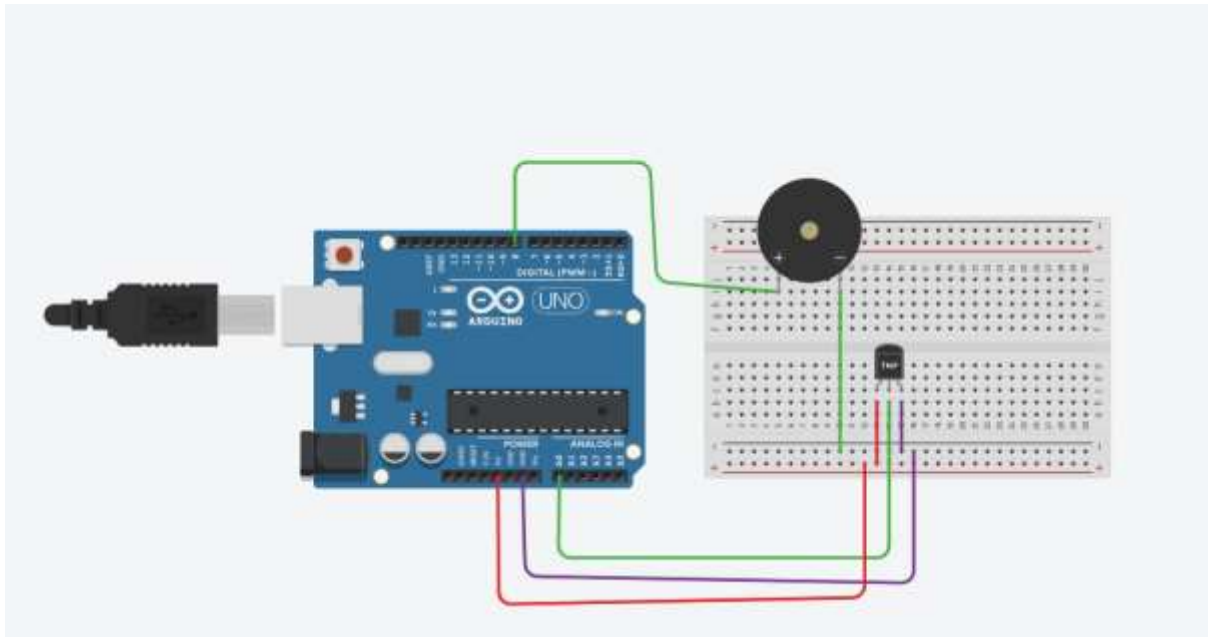**Name –** Thorave Avishkar Shrikrushna

Class – BE Artificial Intelligence and Data Science.

Roll No. – 65

Practical No. 01 - Write a program for sending alert messages to the user for controlling and interacting with your environment .

Circuit Diagram –

Source Code –

```
#define TEMP_PIN A0        // Pin where the TMP36 sensor is connected

#define BUZZER_PIN 8        // Buzzer pin

const float TEMPERATURE_THRESHOLD = 23.0; // Temperature threshold in Celsius

void setup() {

  // Initialize the buzzer pin as an output

  pinMode(BUZZER_PIN, OUTPUT);


  // Start the Serial Monitor for debugging

  Serial.begin(9600);

}
```

```
void loop() {
  // Read the temperature from the TMP36 sensor
  int tempReading = analogRead(TEMP_PIN);
  float voltage = tempReading * (5.0 / 1023.0);
  float temperatureC = (voltage - 0.5) * 100.0;
  // Print the temperature to the Serial Monitor
  Serial.print("Temperature: ");
  Serial.print(temperatureC);
  Serial.println(" C");
  // Check if the temperature exceeds the threshold
  if (temperatureC > TEMPERATURE_THRESHOLD) {
   // Turn on the buzzer
   digitalWrite(BUZZER_PIN, HIGH);
   // Print an alert message to the Serial Monitor
   Serial.println("ALERT: Temperature is too high!");
  } else {
   // Turn off the buzzer
   digitalWrite(BUZZER_PIN, LOW);
  }
  // Wait for a short period before the next loop
  delay(500);
}
```

Output –

Teamperature : 23.80 C

Teamperature : 24.78 C

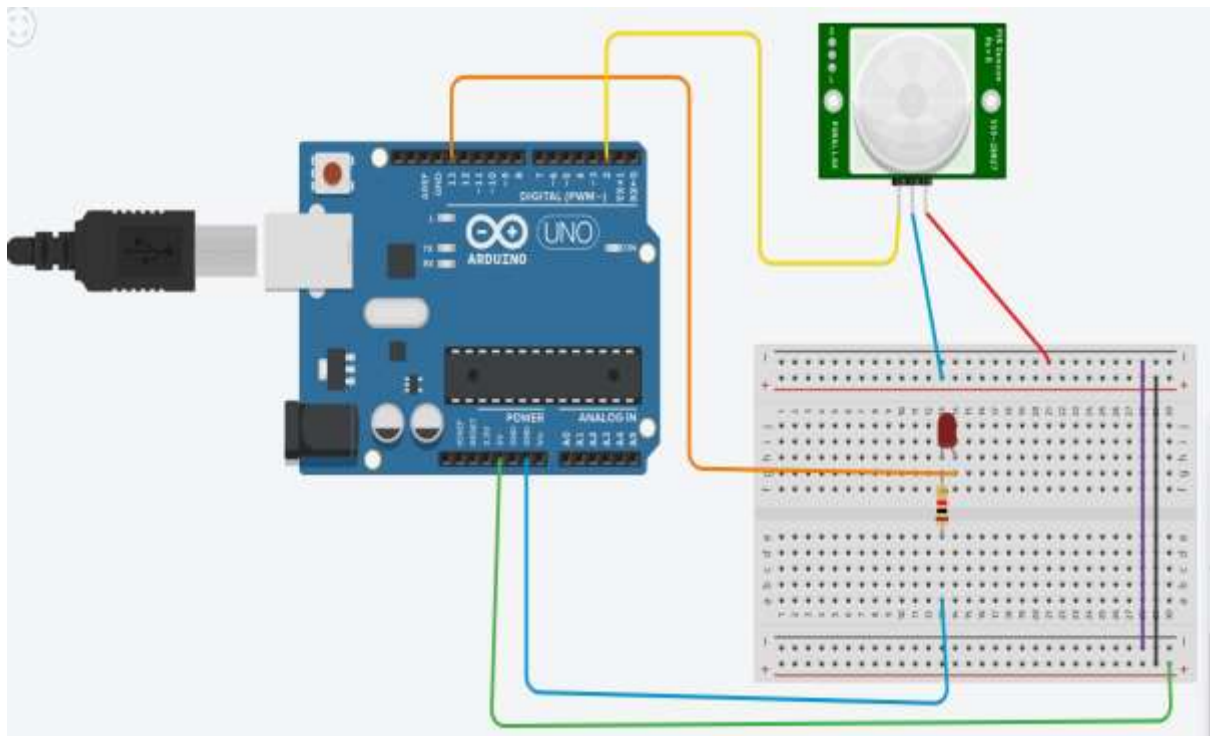ALERT : Teamperature is too high !

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Practical No. 02 - Write an Arduino program for interfacing with PIR sensor Experiment.

Circuit Diagram –

Source Code –

```
// Define pin numbers
const int pirPin = 2;   // PIR sensor input pin
const int ledPin = 13;   // LED output pin (built-in on many Arduino boards)


void setup() {
 pinMode(pirPin, INPUT);    // Set PIR pin as input
 pinMode(ledPin, OUTPUT);   // Set LED pin as output


 Serial.begin(9600);        // Initialize serial communication for debugging
```

```
  }

void loop() {
  int pirState = digitalRead(pirPin);  // Read PIR sensor state

  if (pirState == HIGH) {              // If motion is detected
    digitalWrite(ledPin, HIGH);       // Turn on LED
    Serial.println("Motion detected!");
  } else {
    digitalWrite(ledPin, LOW);        // Turn off LED
    Serial.println("No motion");
  }

  delay(1000);  // Wait for a second before rechecking
}
```

Output –

Motion detected.

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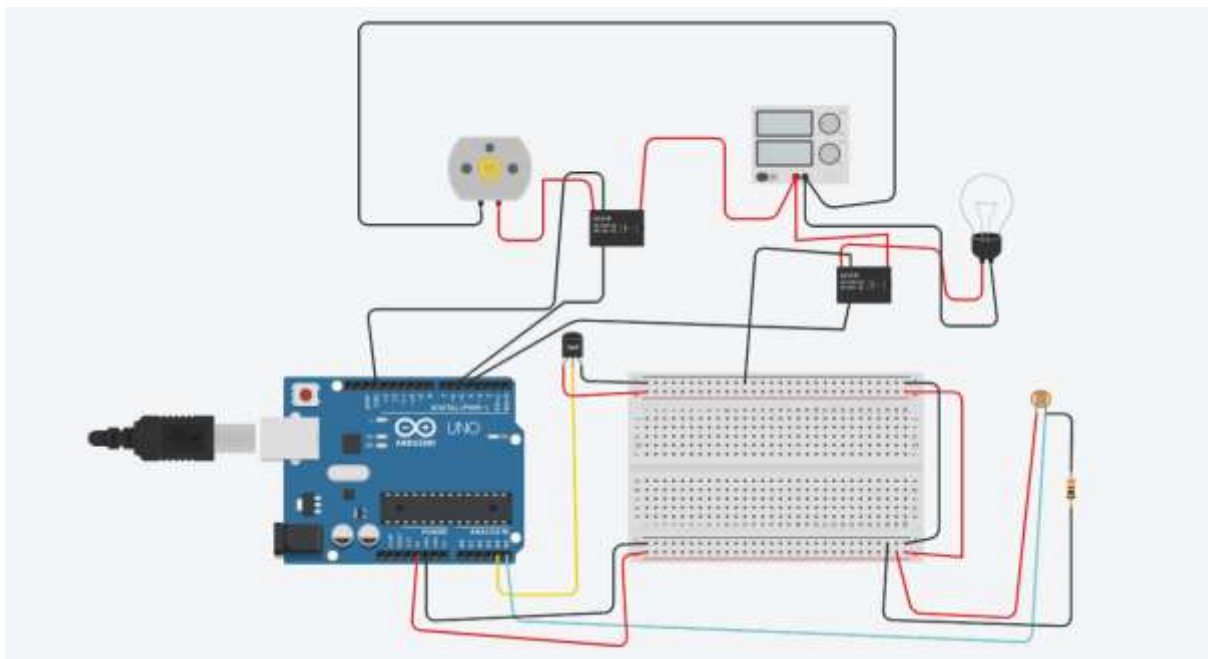
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Practical No. 03 - Write a program for developing an IIoT application for energy monitoring and optimization.

IIOT Application For Smart Home Energy Monitoring.

Circuit Diagram –

Source Code –

```
float x,y,z,temp;
void setup()
{
// pinMode(8, INPUT);
 pinMode(5, OUTPUT);
 pinMode(6, OUTPUT);
 pinMode(A5, INPUT);
 pinMode(A4, INPUT);
Serial.begin(9600);
```

```
    }
    void loop()
    {
   // x= digitalRead(8);
    y= analogRead(A5);
    z= analogRead(A4);
    Serial.println(x);
    Serial.println(y);
    Serial.println(z);
    temp = (double)z / 1024;
    temp = temp * 5;
    temp = temp - 0.5;
    temp = temp * 100;
   //if ( (x>0) )
   //{
     if ((y<550)&&(temp>30))
      {
       digitalWrite(5, HIGH);
       digitalWrite(6, HIGH);
      }
     else if((y<550)&&(temp<30))
      {
       digitalWrite(5, HIGH);
       digitalWrite(6, LOW);
      }
     else if((y>550)&&(temp>30))
      {
       digitalWrite(5, LOW);
       digitalWrite(6, HIGH);
      }
```

```
  else if((y>550)&&(temp<30))
   {
    digitalWrite(5, LOW);
    digitalWrite(6, LOW);
   }
 /*}
 else
 {
  digitalWrite(5, LOW);
  digitalWrite(6, LOW);
 }*/
}
```

Output –

53.00

0.00

6.00

153.00

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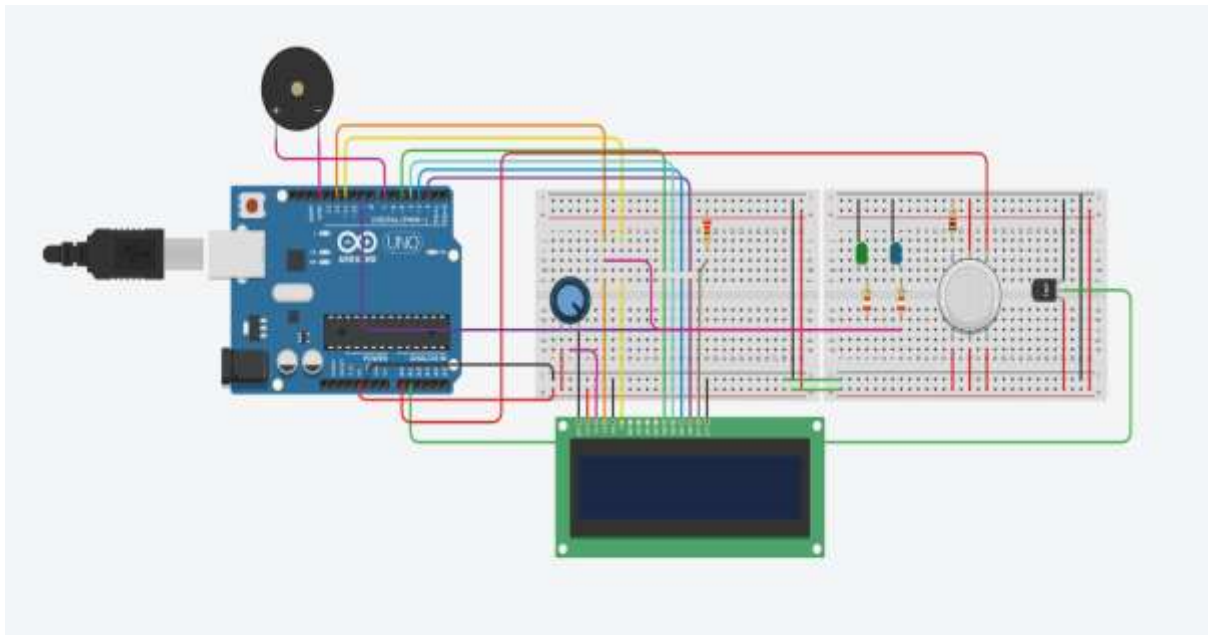**Class –** BE Artificial Intelligence and Data Science.

Roll No. – 65

Practical No. 04 - Write a program for implementing security measures in an IIoT system.

Implementing Seurity Measures for Industry by using IIOT.

Circuit Diagram –

Source Code –

```
#include <LiquidCrystal.h>

// Initialize the LCD with the pin numbers
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);


int V_GasSen = 0;
int V_TempSens = 0;


void setup() {
  pinMode(A0, INPUT); // Gas sensor pin
  pinMode(A1, INPUT); // Temperature sensor pin
  pinMode(7, OUTPUT); // Buzzer pin
```

```arduino
  pinMode(9, OUTPUT); // LED for gas detection
  pinMode(12, OUTPUT); // LED for temperature warning

  lcd.begin(16, 2); // Initialize the LCD with 16 columns and 2 rows
}

void loop() {
  // Read gas sensor value
  V_GasSen = analogRead(A0);

  // Read temperature sensor value and calculate temperature
  V_TempSens = -40 + 0.488155 * (analogRead(A1) - 20);

  // Display temperature and gas status on the LCD
  lcd.clear(); // Clear the LCD
  lcd.setCursor(0, 0); // Set cursor to the first row
  lcd.print("Temperature: "); // Print temperature label
  lcd.print(V_TempSens); // Print temperature value
  lcd.print(" C"); // Print temperature unit

  lcd.setCursor(0, 1); // Set cursor to the second row
  lcd.print("Gas: "); // Print gas label
  lcd.print(V_GasSen); // Print gas sensor value

  // Check for alerts
  if (V_GasSen >= 250) {
    tone(7, 523, 1000); // Play tone if gas is detected
    digitalWrite(9, HIGH); // Turn on the gas detection LED
    lcd.clear();
    lcd.setCursor(0, 0);
```

```
    lcd.print("ALERT: Gas Detected");

  } else {

    digitalWrite(9, LOW); // Turn off the gas detection LED

  }


  if (V_TempSens >= 70) {

    tone(7, 523, 1000); // Play tone if temperature exceeds the threshold

    digitalWrite(12, HIGH); // Turn on the temperature warning LED

    lcd.clear();

    lcd.setCursor(0, 0);

    lcd.print("ALERT: Temp High");

  } else {

    digitalWrite(12, LOW); // Turn off the temperature warning LED

  }


  delay(1000); // Delay for one second

}
```

Output –
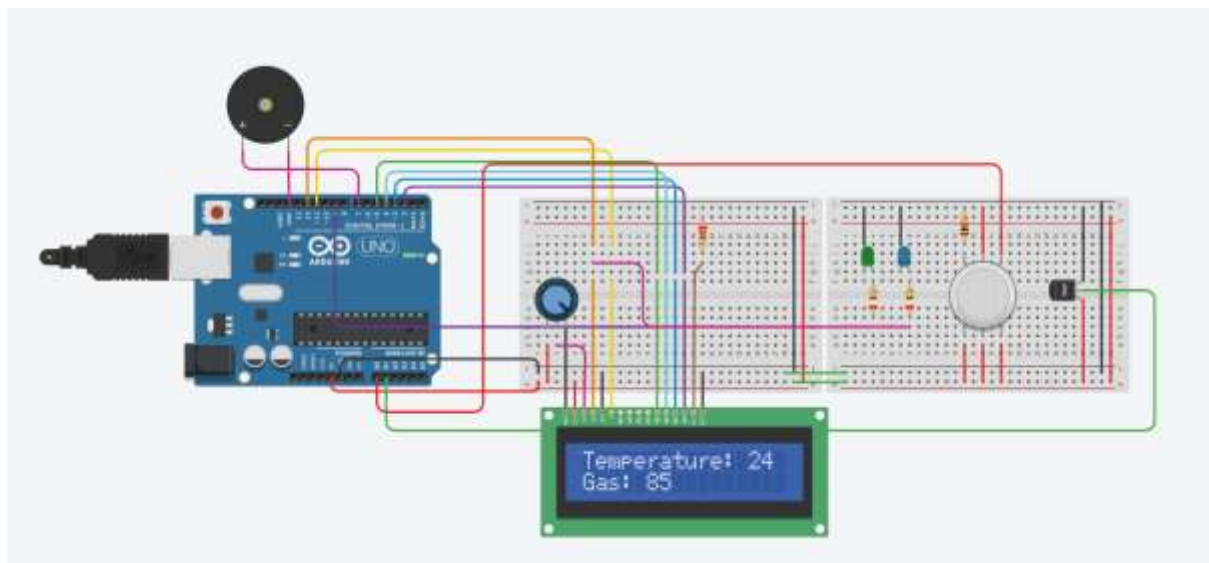
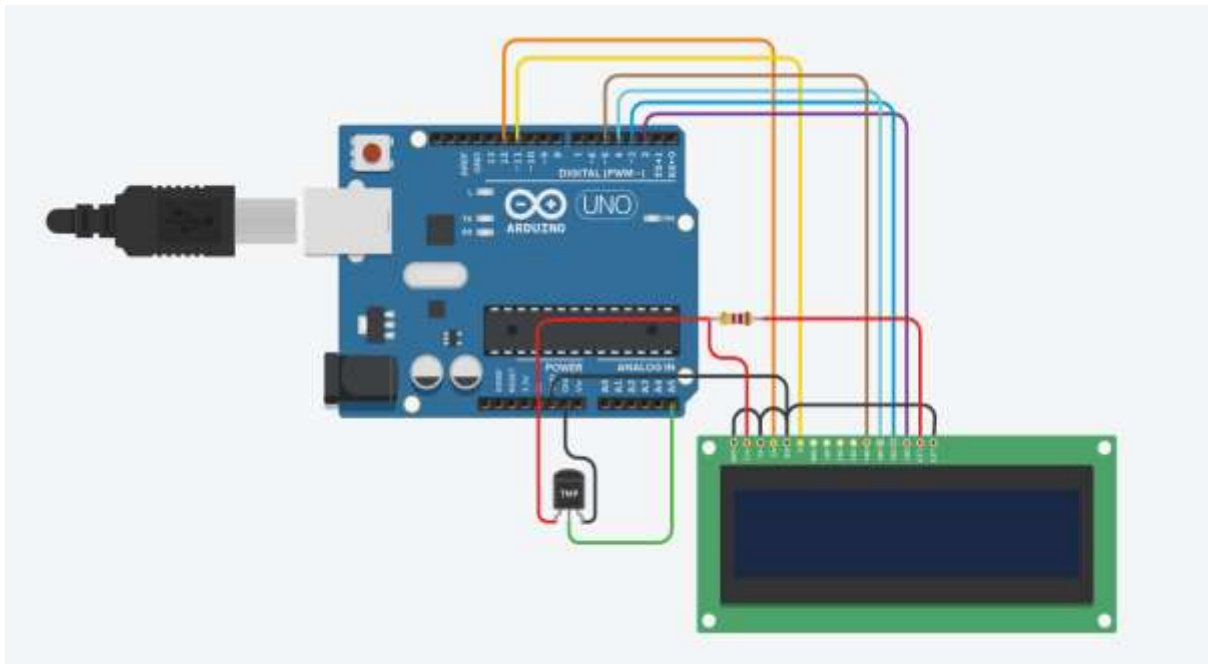**Name –** Thorave Avishkar Shrikrushna

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Roll No. – 65

Practical No. 05 - Write a program for performing industrial data analysis using relevant tools and techniques.

Circuit Diagram –

Source Code –

```
#include <LiquidCrystal.h>  // Include the LCD library


// Initialize the LCD with the number of columns and rows
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);


const int tempPin = A0;  // Analog pin connected to the LM35


void setup() {
  lcd.begin(16, 2); // Set up the LCD's number of columns and rows
  lcd.print("Temp: "); // Print a message to the LCD
```

```
}

void loop() {
  int analogValue = analogRead(tempPin); // Read the analog value from LM35
  float voltage = analogValue * (5.0 / 1023.0); // Convert the analog value to voltage
  float temperatureC = voltage * 100; // Convert voltage to temperature in Celsius

  lcd.setCursor(0, 1); // Set cursor to the beginning of the second line
  lcd.print("Temp: ");
  lcd.print(temperatureC); // Print the temperature to the LCD
  lcd.print(" C");

  delay(1000); // Wait for a second before updating the display
}
```

Output –