# PREMIER UNIVERSITY CHATTOGRAM

DEPARTMENT OF **COMPUTER SCIENCE AND ENGINEERING**

# Lab Report

| COURSE NAME | Microcontrollers Laboratory |
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| COURSE CODE | CSE3816 |
| REPORT NO | 04 |
| REPORT NAME | Making LCD Thermometer with Arduino and LM35. |
| DATE OF REPORT | 18-05-24 |

| SUBMITTED TO | |
|---|---|
| MOHAMMED SAIFUDDIN MUNNA<br><br>ASSISTANT PROFESSOR<br><br>DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING | |

| REMARKS | SUBMITTED BY | |
|---|---|---|
| | NAME | Rimjhim Dey |
| | ID | 0222220005101039 |
| | SEMESTER | 4th |
| | BATCH | 42 |
| | SESSION | Spring 2024 |
| | SECTION | A |

Experiment Name:

 Making LCD Thermometer with Arduino and LM35 .

Objective:

The objective of this project is to create a digital thermometer using an Arduino microcontroller, an LM35 temperature sensor, and an LCD display. The thermometer will measure the ambient temperature and display it on the LCD screen in real-time.

Instruments Required:

* Temperature Sensor (LM35)

* 16×2 LCD I2c

* Jumper wires (generic)

* Arduino UNO

* Breadboard(generic)

Circuit Diagram:
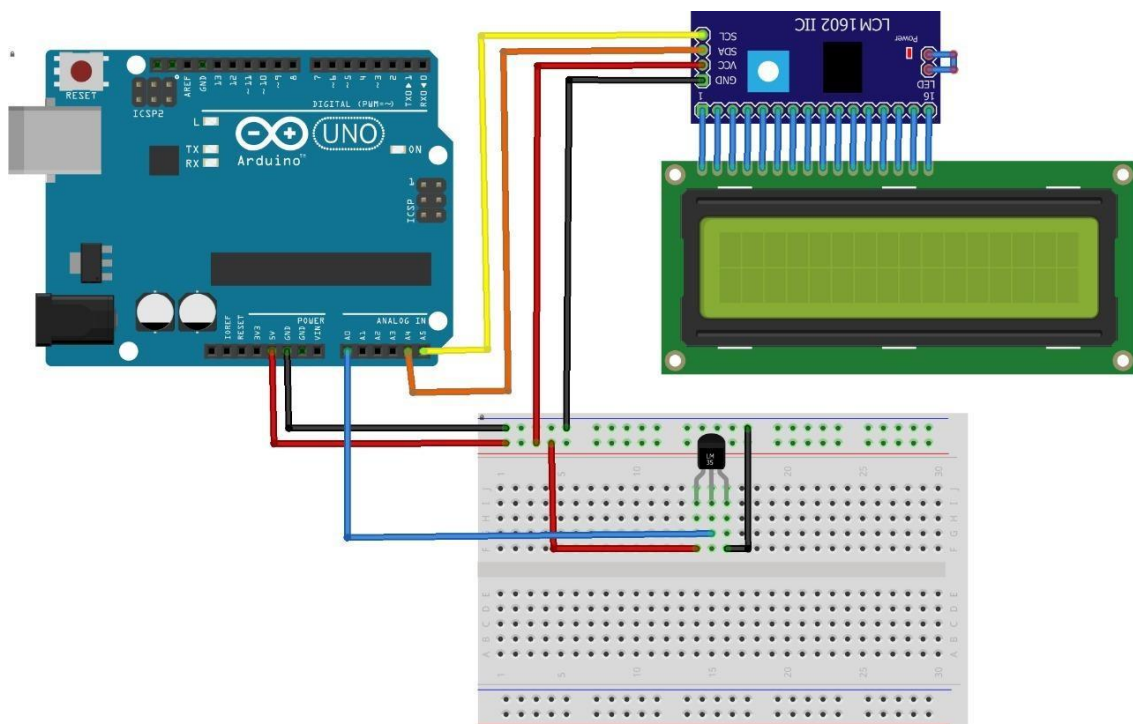
Source Code:

```cpp
#include <Wire.h>
#include <LiquidCrystal_I2C.h>


const int LEDR = 5;
const int LEDG = 7;
const int sensor = A0;


float temp;
float tempc;
float tempf;
int t = 0;


LiquidCrystal_I2C lcd(0x27, 16, 2);

void setup() {
  pinMode(LEDR, OUTPUT);
  pinMode(LEDG, OUTPUT);
  pinMode(sensor, INPUT);

  lcd.begin();
  lcd.backlight();
  lcd.setCursor(0, 0);
  lcd.print("Premier University");
  lcd.setCursor(0, 1);
  lcd.print("TEMPERATURE METER");
  delay(3000);

  Serial.begin(9600);
}

void loop() {
  delay(2000);
  t += 2;


  temp = analogRead(sensor);


  float voltage = temp * (5.0 / 1023.0);


  tempc = (voltage - 0.5) * 100.0;


  tempf = (tempc * 1.8) + 32;
```

```
Serial.println("_____");
Serial.println("Temperature Logger");
Serial.print("Time in Seconds= ");
Serial.println(t);
Serial.print("Temp in deg Celsius = ");
Serial.println(tempc);
Serial.print("Temp in deg Fahrenheit = ");
Serial.println(tempf);

lcd.clear();
lcd.setCursor(0, 0);
lcd.print("Temp in C = ");
lcd.print(tempc);
lcd.setCursor(0, 1);
lcd.print("Temp in F = ");
lcd.print(tempf);


if (tempc < 35) {
  digitalWrite(LEDG, LOW);
  digitalWrite(LEDR, HIGH);
} else {
  digitalWrite(LEDR, LOW);
  digitalWrite(LEDG, HIGH);
}
}
```

Output:

The LCD will display the current temperature in Celsius and Fahrenheit. The serial monitor will log the temperature values along with the time in seconds since the program started. The LEDs will light up based on the temperature:

- The red LED will light up if the temperature is below 35°C.
- The green LED will light up if the temperature is 35°C or above.

## Discussion:

In this experiment, we created a temperature logging device using an Arduino Uno, LM35 sensor, and a 16x2 I2C LCD. The LM35 sensor provides a voltage proportional to the temperature, which the Arduino converts to Celsius and Fahrenheit. These values are displayed on the LCD and logged to the serial monitor. LEDs indicate temperature thresholds: red for below 35°C and green for 35°C or above.

Limitations include the LM35's accuracy (±0.5°C) and the absence of advanced features like data logging. Future improvements could include adding remote monitoring and more precise sensors. This project is a solid introduction to Arduino programming and sensor integration.