

Lab Assignment - 1

Problem Statement - Write a program for sending alert messages to the user for controlling and interacting with your environment.

Component Required :

Quantity	Component
1	Arduino Uno R3
1	Temperature Sensor (TMP36)
1	LED
1	Piezo
1	220 Ω Resistor

Steps To Perfrom :

Step 1: Power Up the Breadboard

Component Pin	Connect To	Note
Arduino 5V Pin	Breadboard Positive (+) Rail	Supplies 5 Volts to the breadboard.
Arduino GND Pin	Breadboard Negative (-) Rail	Creates a common ground connection.

Step 2: Connect the Temperature Sensor

Component Pin	Connect To	Note
Power Pin (Left)	Breadboard Positive (+) Rail	Powers the sensor.
Signal/Vout Pin (Middle)	Arduino Analog Pin A0	Sends temperature data to the Arduino.
Ground Pin (Right)	Breadboard Negative (-) Rail	Completes the sensor's circuit.

Step 3: Connect the LED and Resistor

Component Pin	Connect To	Note
LED Anode (Longer Leg)	One leg of the 220Ω Resistor	This is the positive side of the LED.
Resistor (Other Leg)	Arduino Digital Pin 7	The resistor protects the LED from too much current.
LED Cathode (Shorter Leg)	Breadboard Negative (-) Rail	This is the negative side of the LED.

Step 4: Connect the Buzzer

Component Pin	Connect To	Note
Buzzer Positive (+) Pin	Arduino Digital Pin 8	Receives the signal to make a sound.
Buzzer Negative (-) Pin	Breadboard Negative (-) Rail	Completes the buzzer's circuit.

Code :

```
const int sensorPin = A0; // Vout of the temperature sensor
const int ledPin = 7; // LED anode (+) directly (Tinkercad OK)
const int buzzerPin = 8; // Optional buzzer +
const float limitC = 30.0; // Alert threshold in °C

void setup() {
  Serial.begin(9600); // Open Serial Monitor at 9600 baud
  pinMode(ledPin, OUTPUT);
  pinMode(buzzerPin, OUTPUT);
}

void loop() {
  // 1. Read analog value and convert to volts
  int raw = analogRead(sensorPin);
  float voltage = (raw * 5.0) / 1023.0;

  // 2. Convert voltage to temperature (LM35 = 10 mV per °C)
  float tempC = voltage * 100.0;
```

```

// 3. Display temperature in °C
Serial.print("Temperature: ");
Serial.print(tempC);
Serial.println(" C");

// 4. Alert if temperature is above limit
if (tempC > limitC) {
  Serial.println("ALERT: High Temperature!");
  digitalWrite(ledPin, HIGH);
  digitalWrite(buzzerPin, HIGH);
} else {
  digitalWrite(ledPin, LOW);
  digitalWrite(buzzerPin, LOW);
}

delay(1000); // Update once per second
}

```

Output :

