

```
1 #include <OneWire.h>
2 #include <DallasTemperature.h>
3 #include <LiquidCrystal_I2C.h>
4 LiquidCrystal_I2C lcd(0x27, 16, 2);
5
6 #define SENSOR_PIN A0 // Analog pin connected to LM35 sensor's output
7 #define RELAY_PIN 7 // Digital pin connected to the relay module
8
9 const float TEMP_THRESHOLD_UPPER = 50;
10
11
12 OneWire oneWire(SENSOR_PIN); // Setup a oneWire instance
13 DallasTemperature sensors(&oneWire); // Pass oneWire to DallasTemperature library
14
15
16 void setup() {
17     Serial.begin(9600); // Initialize serial communication
18     sensors.begin(); // Initialize the sensor
19     pinMode(RELAY_PIN, OUTPUT); // Initialize digital pin as an output
20     lcd.init();
21     lcd.backlight();
22 }
23
24 void loop() {
25     int value1 = analogRead(SENSOR_PIN);
26     double tempC = value1 * (5.0 / 1023.0) * 100;
27     double tempF = tempC * 9 / 5 + 32;
28
29     lcd.setCursor(0, 0);
30     lcd.print("..Temperature..");
31     lcd.setCursor(0, 1);
32     lcd.print("C:");
33     lcd.print(tempC);
34     lcd.setCursor(8, 1);
35     lcd.print(" F:");
36     lcd.print(tempF);
37
38     Serial.print("Temperature C: ");
39     Serial.print(tempC);
40     Serial.print("'C");
41     Serial.print("\t");
42     Serial.print("Temperature F: ");
43     Serial.print(tempF);
44     Serial.println("'F");
45
46
47     if (tempC < TEMP_THRESHOLD_UPPER) {
48         Serial.println("The heating element is turned off");
49         digitalWrite(RELAY_PIN, HIGH); // Turn off the relay
50     } else {
51         Serial.println("The heating element is turned on");
52         digitalWrite(RELAY_PIN, LOW); // Turn on the relay
53     }
54
55     delay(500);
56 }
```