Home Security System

Aim:

The aim of this project is to design and build a simple **Home Security Alarm System** that uses a Light Dependent Resistor (LDR) to detect changes in light levels.

Components Required:

Sr. No	Component	Value	Quantity
1	Transistor	BC547	1
2	LED		1
3	Breadboard		1
4	Resistor	220Ω	1
5	Jumping Wires	(M-M)	7
6	9v Battery with Cap	9V	1
7	Light Dependent Resistor (LDR)		1

Components Functionality:

1. Transistor BC547

- Acts as a switch, allowing current to pass through the LED and buzzer when the LDR detects low light (darkness).

2. 10K Ohm Resistor

- Limits the current flowing into the transistor's base to protect the transistor.

3. 220 Ohm Resistor

- Protects the LED by limiting the current to a safe level.

4. LED

- Lights up when the circuit is activated by touching the wire.

5. Breadboard

- Holds all components together for easy prototyping.

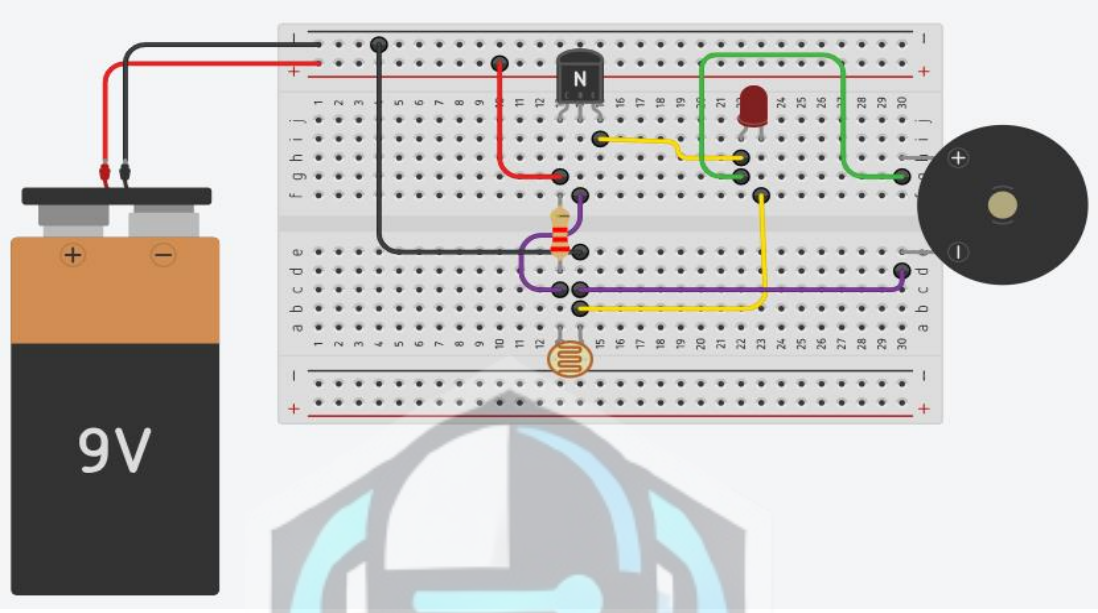
6. Light Dependent Resistor (LDR)

- Detects changes in light intensity. In low light, it triggers the transistor to turn on the LED and buzzer.

7. 9V Battery with Cap

- Provides power to the circuit.

Schematic Diagram: Refer to the attached image for the circuit layout.



Working: This project is a simple home security alarm system that activates when there is no light on the Light Dependent Resistor (LDR) sensor. In low-light conditions, the red LED and the buzzer are triggered, simulating an alarm. When light hits the LDR sensor, the alarm stops, turning off the LED and the buzzer. This setup can be used to alert users of unexpected light changes, making it suitable for basic security applications.

Circuit Diagram Explanation:

Step 1: Power Supply Connection

- Connect the positive terminal of the 9V battery to the positive rail of the breadboard.
- Connect the ground terminal of the 9V battery to the ground rail on the breadboard.

Step 2: Transistor and LED Setup

- Place the NPN transistor on the breadboard.
- Connect the collector of the transistor to the negative leg of the LED.
- Attach a 220-ohm resistor in series with the LED to limit current.

Step 3: LDR and Resistor Configuration

- Place the LDR on the breadboard.
- Connect one side of the LDR to the positive rail.
- Connect a 10K-ohm resistor between the other side of the LDR and the base of the transistor. This resistor ensures the transistor operates correctly based on light levels.

Step 4: Buzzer and LED Connections

- Connect the positive terminal of the buzzer to the positive rail of the breadboard.
- Connect the negative terminal of the buzzer to the collector of the transistor, allowing it to turn on and off based on the transistor's state.

Step 5: Testing the Alarm System

- When the LDR is exposed to light, the transistor remains off, keeping the LED and buzzer deactivated.
- When the light on the LDR is blocked (indicating low-light conditions), the transistor activates, powering the LED and buzzer. This alerts users to the change in lighting, simulating an alarm.

Conclusion: This home security alarm system is a straightforward and effective circuit for detecting light variations and triggering an alarm. It can be adapted for various security applications by adjusting the sensitivity of the LDR and other components.