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Temperature Controlled LED

Temperature Controlled LEDs using LM35

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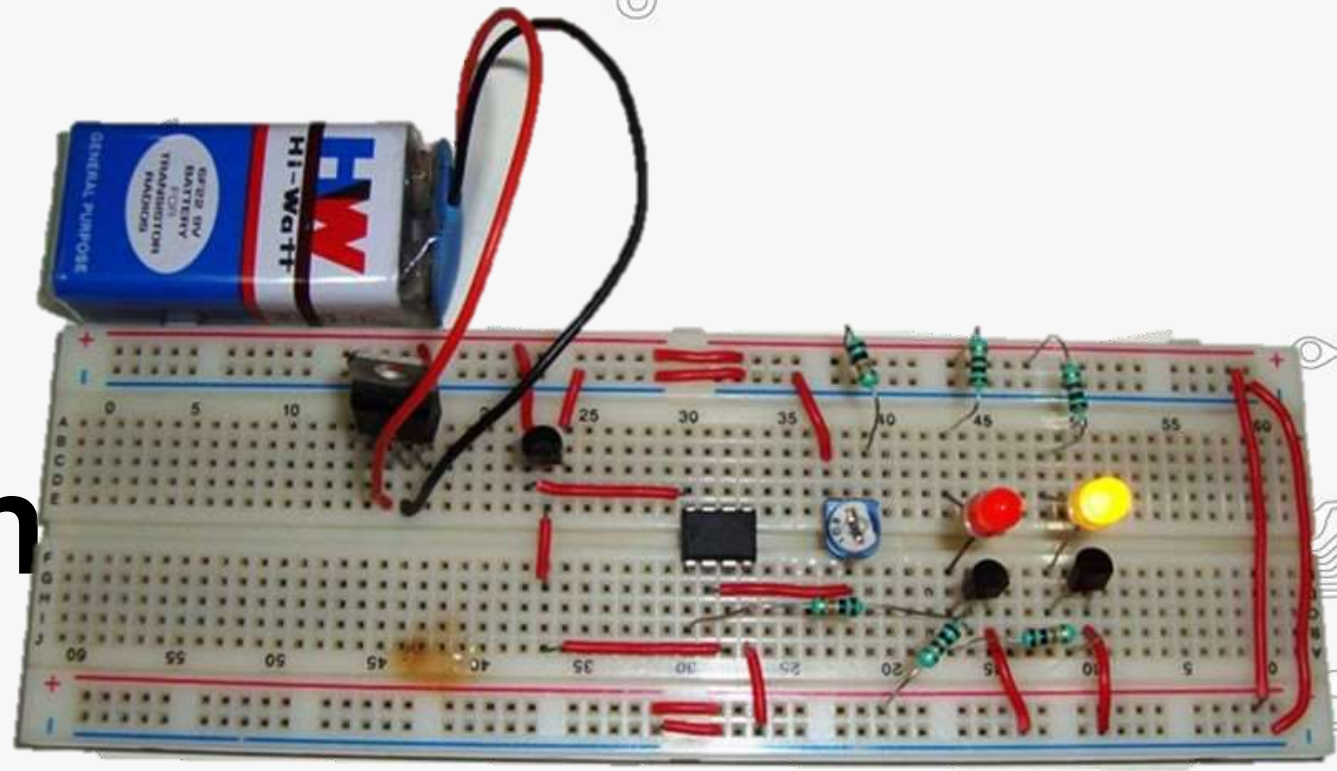
Introduction

Automatic counting



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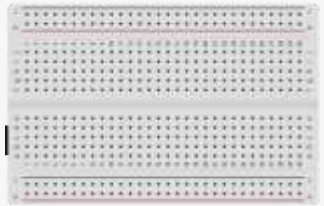
About Project

- In this project, we are going to control the LEDs according to temperature around.
- If temperature goes beyond a particular level (50 Degree in this circuit) then Red LED will glow automatically, otherwise yellow LED remains on below that particular temperature.
- This threshold temperature value can be set by adjusting the Variable resistor in the circuit, according to requirement.
- In this project you will also learn about how to use LM35 sensor in any circuit.
- LM35 is very popular and inexpensive temperature sensor generally used as digital thermometer or to measure temperature.

Required Components

- Breadboard
- Resistor
- Snap Connector
- LED
- LM35
- LM358 IC
- BC548/547 Transistor
- Jumper Wires
- Battery 9v
- 7805 IC
- 10k Potentiometer



Breadboard

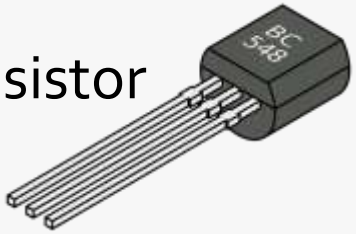
Resistor

Snap Connector

LED

LM35

LM358 IC



BC548/547 Transistor

Jumper Wires

Battery 9v

7805 IC

Potentiometer

Project Working

- In this circuit 9v general purpose battery is used to power up the whole circuit and IC7805 is used to provide the regulated 5v supply to the circuit. When temperature is below 50 degree then output of LM358 remains LOW and Q1 remains in OFF state and transistor Q2 remains in ON state.
- Now when surrounding's temperature goes beyond 50 Degree Celsius, output voltage of LM35 at pin 2 also goes higher than 0.5 volt or 500mV.
- Output of LM35 is connected to Pin 3 of Op-amp LM358 and as we have set the reference voltage (voltage at Pin 2 of LM358) to 0.5 volt, so now voltage at Pin 3 (non-inverting input) becomes higher than voltage at Pin 2 (inverting input) and output of op-amp LM358 (PIN 1) becomes HIGH.
- Output of LM358 connected to the base of NPN transistor Q1, so Q1 also becomes ON and Red LED starts glowing. At the same time, base of Transistor Q2 gets ground and Q2 becomes OFF and yellow LED also becomes OFF.

LM35 Temperature IC

- LM35 is an integrated analog temperature sensor whose electrical output is proportional to Degree Centigrade.
- LM35 Sensor does not require any external calibration or trimming to provide typical accuracies.
- The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

LM358

- The LM358 IC is a great, low power and easy to use dual channel op-amp IC.
- It is designed and introduced by national semiconductor. It consists of two internally frequency compensated, high gain, independent op-amps.
- This IC is designed for specially to operate from a single power supply over a wide range of voltages.

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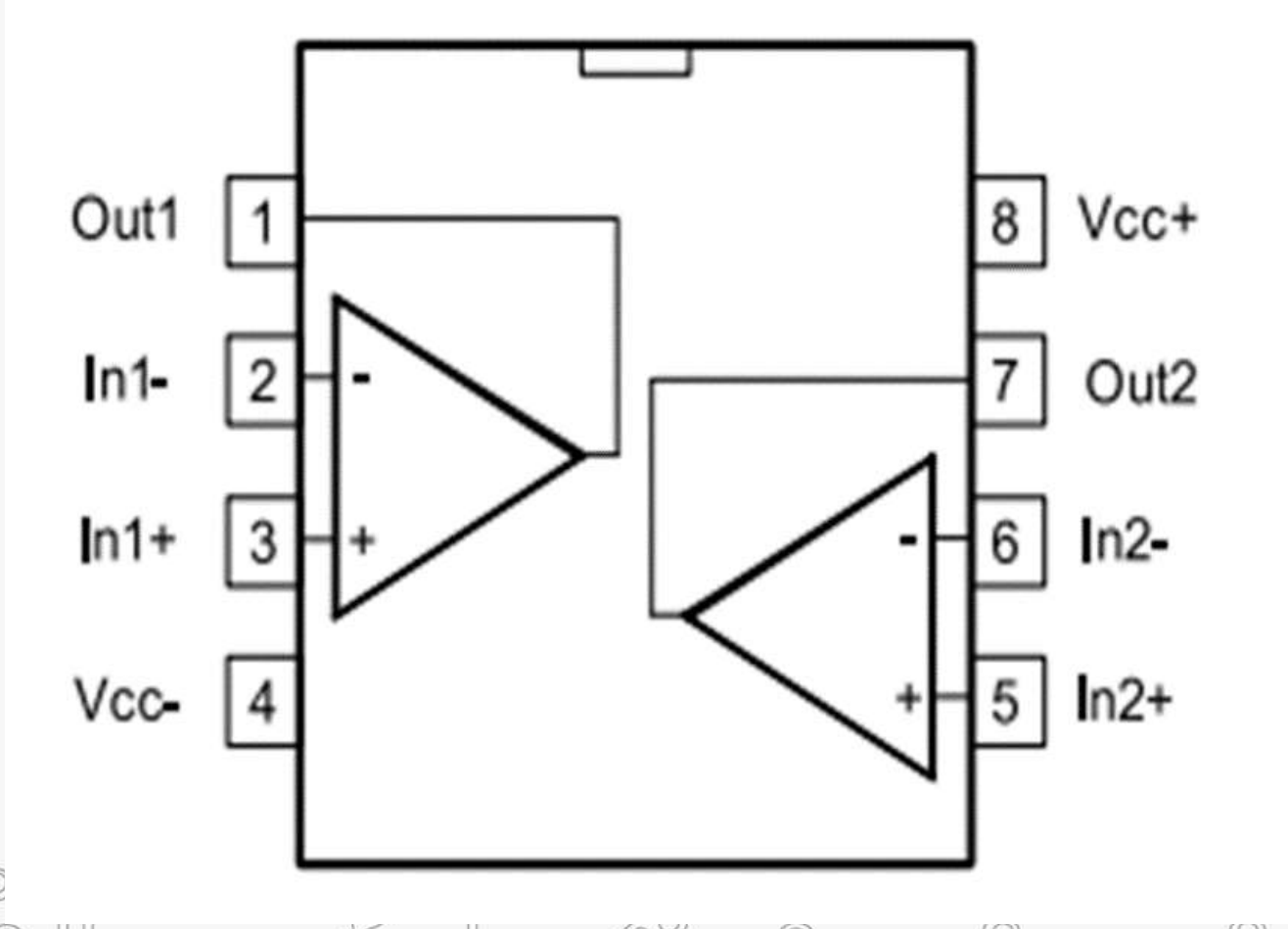
LM358 Pin Diagram



LM7805

- Voltage sources in a circuit may have fluctuations resulting in not providing fixed voltage outputs.
- A voltage regulator IC maintains the output voltage at a constant value.
- 7805 Voltage Regulator, a member of 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC).
- The xx in 78xx indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink.

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Procedure

Connection Steps

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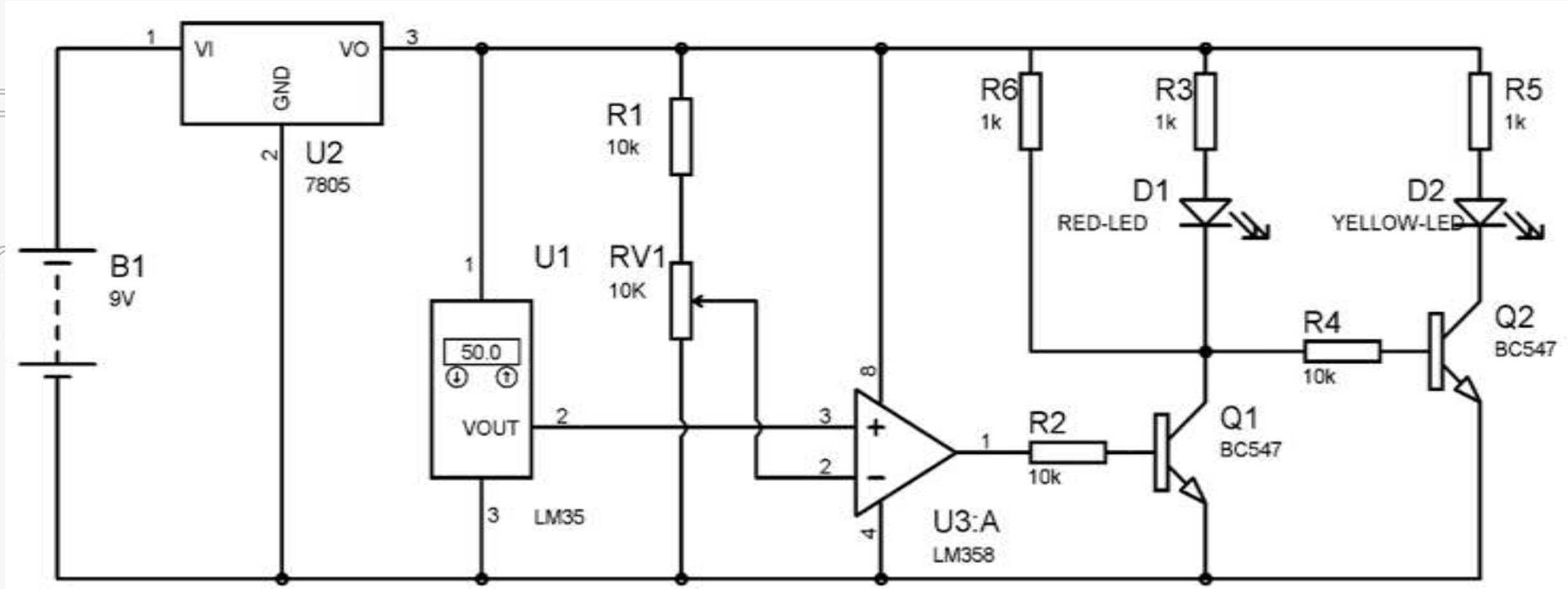
Circuit diagram



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Data & Outcomes

Learning from the activity

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Project Link :

https://youtu.be/3srRvZSlCHk

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Assessment

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Thank you