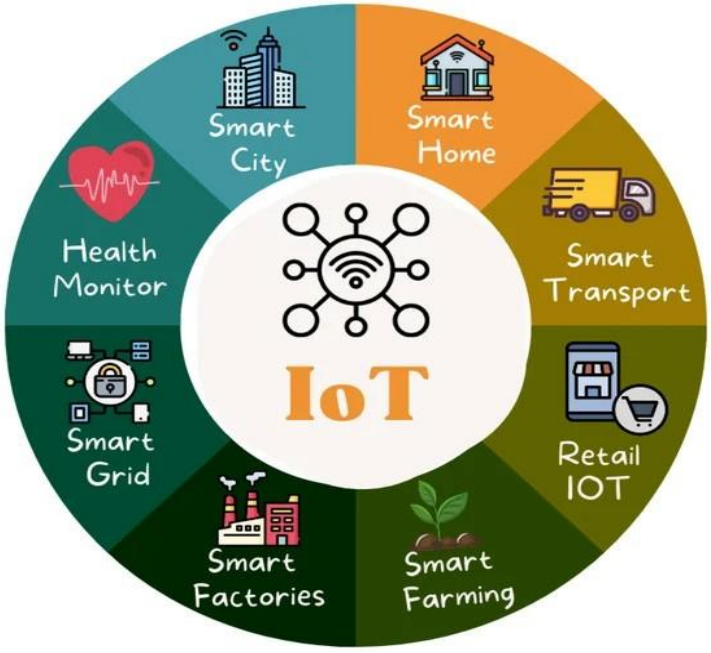
Royal University of Bhutan

College of Science and Technology

Rinchending: Chhukha

In pursuit of preparing tomorrow's technologist



Lab Exercise 04 : Building a home automation system.

Module : Internet of Things (NWC202)

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Submitted by :

Group 13

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1. **Aim:**

To design and build a simple home automation system using an Arduino Uno board. The system will monitor the room temperature and humidity using a DHT11 sensor and activate a fan when the temperature exceeds a set threshold (35°C).

2. **Procedure:**

a. Gather materials:

1. Arduino Uno board
2. LCD display (16x2 character display recommended)
3. DHT11 temperature and humidity sensor
4. Breadboard and jumper wires
5. DC motor
6. 5V SPDT Relay Module

b. Connect the components:

1. Follow the circuit diagram below to connect the LCD display, DHT11 sensor and DC motor to the Arduino Uno board.
2. Ensure proper power and ground connections for all components.

c. Upload the code:

1. Open the provided code in the Arduino IDE (Integrated Development Environment).
2. Connect the Arduino Uno board to your computer.
3. Select the appropriate board and serial port from the Tools menu.
4. Upload the code to the Arduino board.

d. Observe the output:

1. The LCD display should show the current temperature reading in Celsius.
2. If the temperature exceeds 20°C, the DC motor will rotate continuously.

e. Record observations and measurements:

1. Note the displayed temperature and any observations about the DC motor behavior.

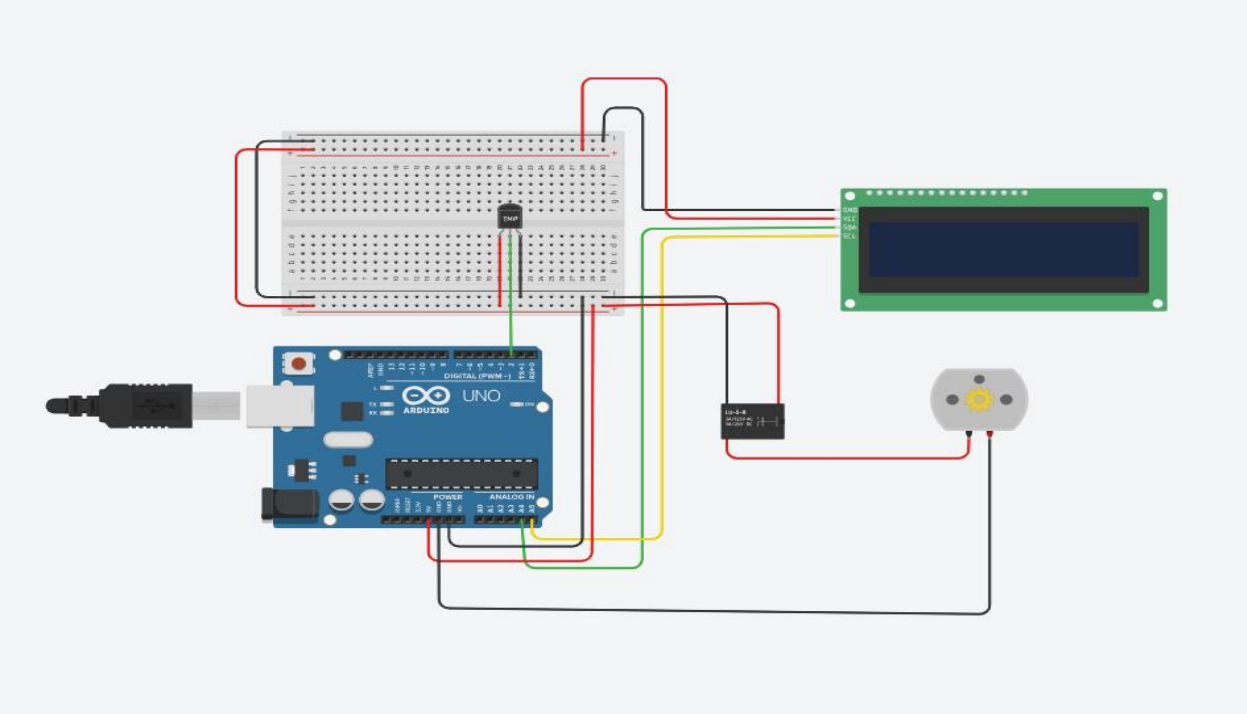
3. **Materials Required:**

1. Arduino Uno board
2. LCD display (16x2 character display)

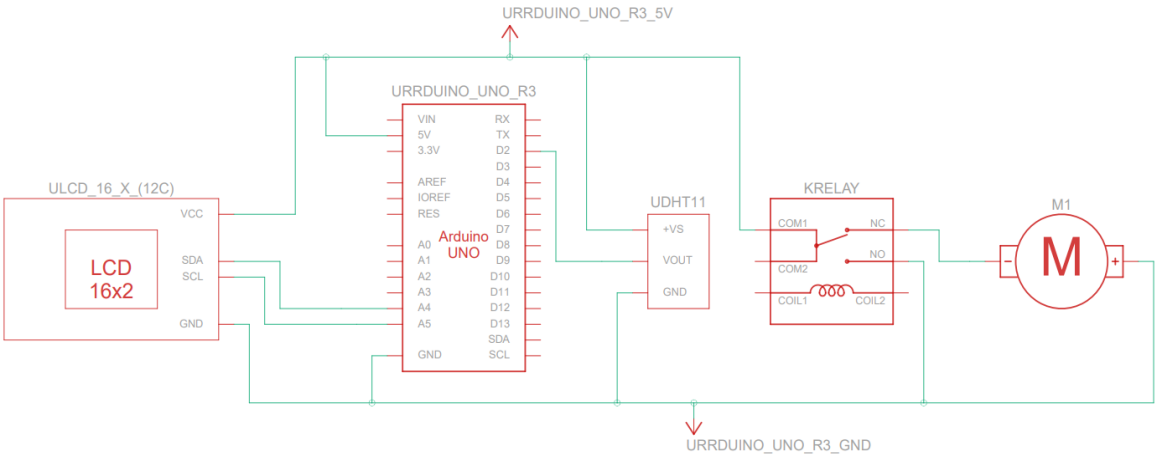
3. DHT11 temperature and humidity sensor
4. Breadboard and jumper wires
5. DC motor

4. *Circuit Diagram:*

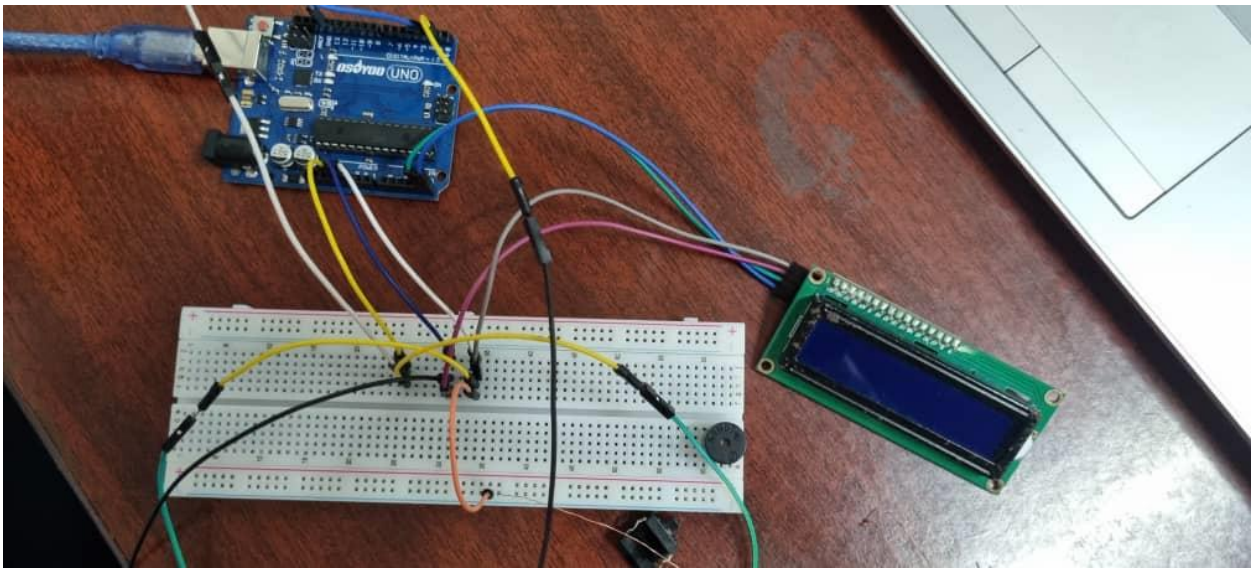
a. *Circuit diagram:*



b. *Schematic Diagram:*



c. *Breadboard diagram (Picture capture)*



5. *Code:*

```
#include <dht.h>

#define DHTPIN 5v  // Pin where the DHT11 is connected
#define MOTORPIN 8 // Pin where the motor is connected

dht DHT;

void setup() {
  pinMode(MOTORPIN, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // Read temperature from the DHT11 sensor
  int chk = DHT.read11(DHTPIN);
  float temp_c = DHT.temperature;

  if (temp_c > 20.0) {
    // If temperature exceeds 20 degrees Celsius, rotate the motor
    digitalWrite(MOTORPIN, HIGH);
    Serial.println("Room temperature exceeds 20°C. Turning on motor.");
  } else {
    // If temperature is below or equal to 20 degrees Celsius, stop the motor
    digitalWrite(MOTORPIN, LOW);
    Serial.println("Room temperature is below or equal to 20°C. Stopping
motor.");
```

```
  }

  delay(1000); // Delay for stability
}
```

35. Output:

36. Conclusion:

37. References: