IOT LAB 49+50

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EXPERIMENT 3

AIM : LCD DISPLAY AND PRINTING TEMPERATURE AND HUMIDITY ON LCD

PROCEDURE :
Components Required
HARDWARE COMPONENTS:

1. Microcontroller: Arduino, ESP8266, or ESP32.
2. Temperature and Humidity Sensor: DHT11 or DHT22.
3. LCD Display: 16x2 or 20x4 character LCD.
4. Breadboard and Jumper Wires: For connections.
5. Resistors: For pull-up or current-limiting purposes.
6. Power Supply: USB cable or external power source.

Software Requirements:

1. Arduino IDE (if using Arduino-based microcontroller)
2. DHT Sensor Library
3. LiquidCrystal Library (for Arduino LCD)
4. Wire Library (for I2C communication)

Steps to Perform the Experiment

Step 1: Circuit Connections

1. Connect the DHT11/DHT22 Sensor:

- VCC → 5V (or 3.3V, depending on the sensor).
- GND → GND.
- Data Pin → Digital Pin of the microcontroller (e.g., D2 on Arduino).

2. Connect the LCD Display:

- VSS → GND.
- VDD → 5V.
- V0 → Potentiometer (to adjust contrast).
- RS → Digital Pin (e.g., D7 on Arduino).
- RW → GND.
- E → Digital Pin (e.g., D8 on Arduino).
- D4-D7 → Digital Pins (e.g., D9-D12 on Arduino).
- A (Backlight Anode) → 5V.
- K (Backlight Cathode) → GND.

3. Add a Potentiometer:

- Connect the potentiometer to adjust the LCD contrast.

Step 2: Install Required Libraries

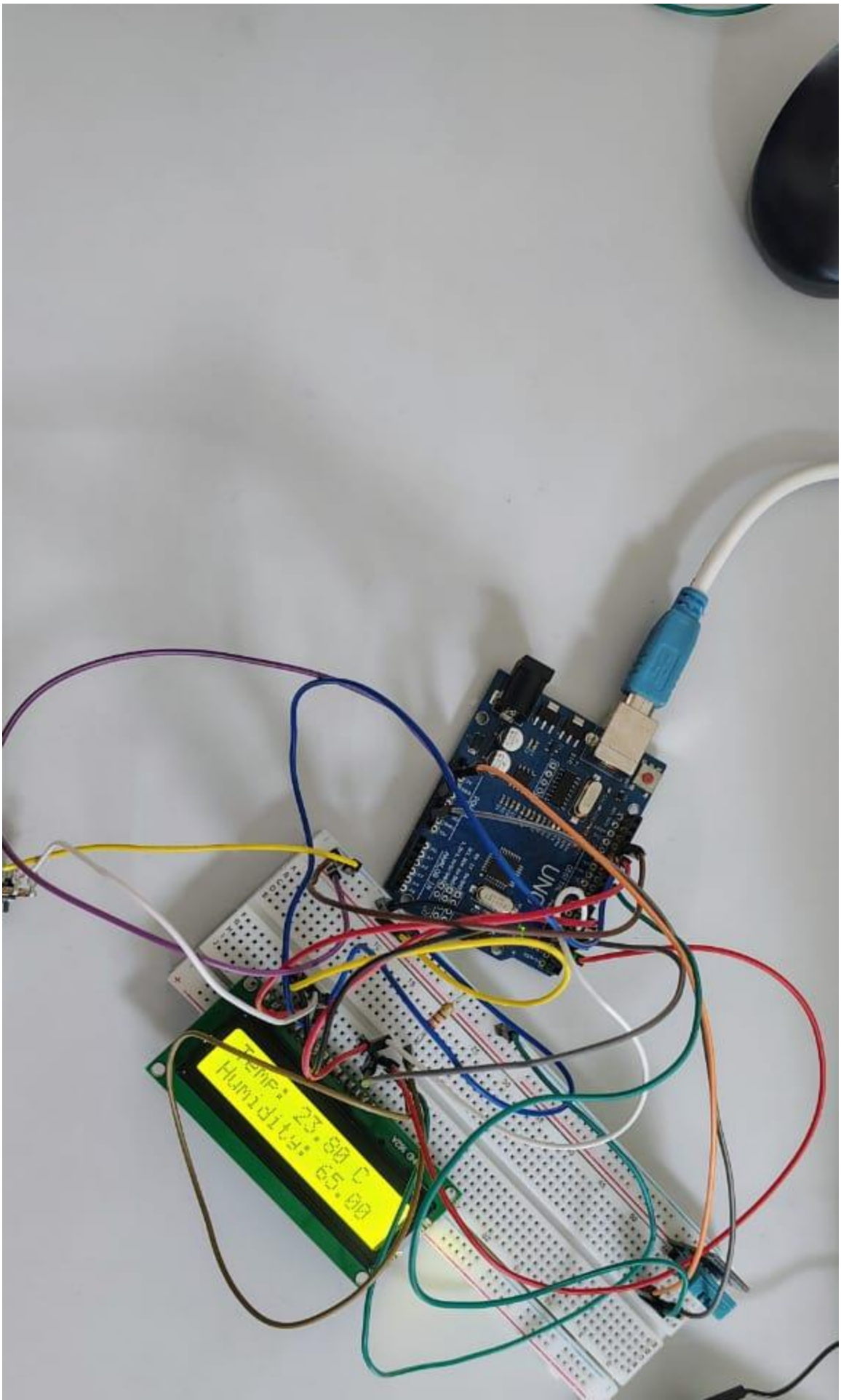
- Install the following libraries in the Arduino IDE:
  - `LiquidCrystal` (for LCD interfacing).
  - `DHT` (for DHT11/DHT22 sensor).

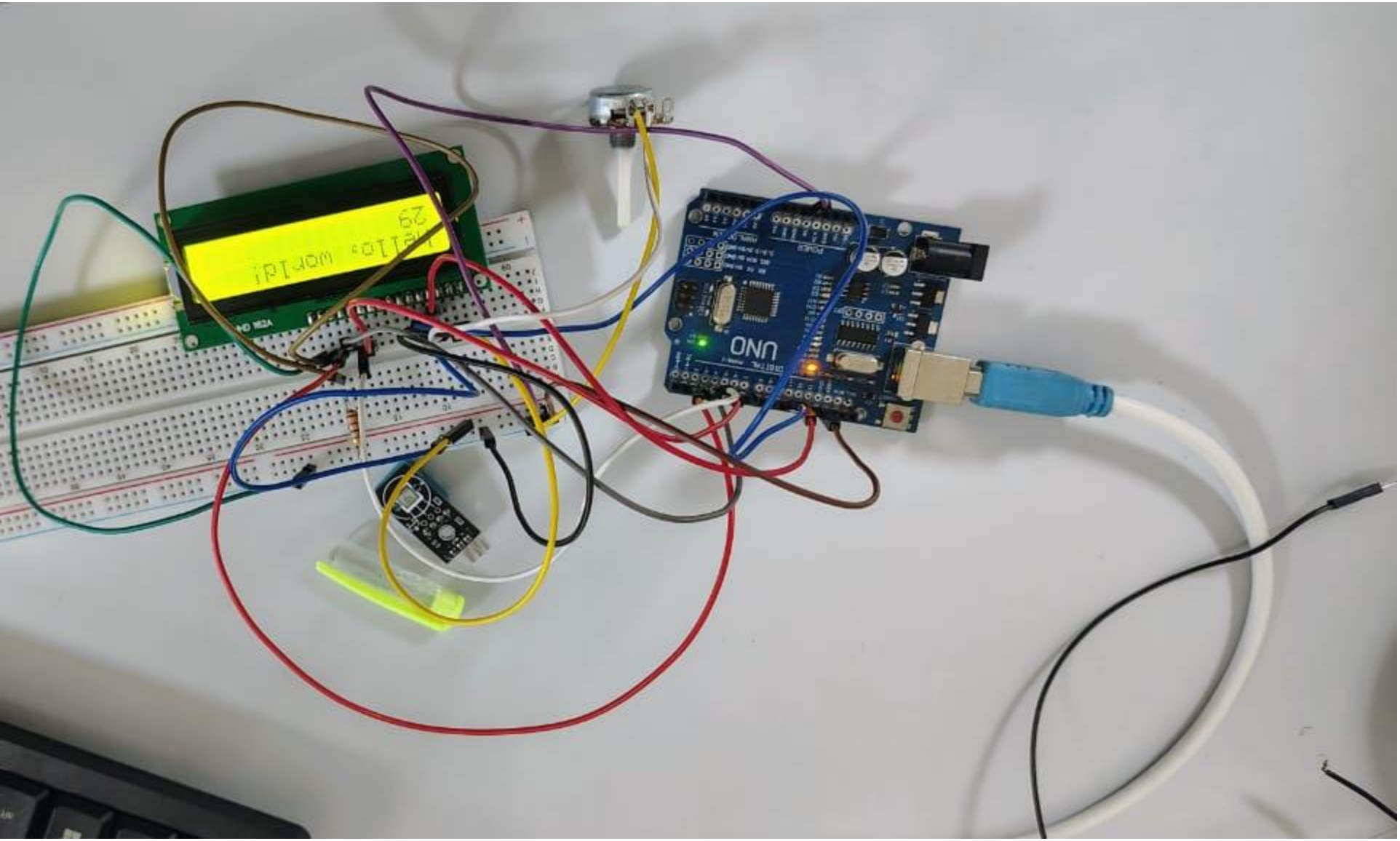
Step 3: Write the Code

```
#include <LiquidCrystal.h>
#include <DHT.h>
// Define pins
#define DHTPIN 2          // DHT sensor connected to D2
#define DHTTYPE DHT11     // DHT11 or DHT22
#define RS_PIN 7          // LCD RS pin
#define E_PIN 8           // LCD Enable pin
#define D4_PIN 9          // LCD D4 pin
#define D5_PIN 10         // LCD D5 pin
#define D6_PIN 11         // LCD D6 pin
#define D7_PIN 12         // LCD D7 pin
// Initialize objects
DHT dht(DHTPIN, DHTTYPE);
LiquidCrystal lcd(RS_PIN, E_PIN, D4_PIN, D5_PIN, D6_PIN, D7_PIN);
void setup() {
  // Initialize LCD
  lcd.begin(16, 2);       // 16x2 LCD
  lcd.print("Temp & Humidity");
  // Initialize DHT sensor
  dht.begin();
}
```

```
void loop() {
  // Read temperature and humidity
  float temperature = dht.readTemperature();  // in Celsius
  float humidity = dht.readHumidity();        // in percentage
  // Check if readings are valid
  if (isnan(temperature) || isnan(humidity)) {
    lcd.setCursor(0, 1);
    lcd.print("Sensor Error!");
    return;
  }
 // Display temperature and humidity on LCD
  lcd.setCursor(0, 0);
  lcd.print("Temp: ");
  lcd.print(temperature);
  lcd.print(" C");
  lcd.setCursor(0, 1);
  lcd.print("Humidity: ");
  lcd.print(humidity);
  lcd.print(" %");
  // Wait for 2 seconds before next reading
  delay(2000);
}
```

OUTPUT:


Temp: 23.00 C
Humidity: 65.00


UNO

RESULT:

Hence , I display hello world on lcd and print temperature and humidity on lcd successfully .