methods as the basis of our project to find out and test whether conventional alarms can be made more efficient in their use so that they can contribute to energy savings. And we also use experimental research methods to test how the alarms and LEDs we make can work.

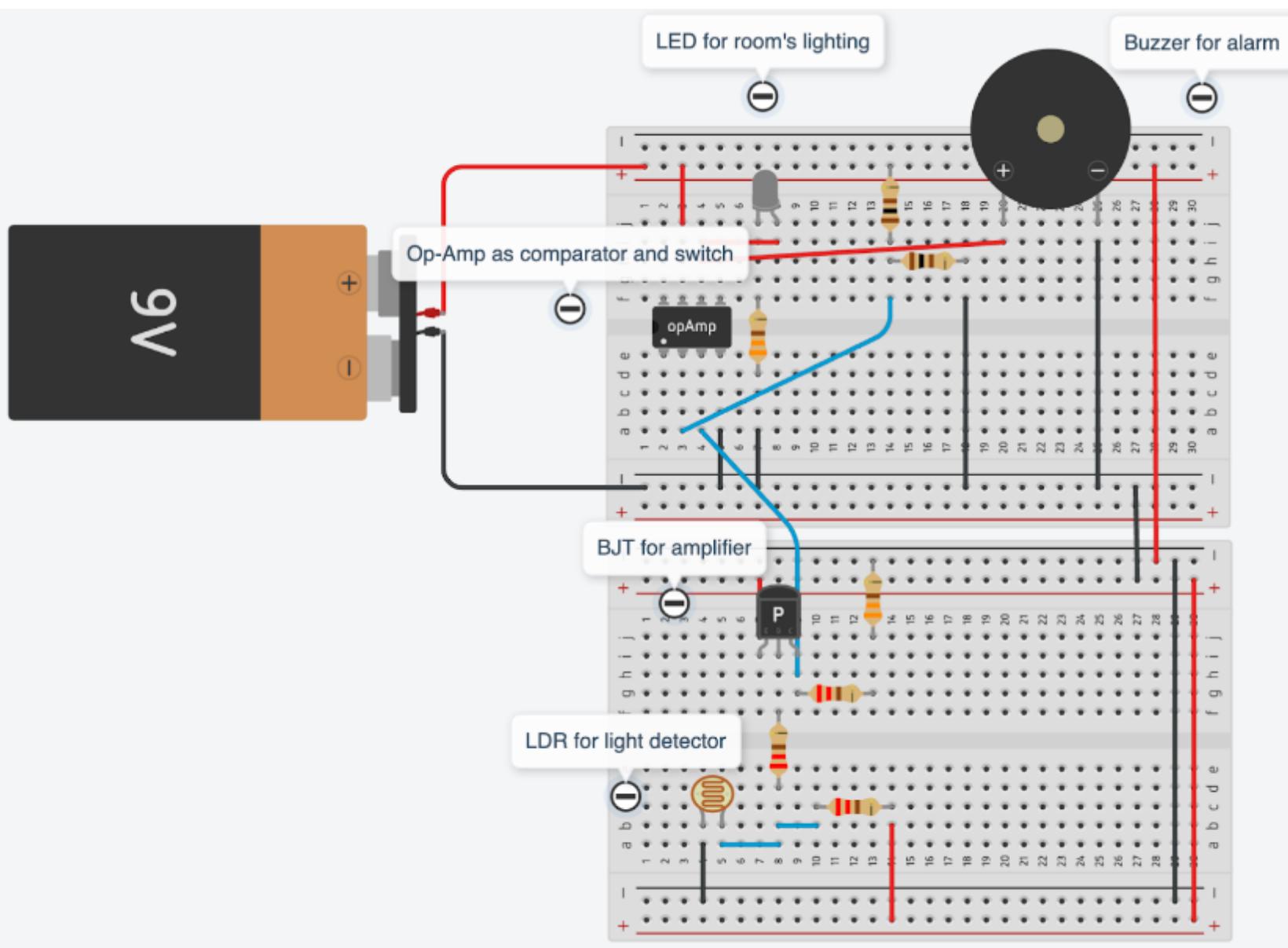


RESEARCH RESULT

The results of our research confirm that the LED and alarm components are **operating as intended**. The result is consistent with fundamental theories of transistors and related components, suggesting that our methodology was compliant with accepted theories. As a result, our research indicates that these effective implementations may be able to result in **energy savings**.



What happens in a circuit?



Photoresistor (LDR): Sensitive to ambient light conditions, facilitating morning sunlight detection.

LED and Buzzer: Visual and auditory cues for alarm activation.



Voltage Divider: Comprising two 100-ohm resistors, establishes a 4.5-volt reference for precise thresholding.



Op-amp: Comparator

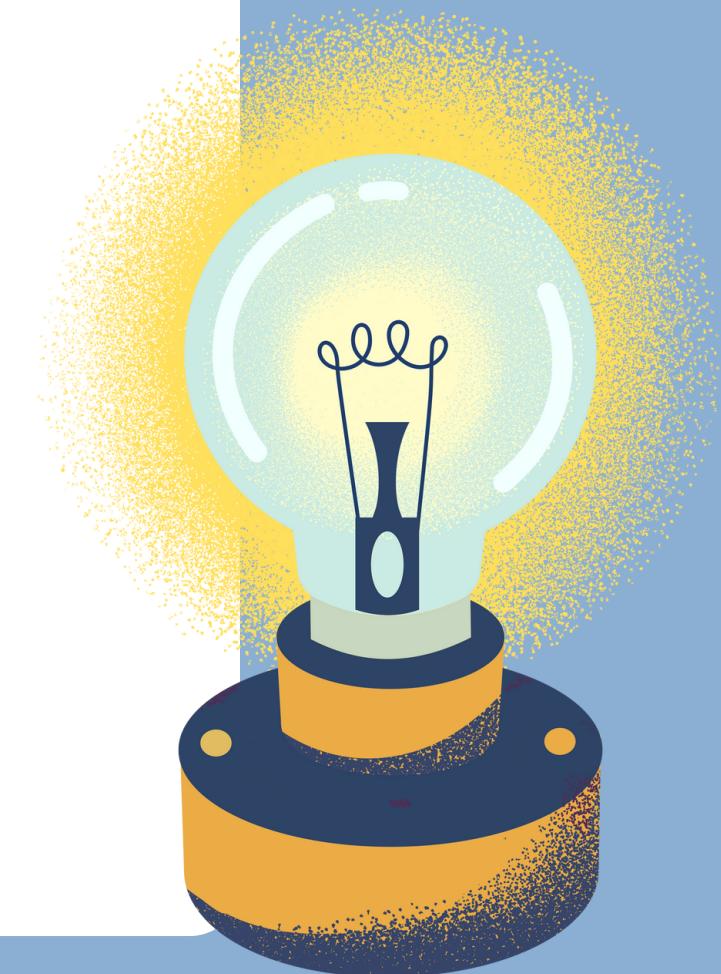


PNP BJT: amplify the circuit.



Conclusion

- Smart Home Automatic Alarm and Light Switch provides users to optimize energy use and streamline morning routines for a more efficient lifestyle through smart city applications.
- Focuses on college students, automating wake-up schedules to address issues with alarm clocks and sleep deprivation.
- The Smart Home Automatic Alarm and Light Switch goes beyond basic features by highlighting the substantial potential for sustainability and energy conservation.





THANK YOU!