Lamp Current Threshold Detection Circuit (0.11A Monitoring System)

This project is a transistor-based current threshold detection circuit designed to verify whether a 12V lamp is operating within its specified current consumption of 0.11A.

The system monitors the lamp current and provides a clear visual indication using two LEDs:

- Green LED ON → Lamp current is 0.11A or higher (Normal operation)
- Red LED ON → Lamp current is below 0.11A (Fault or underperformance)

How It Works

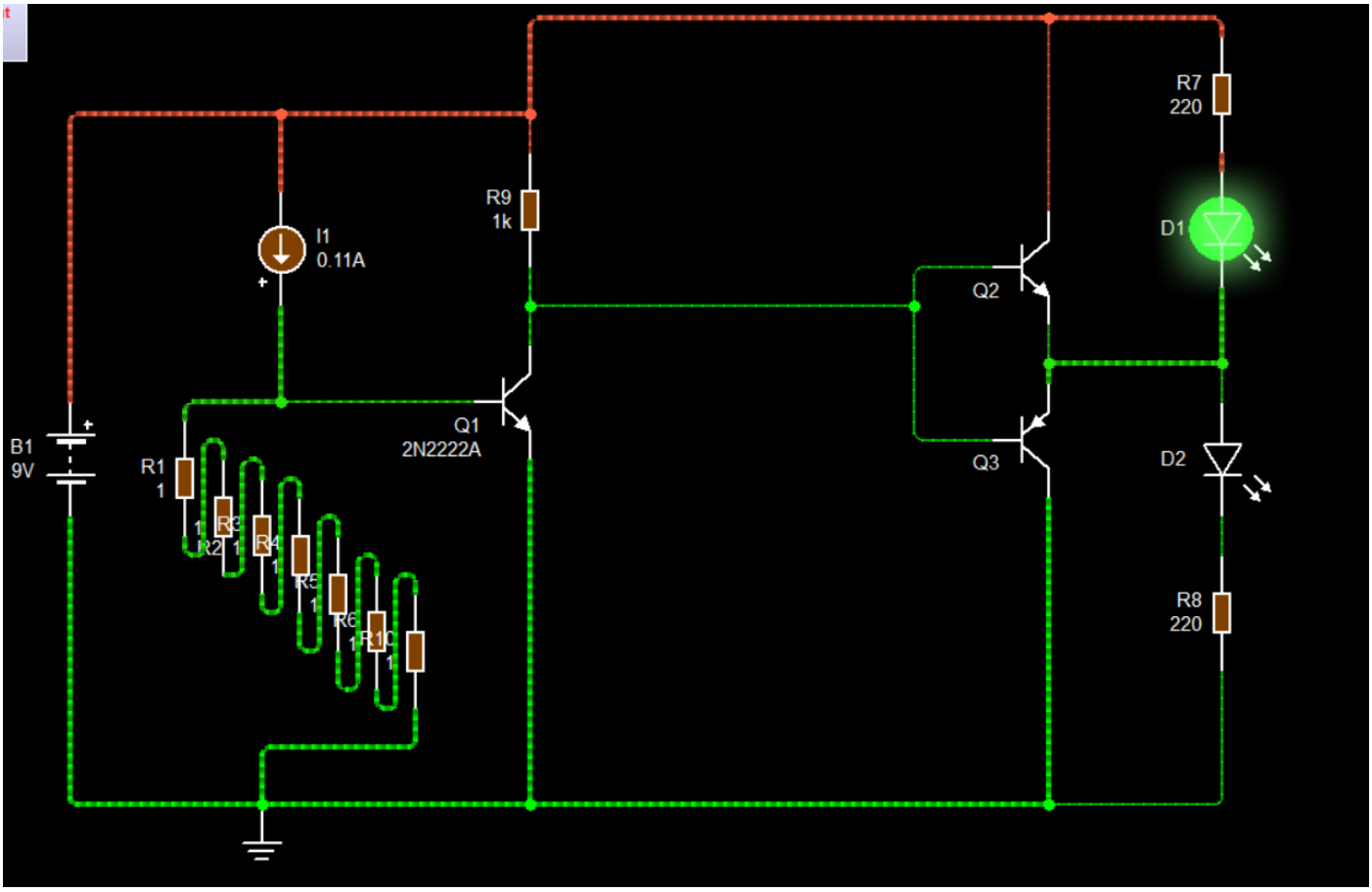
- A sensing resistor network converts lamp current into a proportional voltage.
- Q1 (2N2222A) acts as the main current-sensing transistor.
- When the sensed current reaches the calibrated threshold (~0.11A), Q1 switches state.
- A transistor switching stage (Q2 and Q3) forms a signal inverter/driver stage.
- Depending on the detected current level:
- One transistor path activates the green LED
- The opposite path activates the red LED
- A 9V supply powers the control circuit.

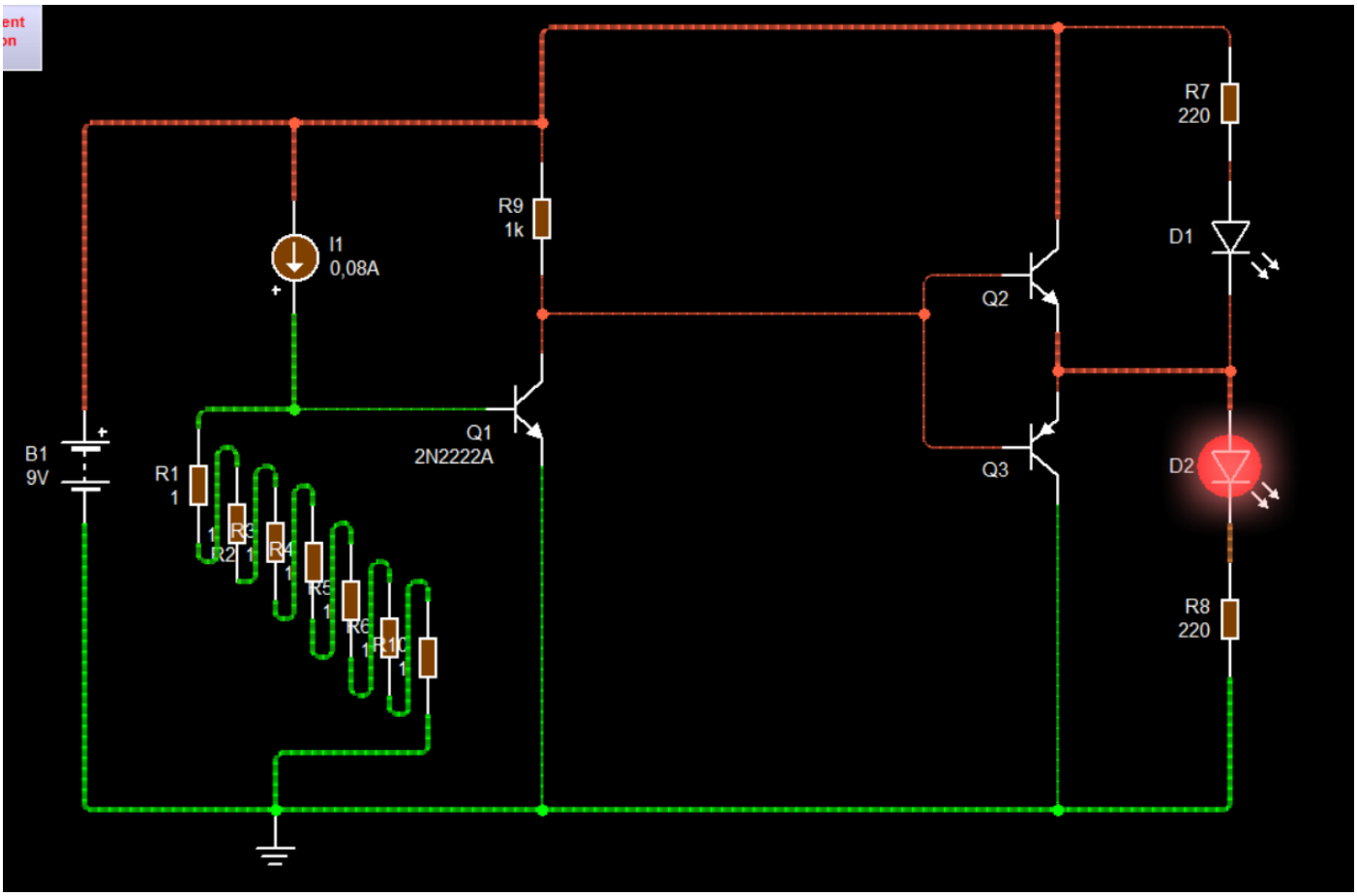
Use cases:

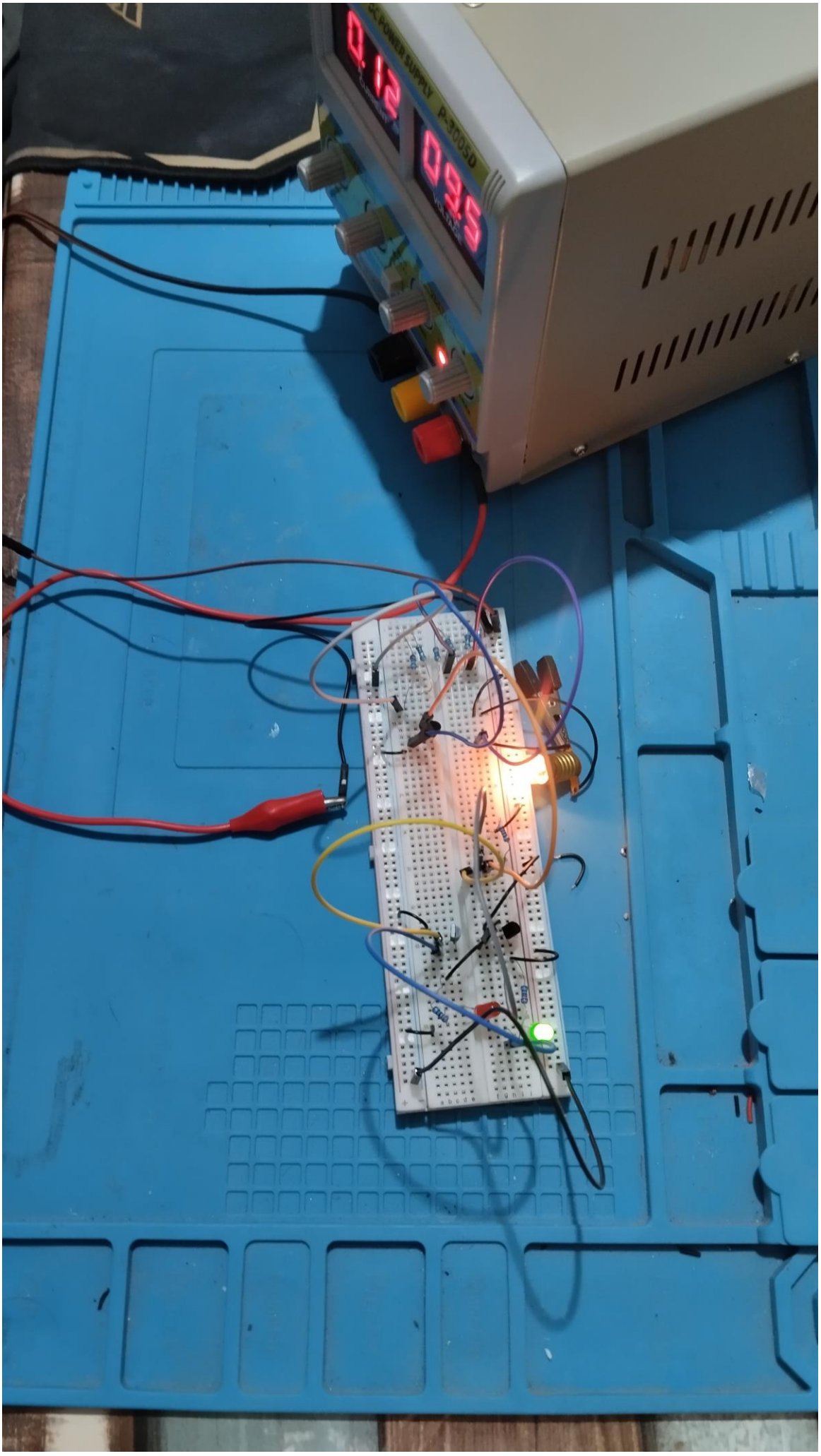
Lamp production testing

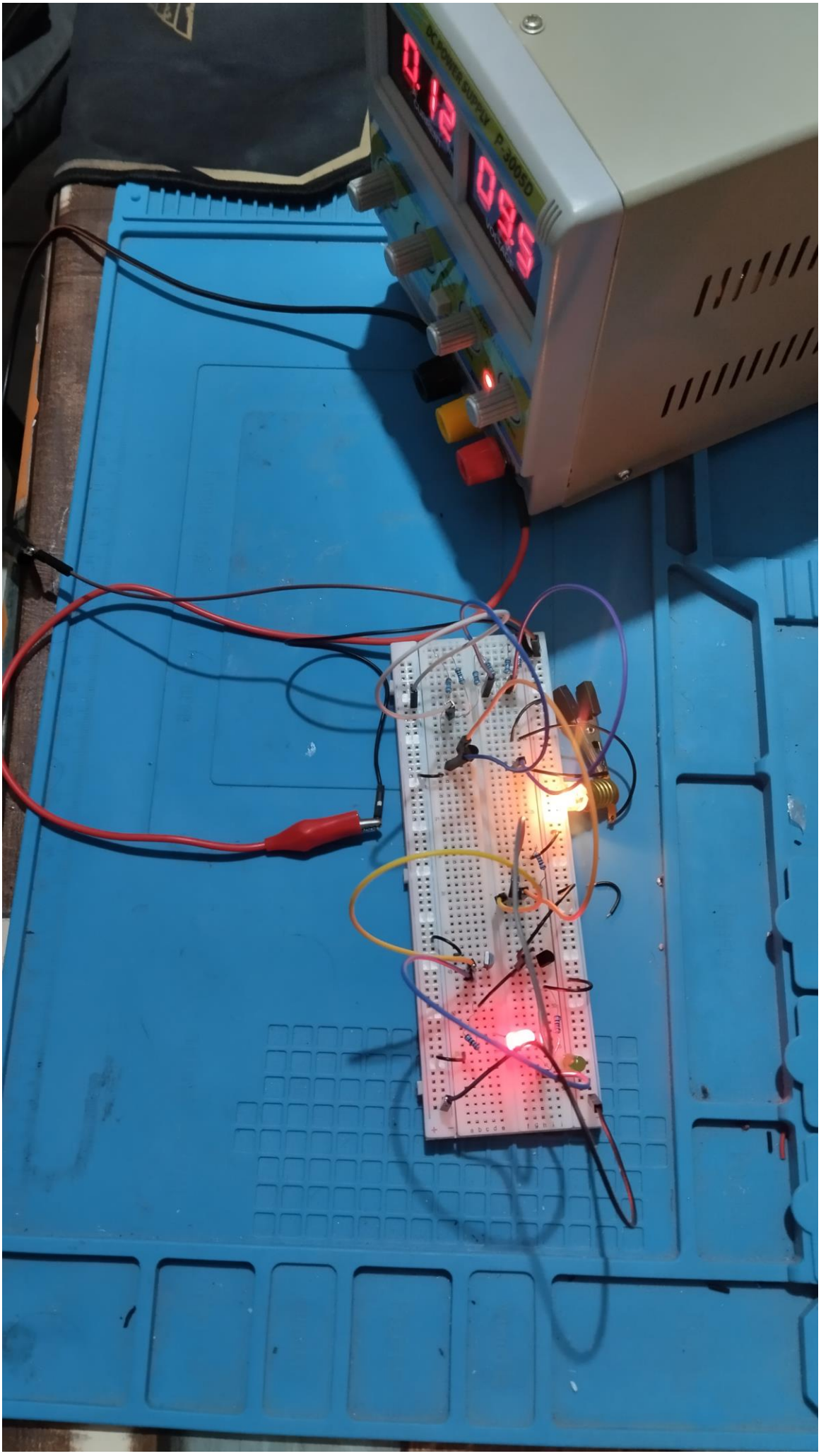
Load verification systems

Automotive bulb diagnostics


R7
220
D1
R9
1k
I1
0.11A
Q2
B1
9V
Q1
2N2222A
Q3
D2
R1
1
R8
220


R7
220
D1
R9
1k
I1
0,08A
Q2
Q1
2N2222A
B1
9V
Q3
D2
R1
1
R8
220


0.12
0.95
P-3005D


0.12
0.95