

# Interfacing Temperature Sensor

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## 1. Introduction

This project demonstrates the interfacing of a temperature sensor with an Arduino board. It reads the analog output from the sensor and converts it into temperature values in Celsius and Fahrenheit, which are then displayed via the Serial Monitor.

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## 2. Key Components

- Arduino Uno
  - Temperature Sensor (e.g., LM35)
  - USB Cable
  - Jumper Wires
  - Breadboard (optional)
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## 3. Working Principle

### 1. Analog Signal Reading:

The temperature sensor outputs an analog voltage corresponding to the measured temperature.

### 2. Voltage Conversion:

The analog signal (0-1023) from the sensor is converted into voltage.

### 3. Temperature Calculation (Celsius):

Using the relation of 10mV/°C with a 0.5V offset, the voltage is converted into a temperature in Celsius.

### 4. Temperature Calculation (Fahrenheit):

The Celsius value is further converted to Fahrenheit using the standard formula.

### 5. Displaying the Readings:

All readings are printed on the Serial Monitor for observation, with a delay of 3 seconds between each reading.

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#### 4. Circuit Overview

- Connect the temperature sensor's **Vcc** pin to **5V** of Arduino.
  - Connect the sensor's **GND** pin to **GND** of Arduino.
  - Connect the **analog output** pin of the sensor to **A0** analog input pin of Arduino.
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#### 5. Code

// Code written by-

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// Interfacing Temperature Sensor

int temp =A0;

float temp\_celsius;

float Voltage;

float analog\_reading;

float temp\_far;

void setup()

{

pinMode(A0, INPUT);

Serial.begin(9600);

}

void loop()

{

```

analog_reading = analogRead(A0);

Serial.print(Analog reading );

Serial.println(analog_reading);


Voltage = analog_reading*5/1024;


Serial.print(Voltage reading );

Serial.println(Voltage);


reading in celsius

converting from 10 mv per degree with 0.5v offset

temp_celsius = 100*(Voltage - 0.5);

Serial.println(Celcius reading + String(temp_celsius) + " ( C)");

temp_far = (temp_celsius * 9/5) + 32;

Serial.println(Fahrenheit reading + String(temp_far) + " (F)");

delay(3000); // give a delay of 3 seconds before repeating the loop
}

```

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## 6. Code Explanation

- **Variable Declarations:**
  - temp: Analog input pin A0 where the sensor is connected.
  - temp\_celsius, Voltage, analog\_reading, temp\_far: Variables to store intermediate readings and temperature values.
- **setup() Function:**
  - Sets pin A0 as input.
  - Starts Serial Communication at 9600 baud rate.

- **loop() Function:**

1. **Reading the Analog Value:**

Reads analog voltage from the temperature sensor via `analogRead(A0)`.

2. **Printing Analog Value:**

Prints the analog reading to the Serial Monitor.

3. **Converting to Voltage:**

Converts analog reading to corresponding voltage (although there's a mistake in multiplication format).

4. **Printing Voltage:**

Prints the calculated voltage.

5. **Calculating Celsius Temperature:**

Converts the voltage to Celsius temperature considering 10mV per °C and an offset.

6. **Printing Celsius Temperature:**

Prints the Celsius value.

7. **Converting to Fahrenheit:**

Converts Celsius temperature to Fahrenheit.

8. **Printing Fahrenheit Temperature:**

Prints the Fahrenheit value.

9. **Delay:**

Waits 3 seconds before repeating the process.

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## 7. Conclusion

This project successfully demonstrates how to interface a temperature sensor with Arduino. By processing analog readings and applying simple calculations, it is possible to monitor real-time temperatures in both Celsius and Fahrenheit. This forms the foundation for more advanced IoT and environmental sensing projects.

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Circuit design Fabulous Bojo-Li X Dashboard - Tinkercad X Circuit design Sizzling Fyran X +

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Sizzling Fyran All changes saved

Code Stop Simulation Send To

Simulator time: 00:00:11

Temperature Sensor [TMP36] ?

Name 2

The image shows a Tinkercad workspace with an Arduino Uno R3 board. A TMP36 temperature sensor is connected to the board's 5V, GND, and A0 pins. A potentiometer is also connected to the 5V and GND pins. The interface includes a top navigation bar, a toolbar, and a bottom status bar showing the system temperature as 27°C.