20ECL53-LINEAR INTEGRATED CIRCUITS LABORATORY
MINI PROJECT REPORT

BREAK FAILURE INDICATOR CIRCUIT USING 555 TIMER IC

BATCH: 11

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AIM:

To design and simulate the break failure indicator circuit using 555 timer IC.

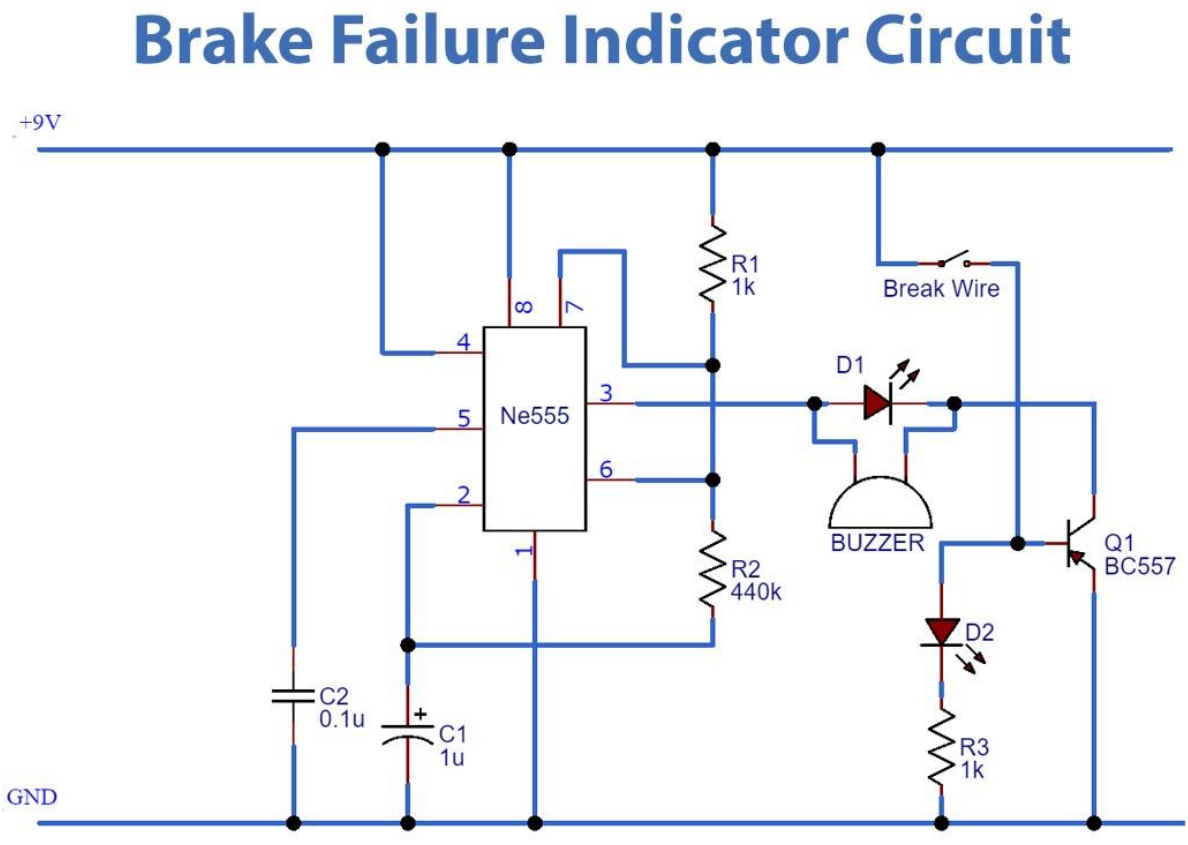
SOFTWARE REQUIRED:

Proteus 8 Professional

HARDWARE REQUIRED:

S.No	Component Name	Value	Quantity
1)	IC	NE555 Timer	1
2)	PNP Transistor	BC557	1
3)	LED	Red, Green	2
4)	Electrolytic Capacitor	1uF	1
5)	Ceramic Capacitor	0.1uF	1
6)	Resistors	1K, 440K	2,1
7)	Buzzer		1

CIRCUIT DIAGRAM:



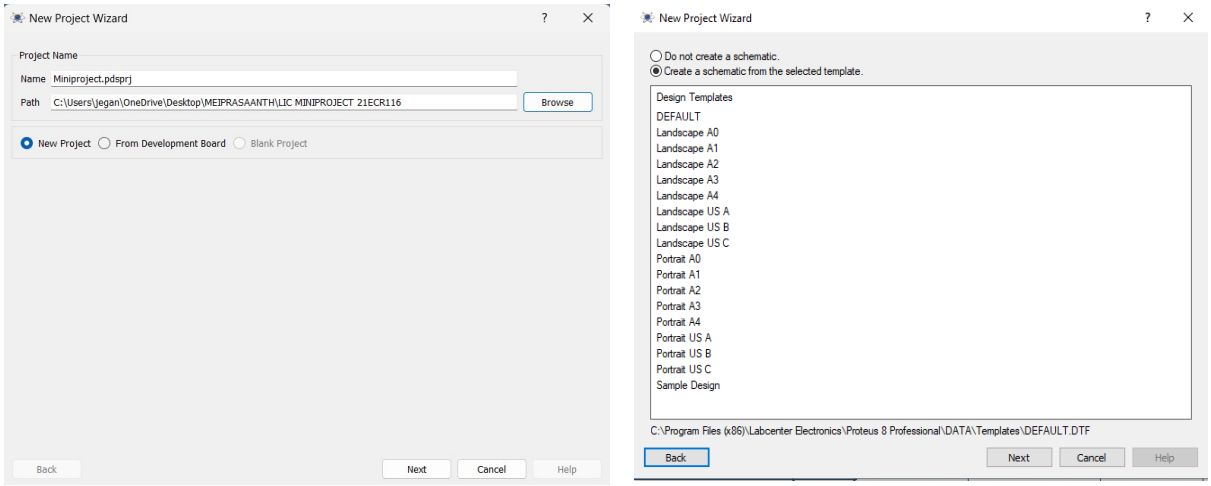
WORKING:

The heart of this circuit is a NE555 Timer IC. The IC possesses an oscillation frequency ranging from 670 to 680 Hz. Here, this NE555 timer acts as an Astable multi-vibrator. An A-stable multi-vibrator is a free-running oscillator that switches continuously between its two unstable states. With no external signal applied, the transistors alternately switch from cutoff to saturation state at a frequency that RC time constants of the coupling circuit determine. If these time constants are equal (R and C are equal) then a square wave will generate with a frequency of 1/1.4 RC. Hence, an Astable multivibrator is also a pulse generator or a square wave generator. On powering the circuit, make sure the Brake cable is connected across the +5V and base of BC557 through a resistor with respect to the circuit diagram in order to ensure proper functioning.

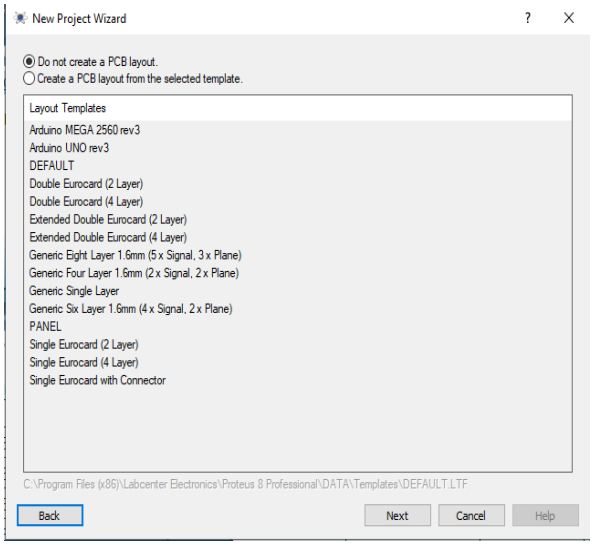
In standard operating conditions, the Green LED turn on and the Buzzer and Red Light Turn Off. Now, removing or cutting the brake cable should trigger the Red LED and the Buzzer and they should start flashing, reflecting proper functioning.

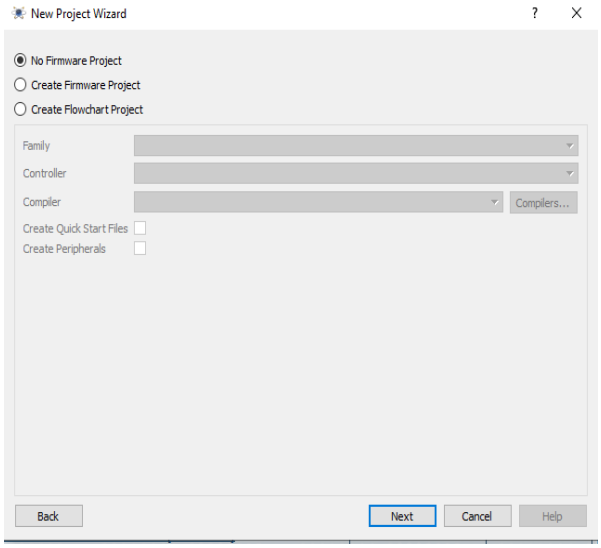
SIMULATION OUTPUT:

Step 1: Open Proteus software, create a new project and save the project in a separate folder and select create a schematic from the selected template.

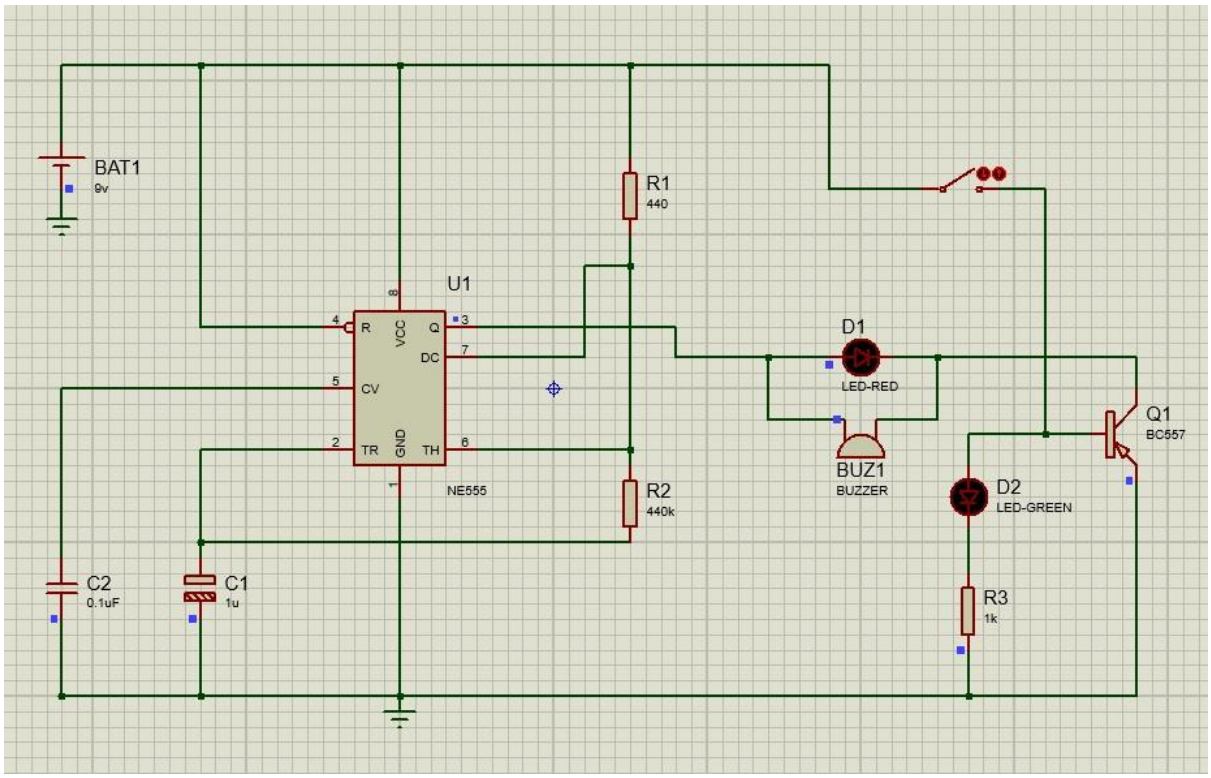


Step 2: Select do not create a PCB layout and create no firmware project.





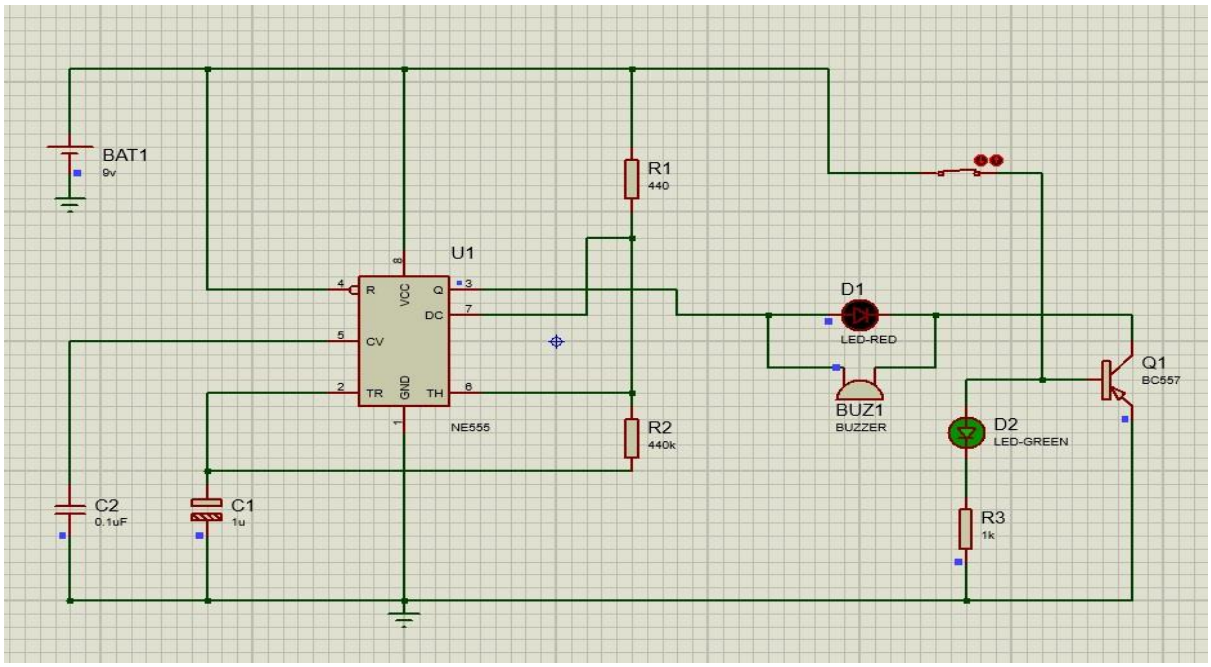
Step 3: Pick parts from library and place it in simulation window. Give the required connections.



Step 4: Run and stimulate the connections by clicking run button on the left bottom side.

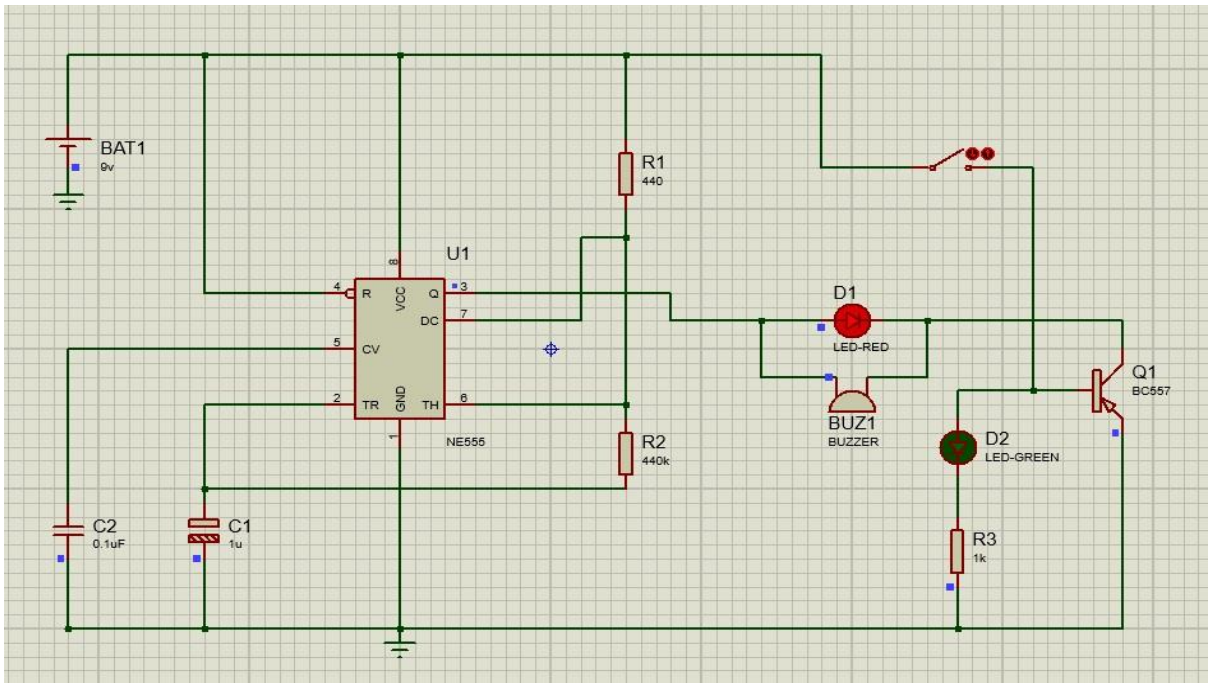
Break cable connected properly:

When the break cable is connected to the circuit, green LED turns ON and glows continuously, until the wire gets disconnected.



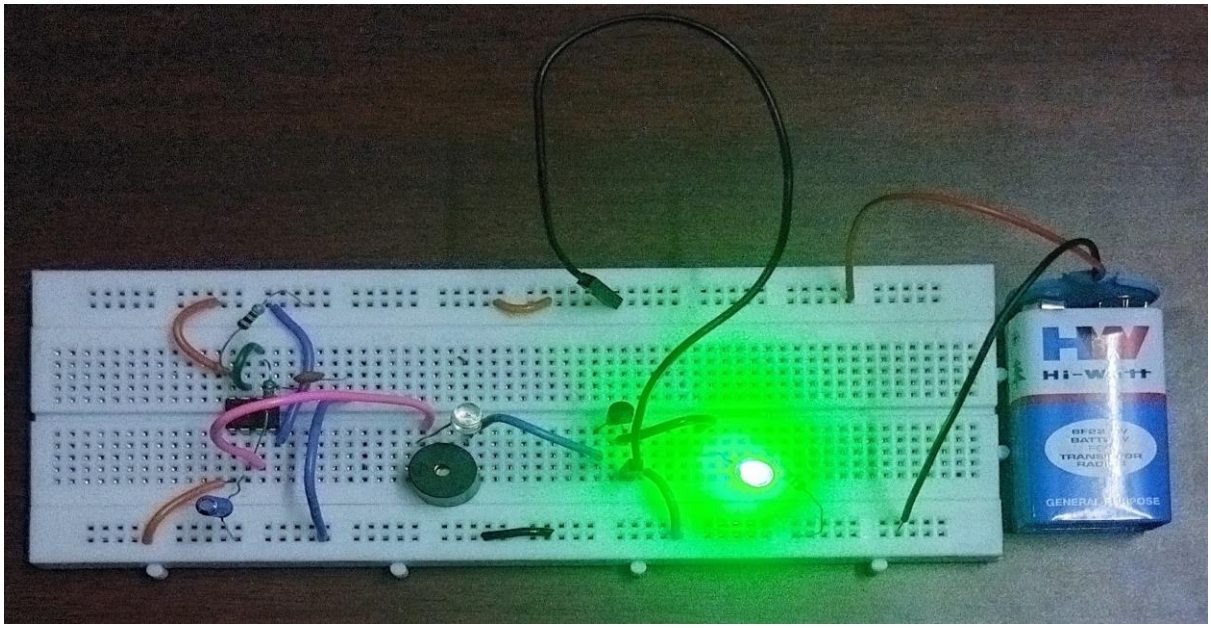
Break cable disconnected:

When the break cable is removed or disconnected from the circuit, the red LED and the buzzer starts flickering. This indicates the use that the condition of break cable.

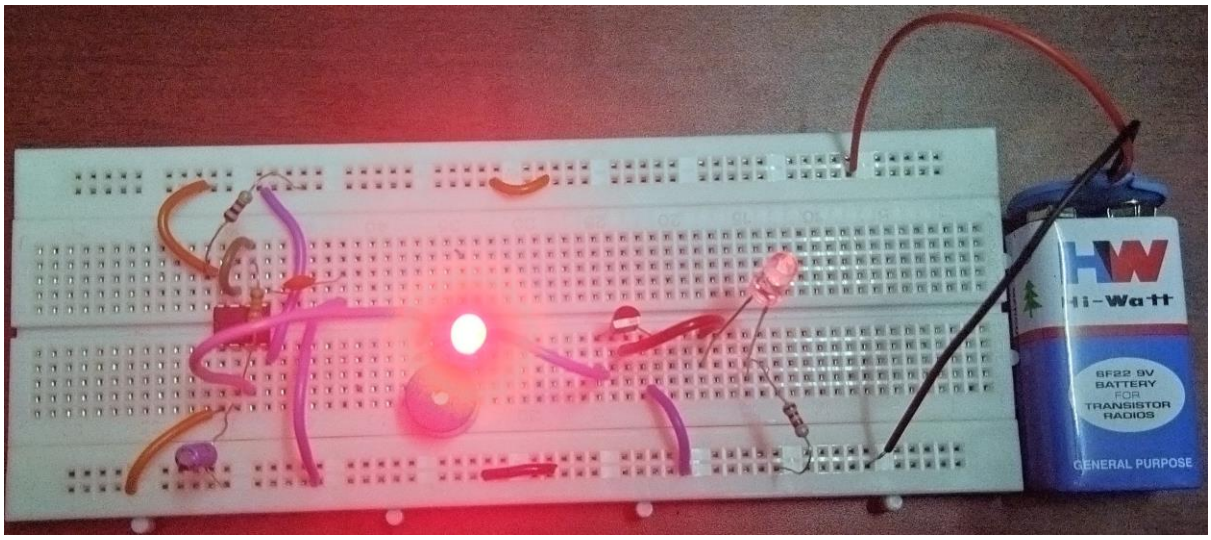


BREADBOARD OUTPUT:

Break cable connected properly:



Break cable disconnected:

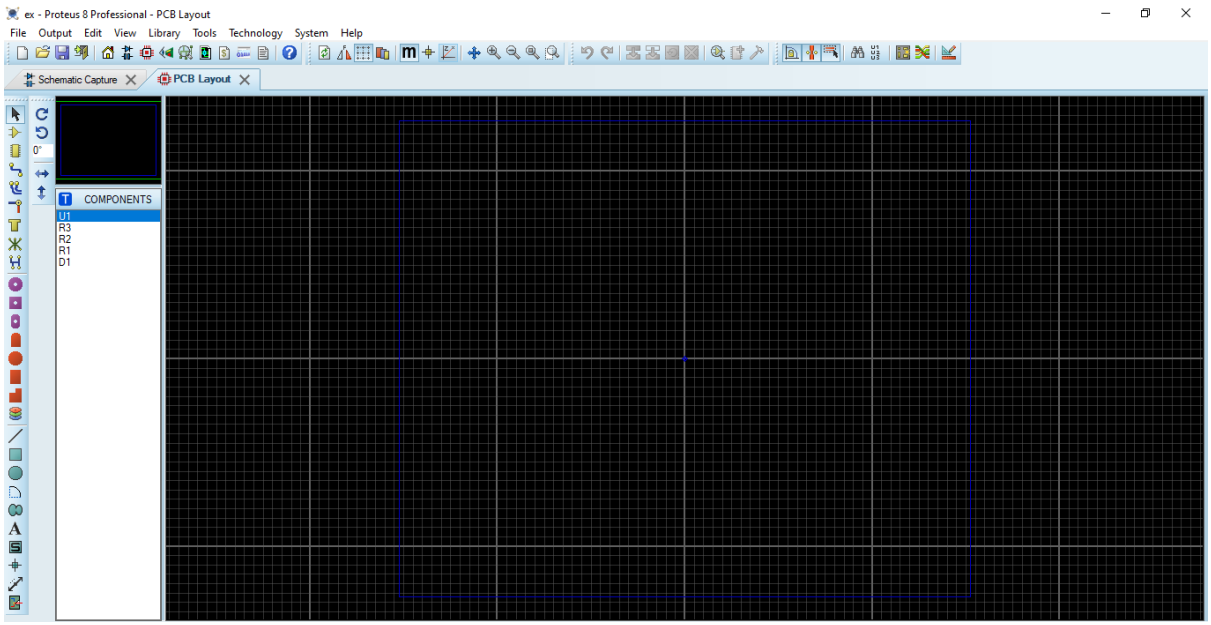


Video link:

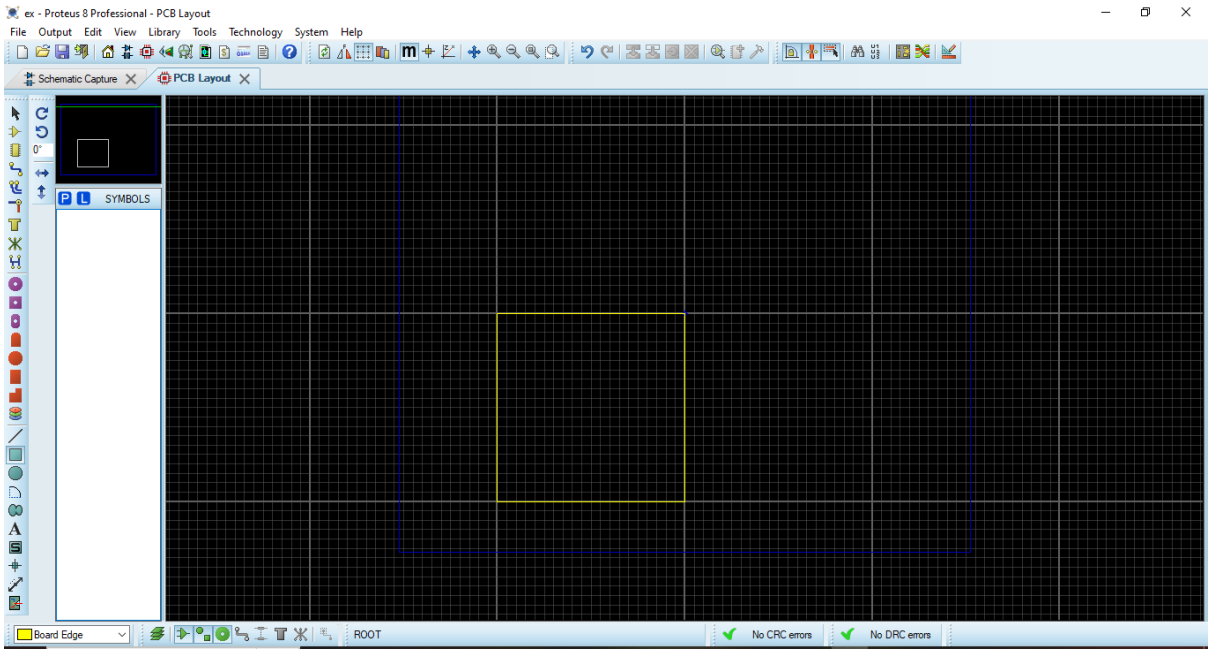
https://drive.google.com/file/d/1bPRpHu1915CIhXgbG-jqEbkZv4SOA0nl/view?usp=drivesdk

PCB LAYOUT:

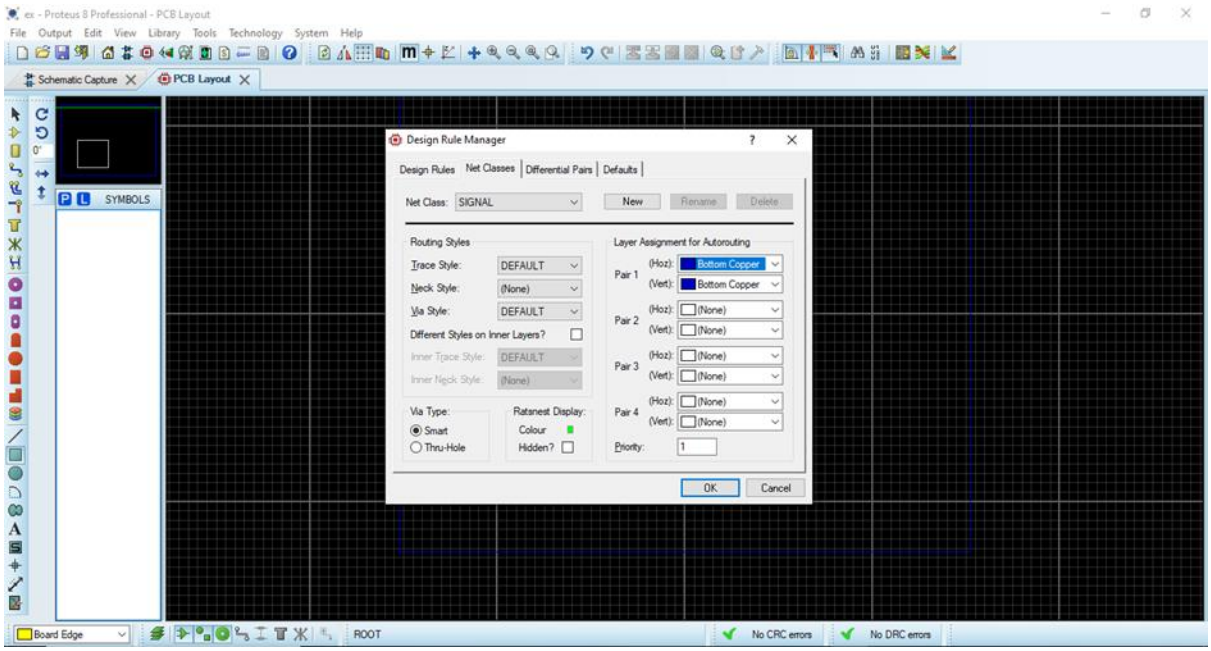
Step 1: Open PCB layout in Proteus.



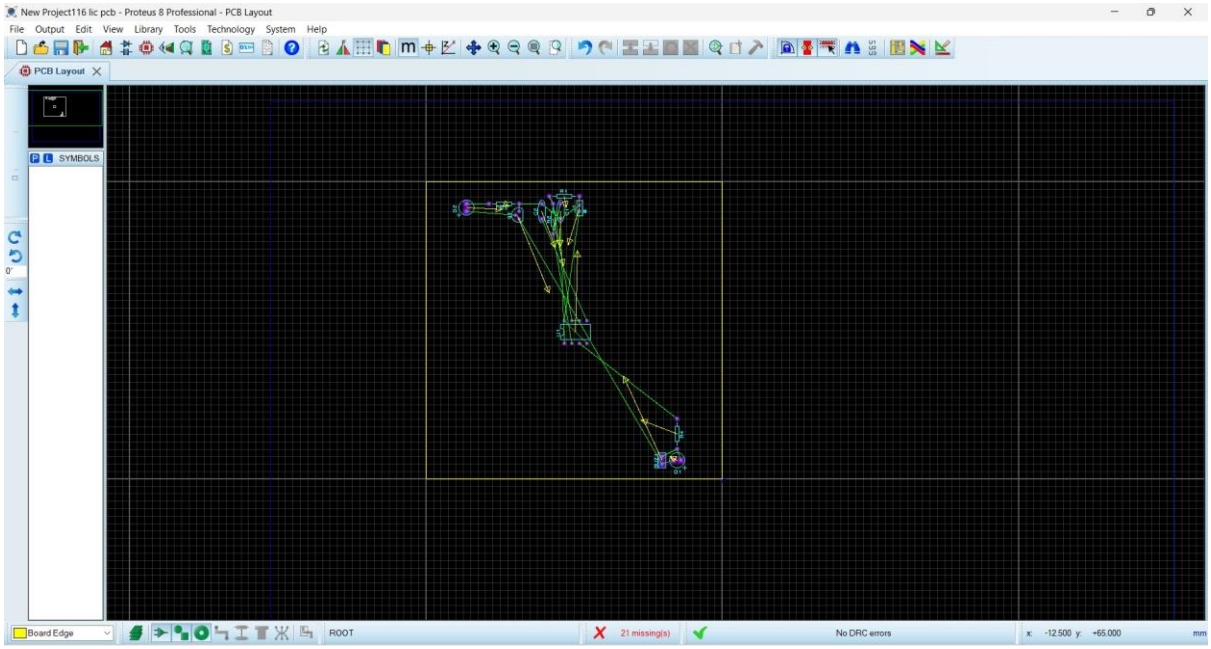
Step 2: In layer selector select board edge and select 2D graphics select mode and then drag to make a box.



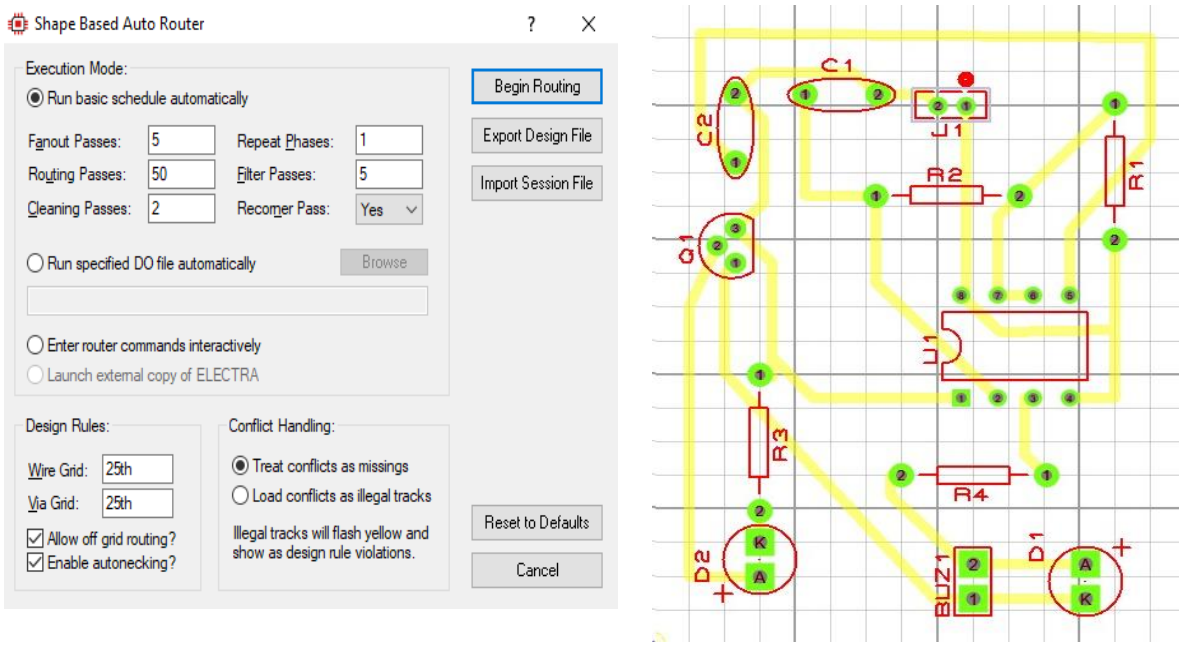
Step 3: In Designer rule manager select new classes. Then change the default to signal and pair1 to bottom copper.

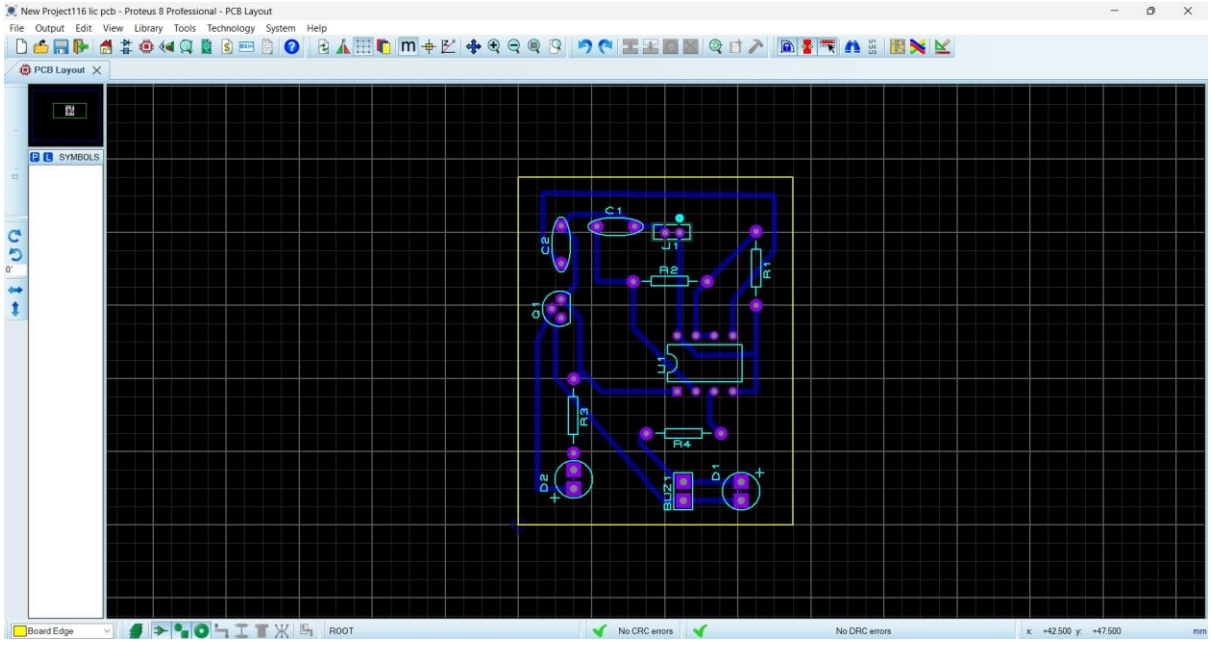


Step 4: Place components by selecting the components from component mode.

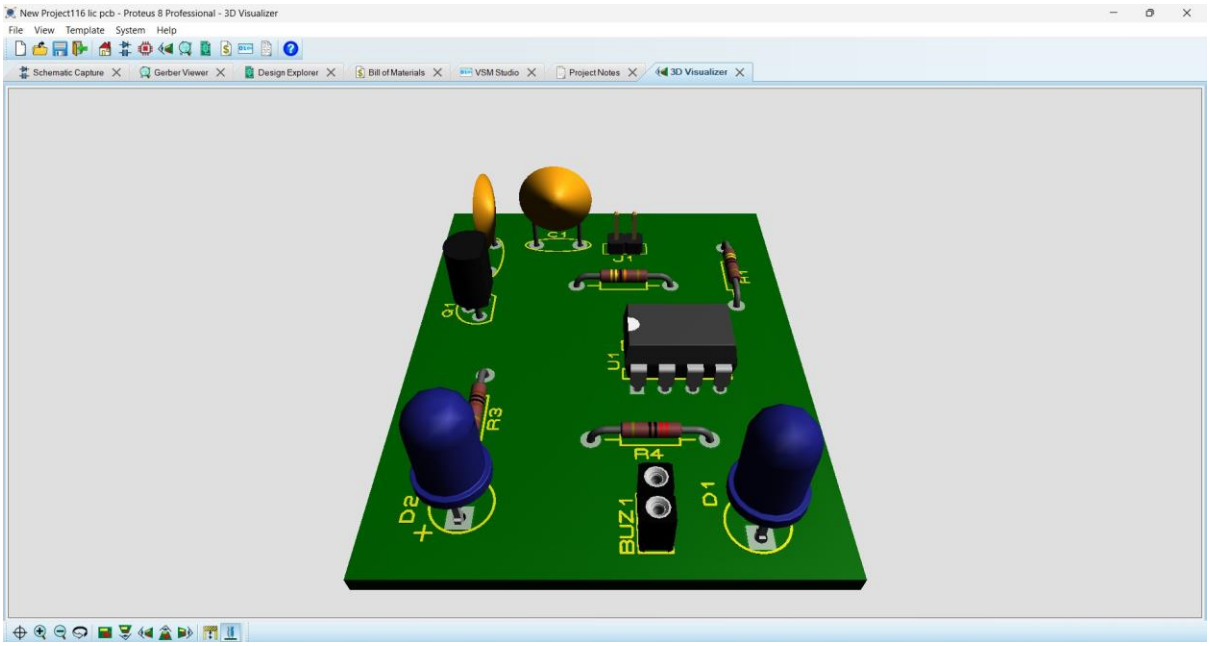


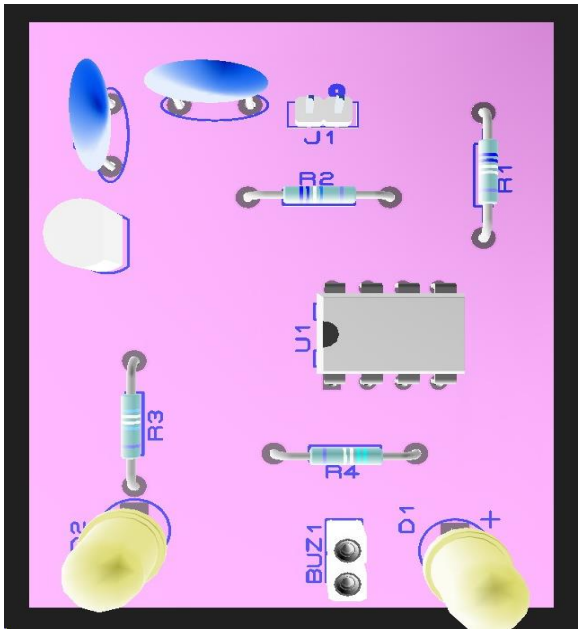
Step 5: Click auto Router and begin routing. The connections are made automatically, if any error you can make your own connections.





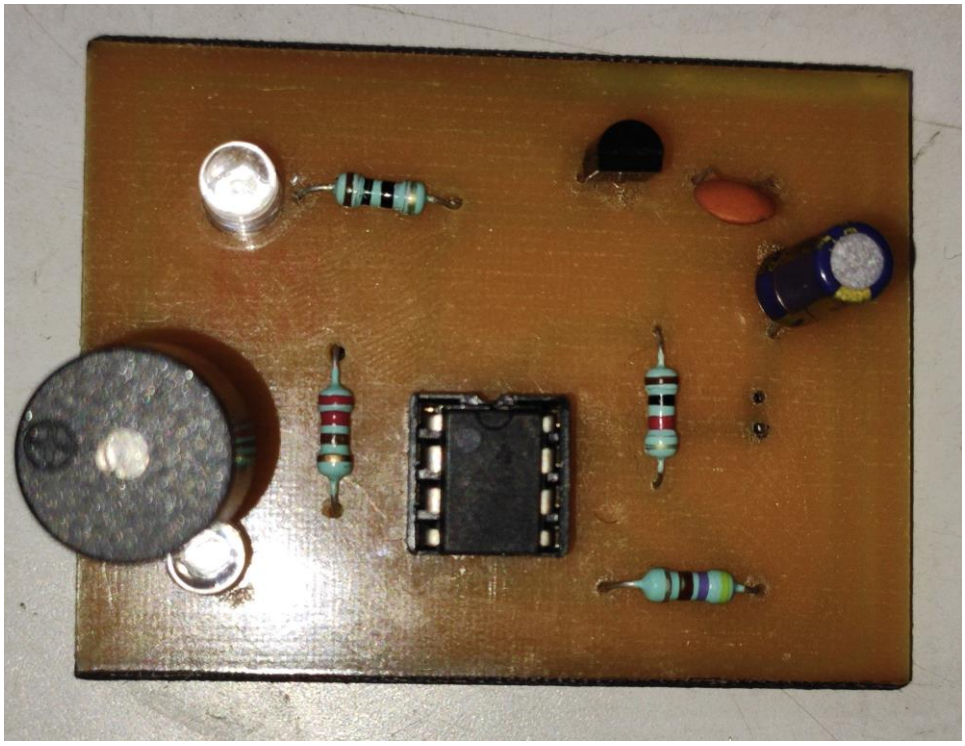
Step 6: Then select 3d visualizer to see 3D model.

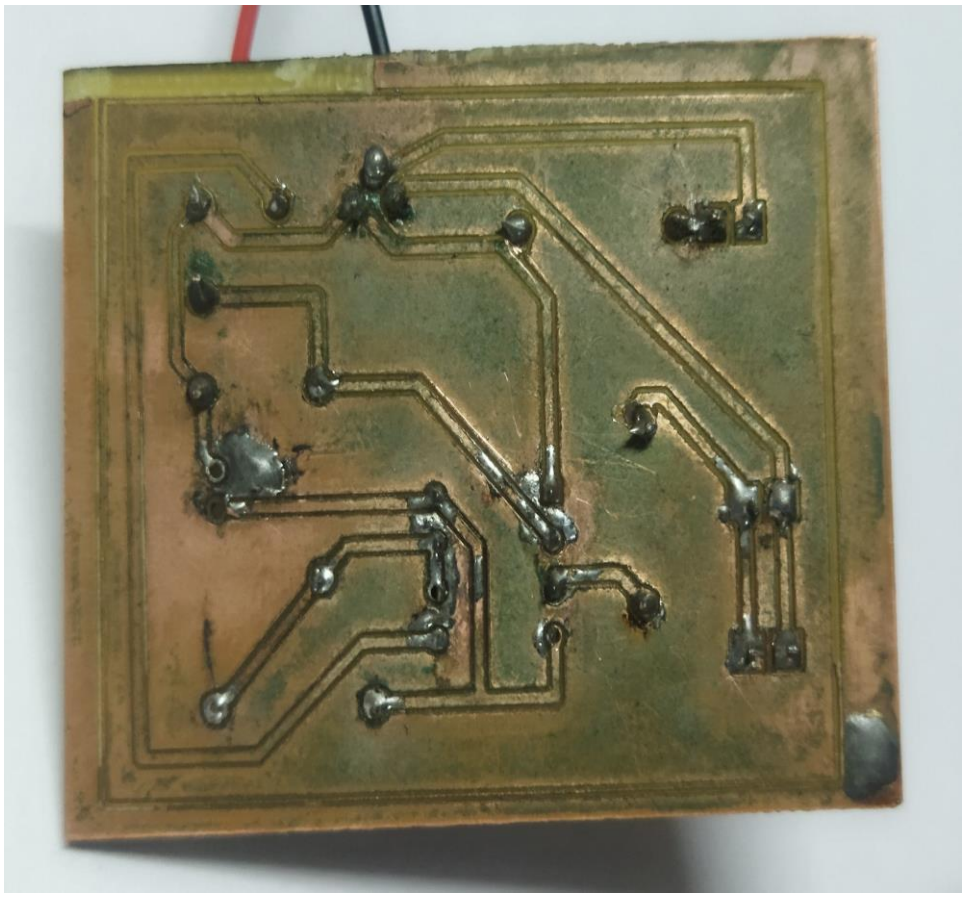




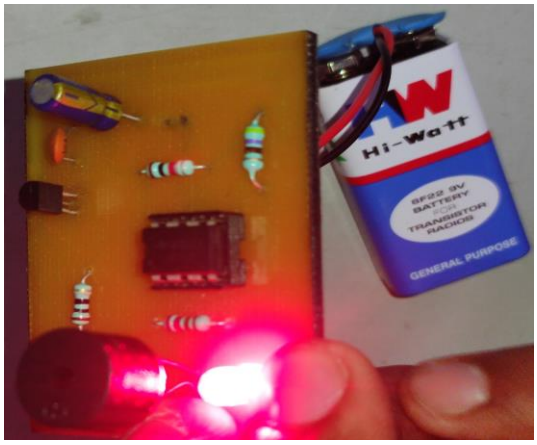
PCB OUTPUT:

After printing the top layer and bottom layer of PCB:

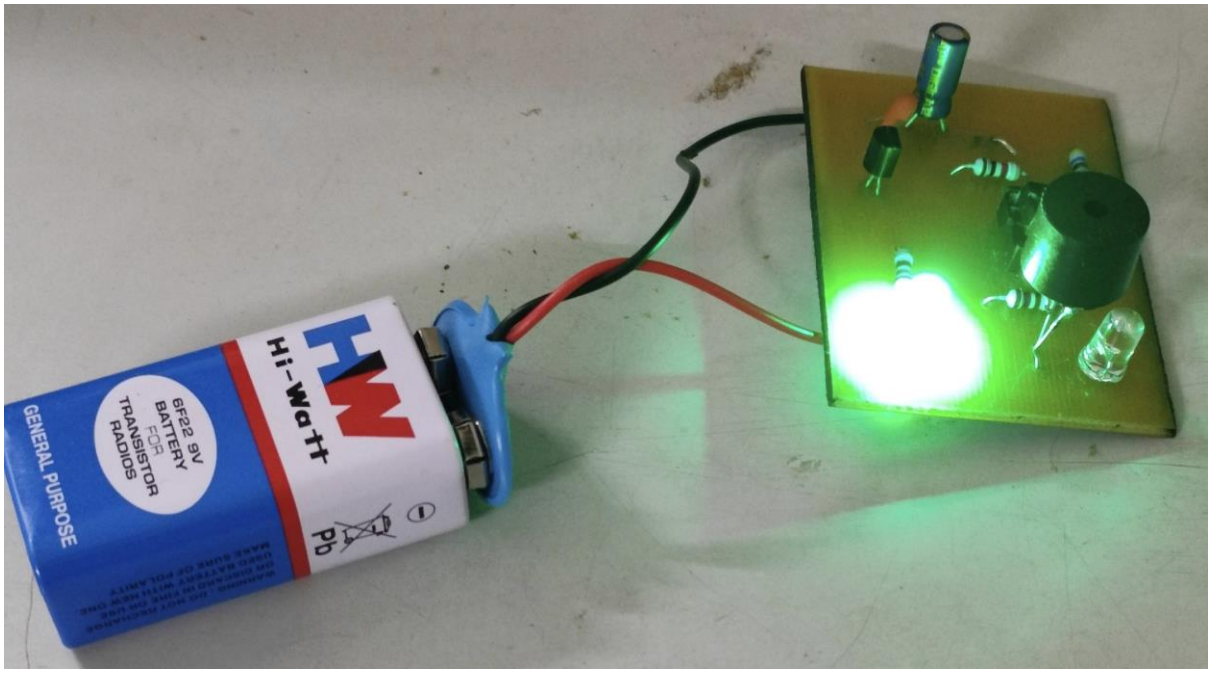




Break cable disconnected:



Break cable connected properly:



Video link:

https://drive.google.com/file/d/1cCJ41w5Kd5_g5GENVrrmtg7YtoC8WBaD/view?usp=drivesdk

Result:

Thus, the circuit for break failure indicator was designed and the output is verified.