

**BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY**



**Department of Electrical and Electronic Engineering**

**Course No.: EEE 202(H)**

**Course Title: Electronic Circuits I Laboratory**

**A Project Report On**

**THEFT-ALARM CIRCUIT**

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## **Introduction:**

A lot of valuable things such as ornaments, money, documents, etc. are kept in people's houses and these need security from any type of burglary attempt. The theft-alarm circuit that we attempted to create can be an easy yet effective solution to thwart burglary. It sounds an alarm through the buzzer when someone tries to intrude into any house or office inappropriately. If someone tries to enter after giving the wrong code several times in the smart lock integrated into the doors, the circuit will be activated, the buzzer will generate sound and the security system will get started. This project is going to be a useful yet cost-efficient approach to solve the problem of thefts in houses, offices, etc.

## **Components used:**

SL No	Components' Name	Quantity
1	Buzzer	1
2	5 mm Red LED	1
3	220 $\Omega$ resistor	2
4	1k $\Omega$ resistor	1
5	NPN Transistor BC547	1
6	9V Battery	1
7	Tactile Push-Button Switch	1
8	Jumper Wire	1 set
9	9V Battery Connector	1
10	Breadboard	1

**Costing:**

SL No	Components' Name	Quantity	Cost
1	Buzzer	1	BDT 25.00
2	5 mm Red LED	1	BDT 1.00
3	220 $\Omega$ resistor	2	BDT 4.00
4	1k $\Omega$ resistor	1	BDT 2.00
5	NPN Transistor BC547	1	BDT 3.00
6	9V Battery	1	BDT 50.00
7	Tactile Push-Button Switch	1	BDT 5.00
8	Jumper Wire	1 set	BDT 100.00
9	9V Battery Connector	1	BDT 10.00
10	Breadboard	1	BDT 125.00

Total: BDT 325.00

## Circuit Diagram:

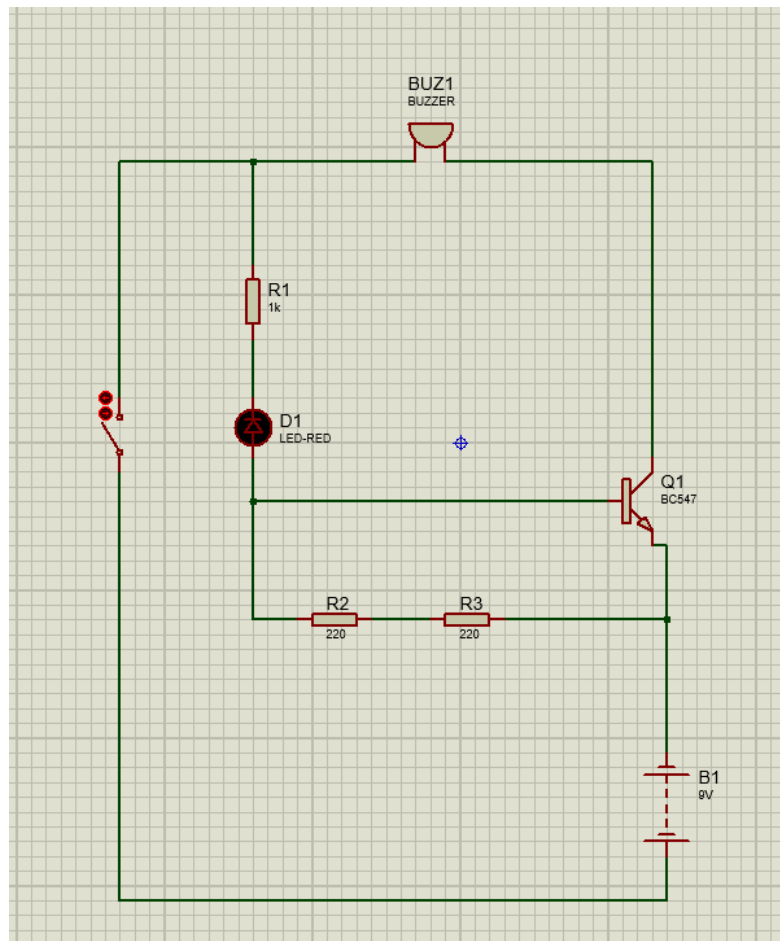
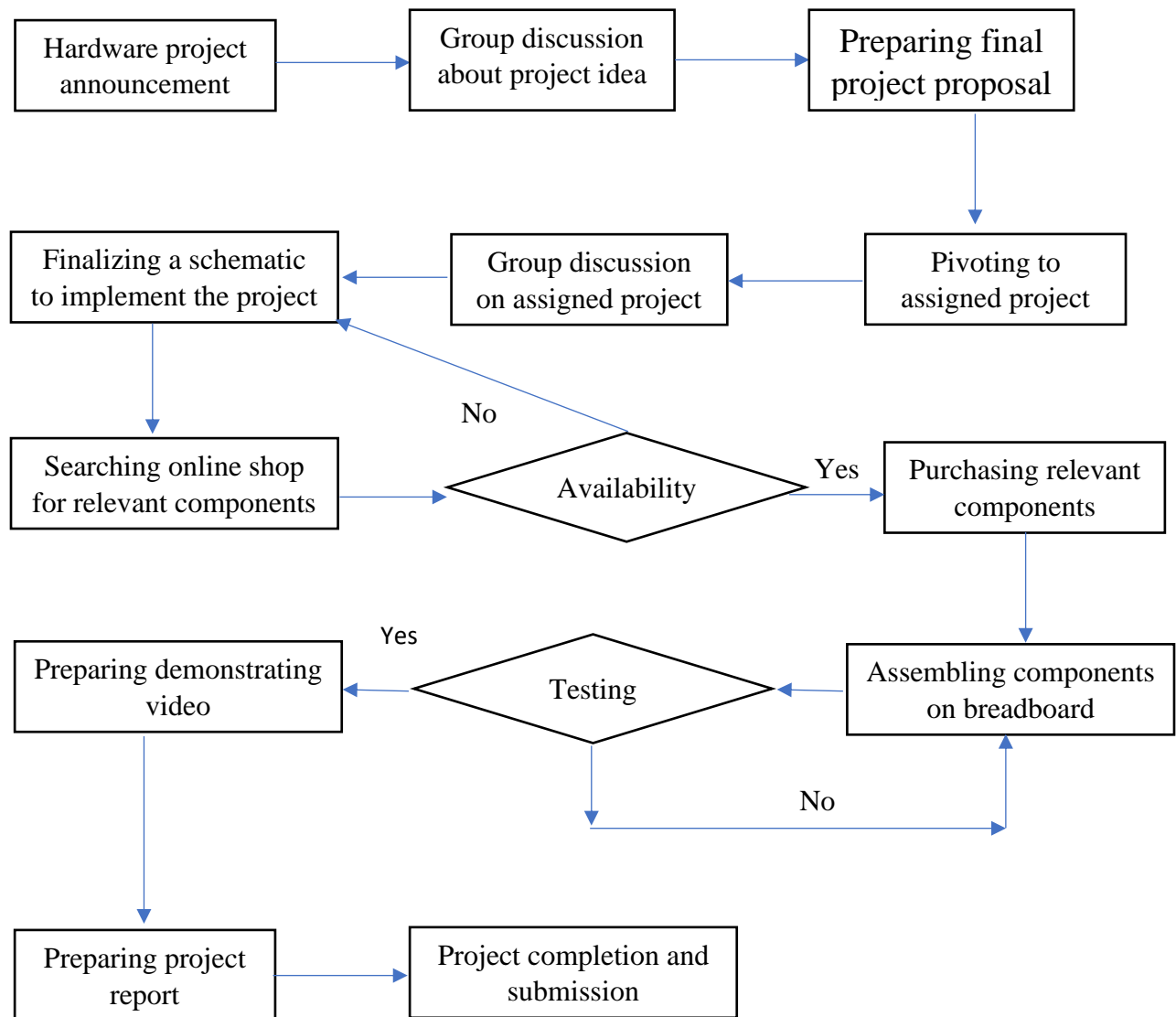


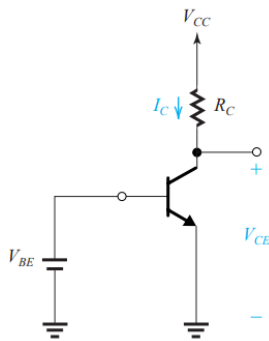
Figure: Circuit Diagram for Theft-Alarm Circuit

## **Workflow:**



## **Theory:**

In our circuit, the main component is the transistor. It is an NPN BC547 transistor. Here, the transistor is working as a switch. When, both base-collector and base-emitter are in forward bias, then it is called saturation mode and the transistor acts as a switch. Also, in saturation mode,  $V_{CE}$  is around 0.05-2.00 V. In our case, it is 0.168 V. For our circuit, when the switch becomes on, then the transistor allows to flow current through base and collector. For flowing current through the collector, the buzzer makes a sound, and thus the circuit works.



## **Description:**

- Construction of the circuit:

To construct the circuit, first, we connect the BJT of BC547 to the breadboard. Then we make a series resistance of 440  $\Omega$  connecting two 220  $\Omega$  resistors in series. The 440  $\Omega$  equivalent resistor has two terminals. We connect one terminal with the emitter of BJT and the other terminal had been connected to the anode terminal of the Red LED. We connect the base of BJT in the anode terminal of the Red LED. The cathode of Red LED is connected to a terminal of resistor  $R1=1k \Omega$ . Another terminal of  $R1$  is connected with the positive terminal of Buzzer and we connect the other terminal of Buzzer with

connected with the collector terminal of BC547. The junction of resistor=440  $\Omega$  and the emitter are connected with the negative terminal of our DC source having the value of 9V. We connect the positive terminal of the battery with a switch. The other terminal of the switch is connected with the junction of the positive terminal of Buzzer and a terminal of  $R1=1K \Omega$ .

- **Implementation of the circuit:**

We can implement the circuit in a digital door. To open a digital door, we have to insert the passcode properly as a smart lock system is integrated there. If anyone fails to give the correct code after given trial attempts, a trigger will press the switch and the buzzer will start to buzz. For a regular door, we can set our circuit with the door so that if someone tries to open the door inappropriately, the circuit will start to work as the switch will get pushed, and the buzzer will be buzzing.

### **Discussion:**

The circuit can be very useful to detect the thief. To construct the circuit the main challenge was to connect each terminal accurately. As there was a BJT, we had to use a lot of jumpers. Uses of jumpers made the circuit a bit difficult to construct. When we tried to construct the circuit, we failed to get the proper output as the resistor of 390  $\Omega$  was destroyed. So, we had to use two resistors of 220  $\Omega$  in series as we had no 390  $\Omega$ . But after completing the construction we got the desired output. The circuit we had built is very sensitive. It is not flexible at all. Because if any of the components of the circuit gets destroyed the whole circuit will not work anymore. And if somehow the buzzer gets spoiled, the circuit will be of no use. But we can solve this problem by reserving some extra components and using them if

any of the components stop functioning. As its elements are not expensive and it is a simple circuit, implementation of this circuit will be easy if the drawbacks can be overcome.