

PRACTICAL: 3

AIM: Program using Temperature Sensors.

Objective:

This project is to measure temperature using the **TMP36 temperature sensor** and an **Arduino Uno**, then process and display the data for further analysis.

Components Required:

- **Arduino Uno** (Microcontroller Board)
- **TMP36 Temperature Sensor**
- **Jumper Wires** (Male-to-Male or Male-to-Female, as needed)

CONNECTION:

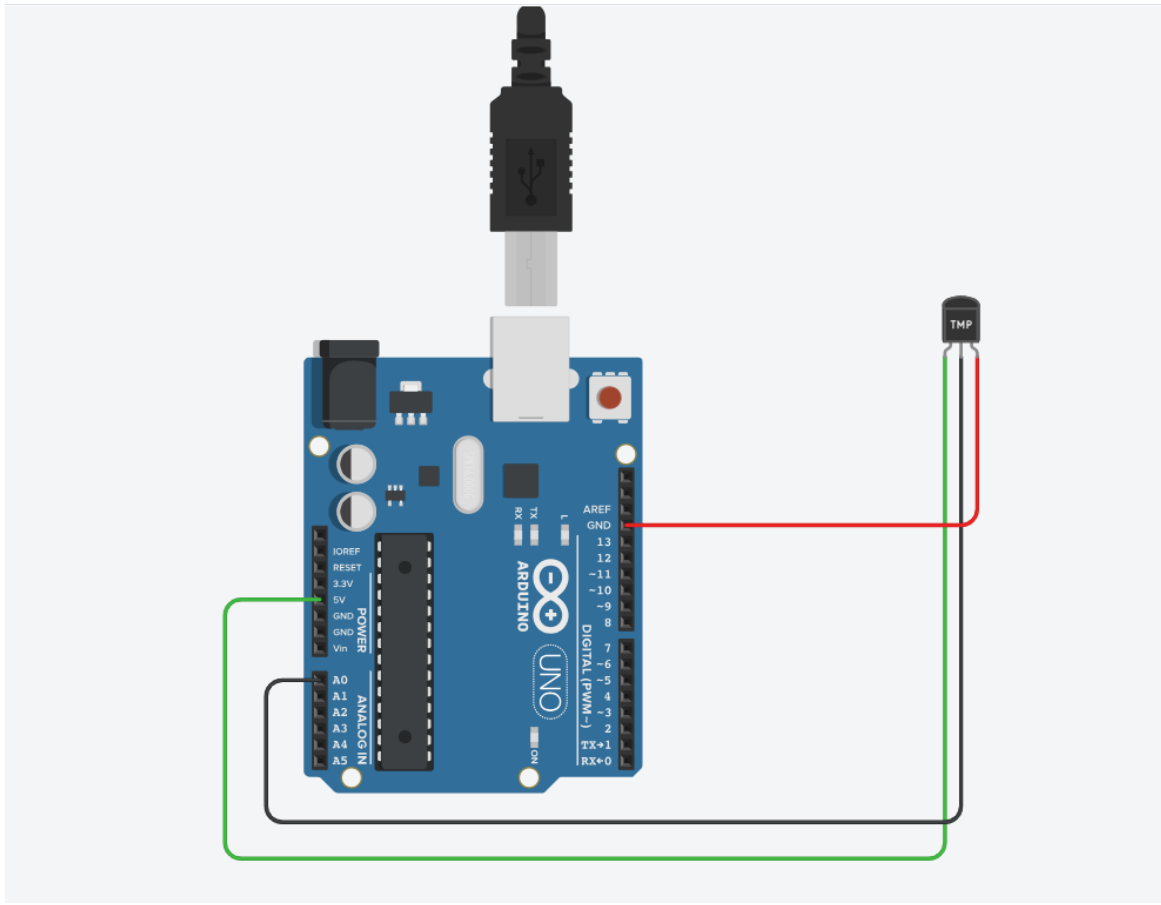
Step: 1: Identify TMP36 Pins:

- The TMP36 sensor has three pins:
 1. VCC (Left pin): Power supply (3.3V or 5V)
 2. VOUT (Middle pin): Output voltage (temperature data)
 3. GND (Right pin): Ground

Step: 2: Connect the TMP36 to the Arduino Uno:

- Connect the VCC (left pin) of the TMP36 to the 5V pin on the Arduino.
- Connect the GND (right pin) of the TMP36 to the GND pin on the Arduino.
- Connect the VOUT (middle pin) of the TMP36 to A0 (Analog Pin 0) on the Arduino.

DIAGRAM



CODE

```
const int sensorPin = A0;

void setup() {
  Serial.begin(9600);
}

void loop() {
  int sensorValue = analogRead(sensorPin);
  float voltage = sensorValue * (5.0 / 1023.0);
  float temperature = (voltage - 0.5) * 100;

  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.println(" °C");

  delay(1000);
}
```

CODE EXPLANATION

1. Defines the sensor pin:

- `sensorPin = A0` → The TMP36 temperature sensor is connected to Analog Pin A0.

2. Setup Function (`setup()`):

- Initializes serial communication at 9600 baud rate to display temperature readings on the Serial Monitor.

3. Loop Function (`loop()`):

- ❖ Reads the analog value from the TMP36 sensor.
- ❖ Converts the analog reading into voltage using:
$$\text{voltage} = \text{sensorValue} \times \left(\frac{5.0}{1023.0} \right)$$
$$\text{voltage} = \text{sensorValue} \times (1023.05.0)$$
- ❖ Converts the voltage into temperature in Celsius using:
$$\text{temperature} = (\text{voltage} - 0.5) \times 100$$
$$\text{temperature} = (\text{voltage} - 0.5) \times 100$$
- ❖ Prints the temperature value to the Serial Monitor.
- ❖ Waits 1 second (1000ms) before taking the next reading.

❖ The Output of this Shown on Serial Monitor Like this



Serial Monitor

```
temperature: 24.78 A°C  
Temperature: 24.78 Â°C  
Temperature: 24.78 Â°C  
Temperature: 24.78 Â°C  
Temperature: 24.78 Â°C  
Temperature: 24.78 Â°C
```