Enrollment No. : 202203103510097

CIE 2 : Arduino with LCD and Temperature Sensor

Aim : To interface an LCD display and a temperature sensor (such as LM35 or DHT11) with an Arduino to display real-time temperature readings.

Overview :

This project demonstrates how an Arduino microcontroller can read temperature data from a **sensor** and display it on an **LCD screen**. It helps in understanding sensor interfacing, analog-to-digital conversion, and real-time data visualization using an LCD.

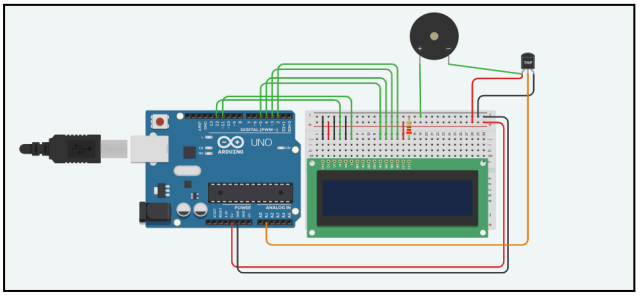
Materials Required :

- Arduino Uno R3
- LCD 16x2
- 3 x 1kΩ Resistor
- Temperature Sensor (TMP36)
- Piezo Buzzer
- Jumper Wires
- Arduino IDE (Installed on your Computer)

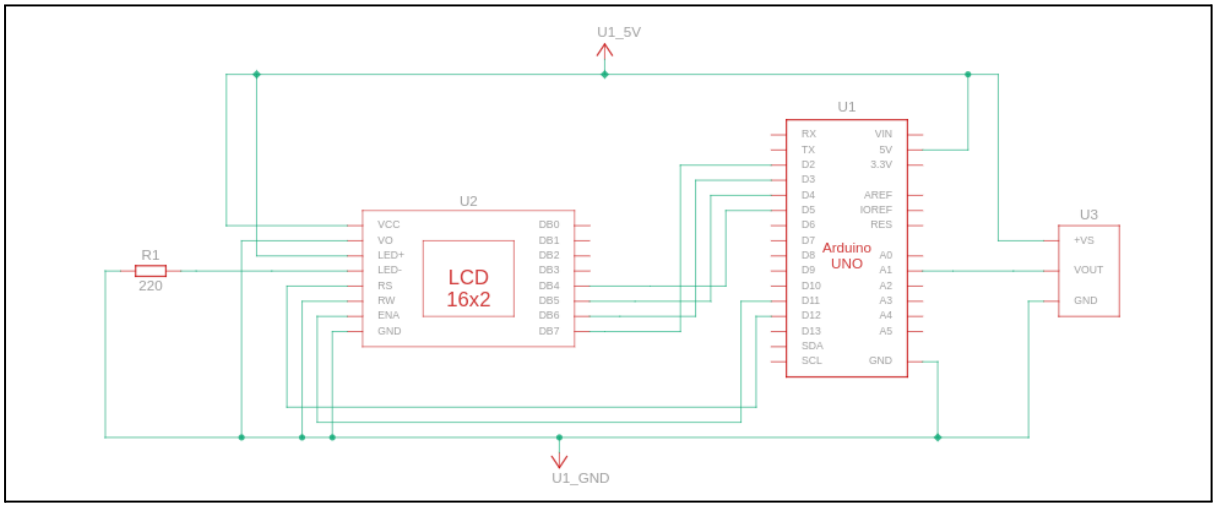
Circuit Connection and Steps :

1. **Connect LCD (16x2) with I2C to Arduino:**
   - **VCC → 5V, GND → GND**
   - **SDA → A4, SCL → A5**
2. **Connect Temperature Sensor (LM35) to Arduino :**
   - **VCC → 5V, GND → GND, OUT → A0**
3. **If Using DHT11 Instead of LM35 :**
   - **VCC → 5V, GND → GND, Data → D2** (Use 10kΩ pull-up resistor if needed)
4. **Set Up Arduino IDE :**
   - Open Arduino IDE
   - Install **"LiquidCrystal_I2C"** and **"DHT sensor"** libraries (if needed)
   - Select the correct board and port
   - Upload the code and observe temperature readings on LCD

Circuit Diagram :



Schematic Diagram :



Code :

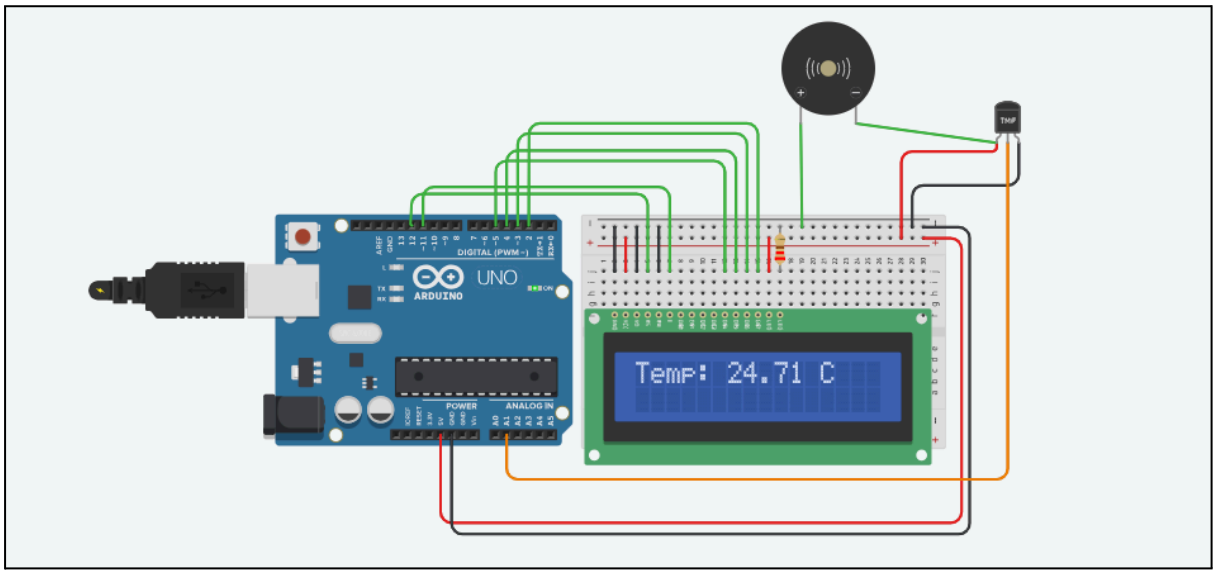
```
#include <LiquidCrystal.h>

// Define LCD pin connections
const int RS = 12, EN = 11, D4 = 5, D5 = 4, D6 = 3, D7 = 2;
LiquidCrystal lcd(RS, EN, D4, D5, D6, D7);

// Temperature sensor pin
const int TEMP_SENSOR = A1;

void setup() {
    lcd.begin(16, 2); // Initialize LCD (16×2 display)
    pinMode(TEMP_SENSOR, INPUT);
}

void loop() {
    // Read temperature sensor value
    float voltage = analogRead(TEMP_SENSOR) * (5.0 / 1023.0);
    float temperature = (voltage - 0.5) * 100.0;

    // Display temperature on LCD
    lcd.setCursor(0, 0);
    lcd.print("Temperature:");

    lcd.setCursor(0, 1);
    lcd.print(temperature);
    lcd.print(" C");

    delay(1000);  // Update every second
    lcd.clear();
```

```
}
```

Results :

The **LCD screen** will display real-time temperature readings.

- The temperature sensor will measure the surrounding temperature and send the data to the **Arduino**.
- The **LCD will update every 1 second**, showing the current temperature in **Celsius**.
- If the temperature changes, the display will reflect the new value dynamically.
- This cycle will **repeat indefinitely**, continuously monitoring and displaying temperature readings.



Conclusion :

This project successfully **interfaces an LCD and a temperature sensor** with an Arduino. It provides practical experience with **sensor integration, data display and I2C communication**. It can be extended for **real-time temperature monitoring in smart home systems**.