Lab Assignment - 4

Problem Statement -Write a program for implementing security measures in an IIoT system.

Component Required :

Quantity	Component
1	Arduino Uno R3
1	Green LED
1	Red LED
1	Piezo
1	220 Ω Resistor

Steps To Perfrom :

Step 1: Create the Common Ground Connection

Component Pin	Connect To	Note
Arduino GND Pin	One leg of the 220Ω Resistor	The resistor will limit current for all components.
Resistor (Other Leg)	A row on the breadboard (e.g., row 15)	This row now acts as your shared ground point.

Step 2: Connect the Green LED

Component Pin	Connect To	Note
LED Anode (Longer Leg)	Arduino Digital Pin 8	This is the positive side that receives the "ON" signal.
LED Cathode (Shorter Leg)	The shared ground row on the breadboard	Connects the LED to the common ground through the resistor.

Step 3: Connect the Red LED

Component Pin	Connect To	Note
LED Anode (Longer Leg)	Arduino Digital Pin 9	This is the positive side that receives the "ALERT" signal.
LED Cathode (Shorter Leg)	The shared ground row on the breadboard	Connects the LED to the common ground.

Step 4: Connect the Buzzer

Component Pin	Connect To	Note
Buzzer Positive (+) Pin	Arduino Digital Pin 7	Receives the signal to make a sound.
Buzzer Negative (-) Pin	The shared ground row on the breadboard	Connects the buzzer to the common ground.

Code :

```
String PASSWORD = "1234";   // set your password here
String inputCode = "";

const int buzzer = 7;
const int greenLED = 8;
const int redLED = 9;

void setup() {
  pinMode(greenLED, OUTPUT);
  pinMode(redLED, OUTPUT);
  pinMode(buzzer, OUTPUT);

  digitalWrite(greenLED, LOW);
  digitalWrite(redLED, LOW);
  digitalWrite(buzzer, LOW);

  Serial.begin(9600);
  Serial.println("== Password Authentication with Buzzer ==");
  Serial.println("Enter password:");
}
```

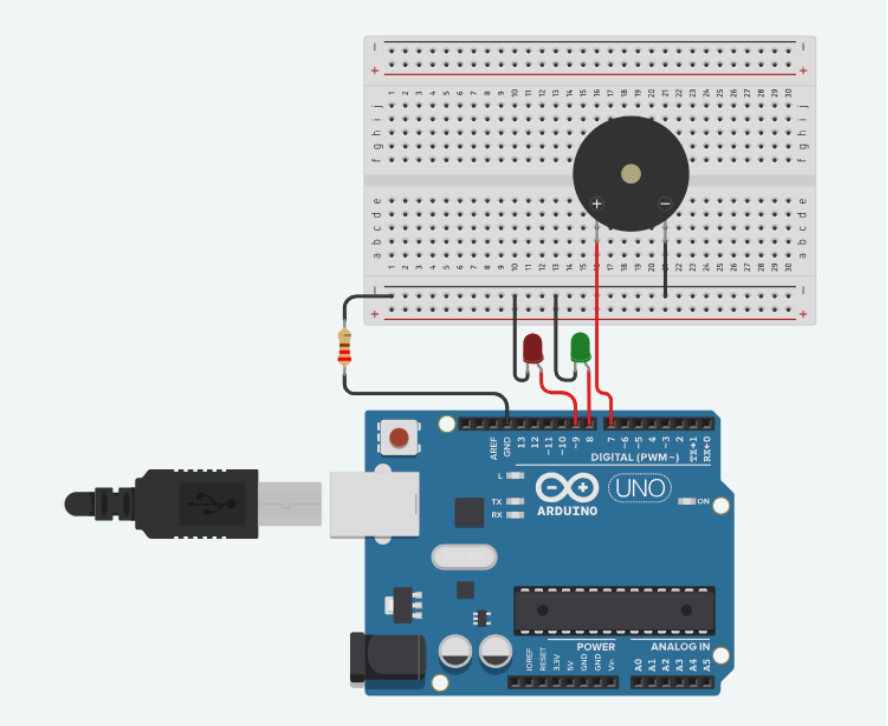
```
void loop() {
  if (Serial.available()) {
    inputCode = Serial.readStringUntil('\n');  // read until Enter
    inputCode.trim();  // remove spaces/newlines

    Serial.print("Entered: ");
    Serial.println(inputCode);

    if (inputCode == PASSWORD) {
      Serial.println("Correct Password!");
      digitalWrite(greenLED, HIGH);   // green LED ON
      delay(5000);                    // keep green LED ON for 5 sec
      digitalWrite(greenLED, LOW);    // turn OFF green LED after 5 sec
    }
    else {
      Serial.println("Wrong Password!");
      // blink red LED + beep 3 times
      for (int i = 0; i < 3; i++) {
        digitalWrite(redLED, HIGH);
        digitalWrite(buzzer, HIGH);
        delay(300);
        digitalWrite(redLED, LOW);
        digitalWrite(buzzer, LOW);
        tone(buzzer, 1000, 500);
        delay(300);
      }
    }

    Serial.println("Enter password:");
    inputCode = "";  // reset
  }
}
```

Output :



Serial Monitor

```
== Password Authentication with Buzzer ==
Enter password:
Entered: 2323
Wrong Password!
Enter password:
Entered: 1234
Correct Password!
```