



MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY
SANTOSH, TANGAIL-1902

DEPARTMENT OF
INFORMATION AND COMMUNICATION TECHNOLOGY

LAB REPORT

Lab Report No: 04

Lab Report On: Observe Temperature from environment using Arduino and temperature sensor.

Course Title : Computer Peripheral and Interfacing Lab

Course Code : ICT-3206

Submitted By	Submitted To
Mahmudul Hasan ID: IT-21019 3rd Year, 2nd Semester Session: 2020-2021 Dept. of ICT, MBSTU	Md. Anowar Kabir Lecturer Dept. of ICT MBSTU

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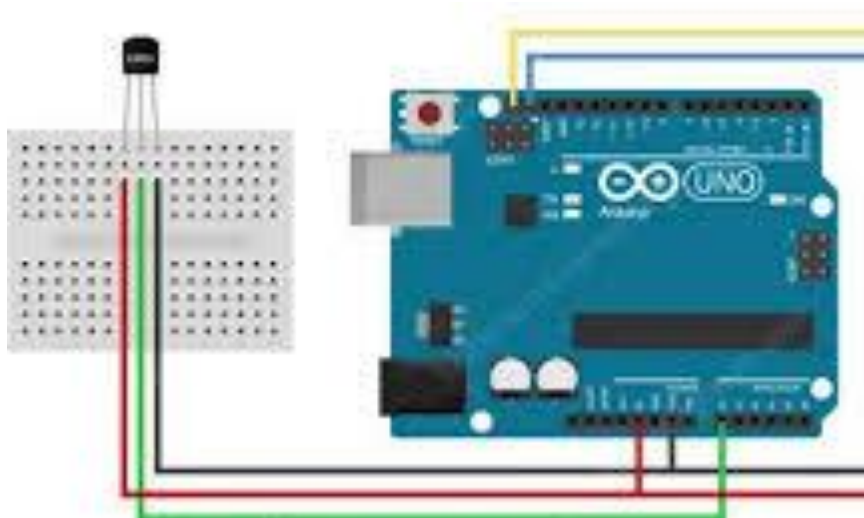
Lab Title: Observe Temperature from environment using Arduino and temperature sensor.

Introduction: This experiment focuses on capturing and monitoring environmental temperature using an Arduino and a temperature sensor. By integrating the LM35 sensor, the system collects real-time temperature data, processes it through the Arduino, and displays the readings on a serial monitor. This setup demonstrates the practical application of Arduino in environmental sensing and highlights its potential for developing efficient.

Objectives: The objective of this experiment is to design and implement a system for measuring environmental temperature using an Arduino and a temperature sensor. It involves creating a circuit, programming the Arduino to capture and process temperature data, and displaying the results in real time. Additionally, the experiment aims to test the system's functionality by exposing the sensor to varying temperature conditions and verifying its accuracy.

Apparatus:

1. Arduino Mega 2560
2. Temperature sensor (LM35)
3. Resistor (1 k Ω)
4. Breadboard
5. Jumper wires
6. USB cable for programming



Working Procedure:

Here are the steps to set up and operate the temperature monitoring system using an Arduino and a temperature sensor.

1. Circuit Connection:

- Connect the VCC pin of the temperature sensor to the 5V pin on the Arduino board.
- Attach the GND pin of the sensor to the GND pin on the Arduino.
- Link the sensor's data pin to analog pin A0 on the Arduino board.

2. Code Implementation:

```
const int lm35Pin = A0;
void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
}

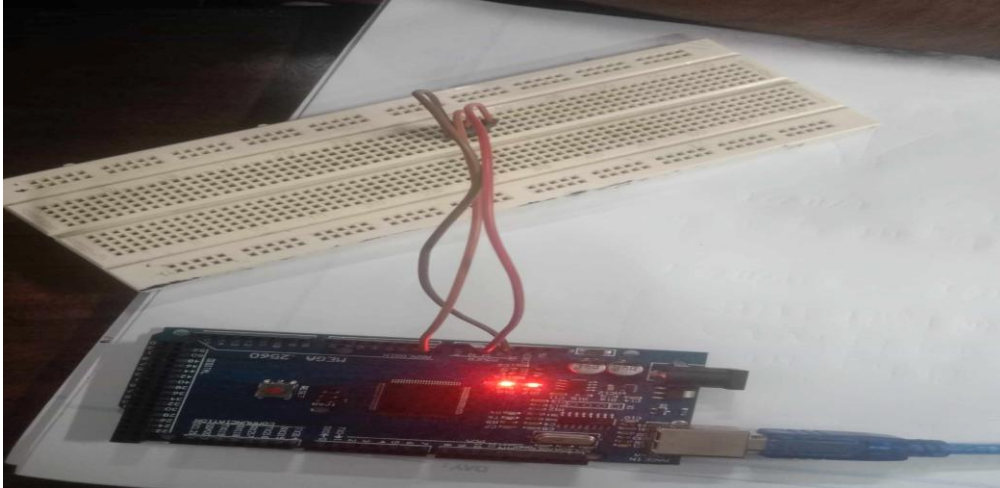
void loop() {
  // read analog value from the lm35
  int analogValue = analogRead(lm35Pin);
  Serial.println(analogValue);
  //convert the analog value to voltage(0-5v)
  float voltage = analogValue * (5.0 / 8191.0);
  Serial.println(voltage);
  //the lm35 gives 10mV per degree celcius
  float temperatureC = voltage * 100.0;
  Serial.println(String(" Temperature: ") + temperatureC + " C");
  delay(1000);
}
```

3. Upload the Code:

- Connect the Arduino board to the laptop using the USB cable.
- Upload the code to the Arduino board via the Arduino IDE.

4. Testing and Observation:

- The temperature sensor successfully captured real-time temperature data from the environment.
- The LM35 sensor maintained consistent performance and precision during the testing phase.



Results:

The system effectively measured and displayed environmental temperature in real-time on the serial monitor. It accurately detected and responded to changes in temperature, validating its functionality for environmental monitoring applications.

Conclusion:

The experiment successfully demonstrated the use of an Arduino and a temperature sensor to monitor environmental temperature. The system reliably captured and displayed temperature readings in real-time, showcasing its potential for applications like weather monitoring and smart temperature control systems.