Mapúa University

School of Electrical, Electronics and Computer Engineering

Real Time Embedded System
COE187P/ E01

Humidity Sensor
Lab: #05

Submitted By:

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I.   Introduction

Humidity is the amount of water vapor present in the atmosphere and is invisible to the human eye, humidity is not only important to humans but also for the plants and animals. Humidity sensor measures the moisture and the air temperature and is used in many devices and machines; the humidity sensor I am going to use is the DHT11 which is a digital temperature and humidity sensor which I also used in Lab #04 and which will require a library for the Arduino code and the sensor to work.

II.   Objectives

1. Familiarize the basic connection and functions of Arduino UNO

2. Familiarize on coding the Arduino UNO

3. Familiarize on using different libraries for the sensors and other modules

4. Familiarize on using the Serial Monitor

5. Familiarize on how to code the LCD in Arduino UNO

6. Use LCD to display the Humidity

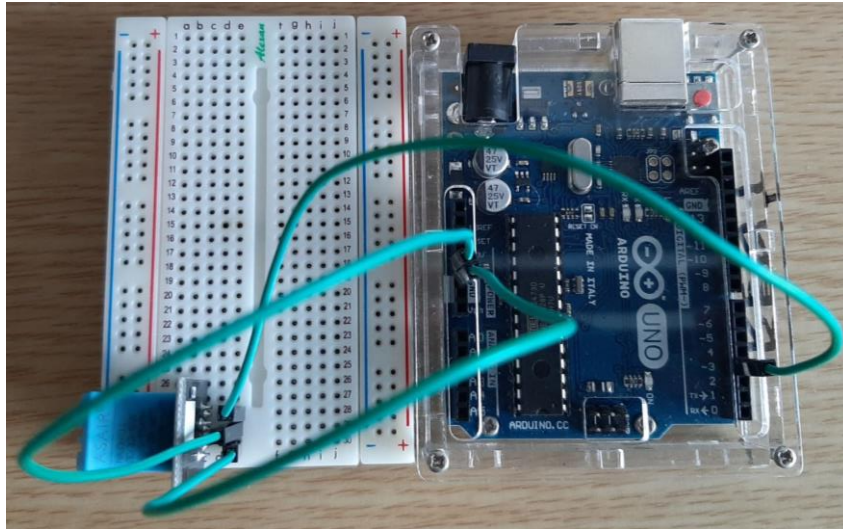7. Use DHT11 as the Humidity Sensor

III.   Materials and Components

- Arrduino UNO and peripherals
- Jumper Wires
- Breadboard
- Arduino IDE / Visual Studio with Arduino IDE plugin
- DHT11 Humidity and Temperature Sensor
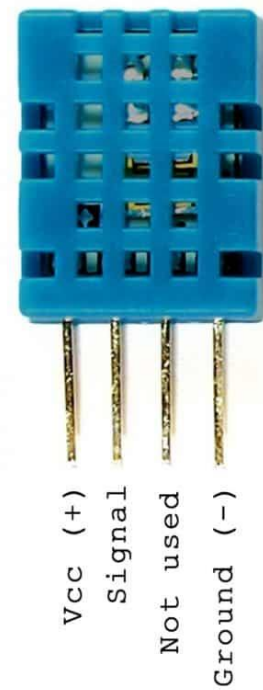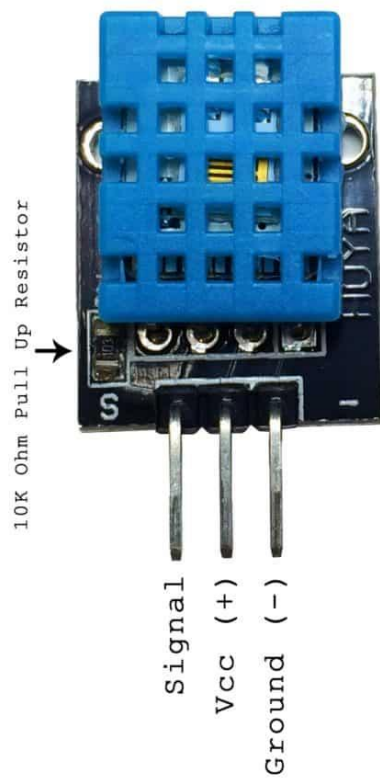- LCD with IC PCF

IV.   PROCEDURE

<u>Part01: Humidity Sensor and Serial</u>

1. Follow the Connection of the DHT11 to the Arduino

2. Connect the VCC to 5 volts and GND to ground of the Arduino
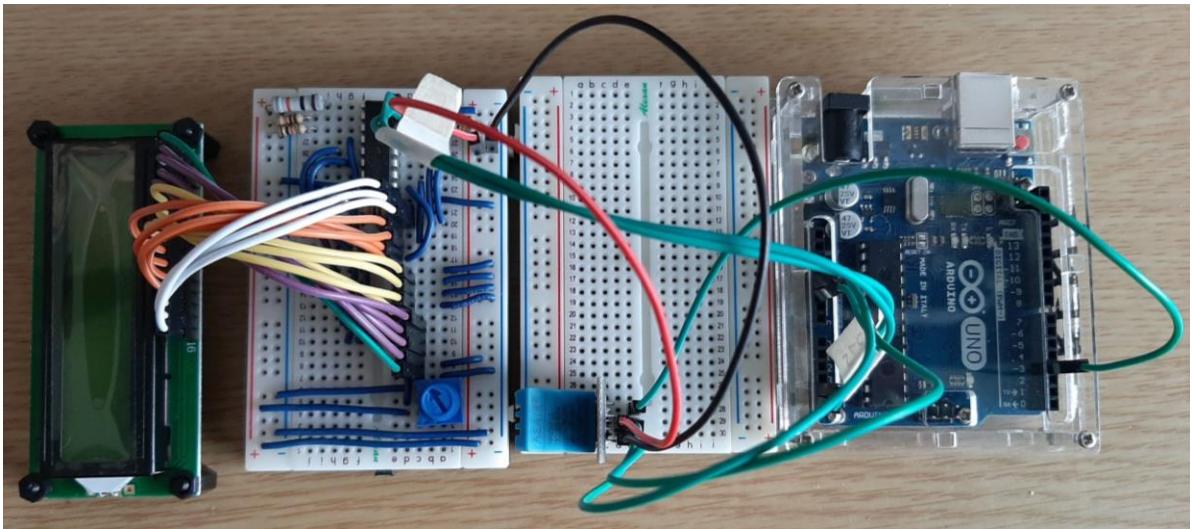3. Connect the Signal pin of the DHT11 to pin 3 of the Arduino

4. Open Arduino IDE or Visual Studio with Arduino IDE plugin

5. Enter the Code below

```
DHT11_Humidity.ino*  ⇥ ✕
DHT11_Humidity
1      #include <dht11.h>
2      dht11 DHT;
3      #define DHT_pin 3
4    void setup(){
5        Serial.begin(9600);
6    }
7
8    void loop() {
9        DHT.read(DHT_pin);
10       Serial.print("HUMIDITY: ");
11       Serial.print(DHT.humidity, 1);
12       Serial.println("%");
13       delay(500);
14   }
```

6. Select the correct COM port for the Arduino

7. Verify, Save, and Upload the code to the Arduino UNO

8. Open the Serial Monitor of the Arduino IDE to determine the humidity value of the DHT11

9. Test and observe the results

Part 02: Humidity Sensor and LCD

1. Follow the connection of the DHT11 to the Arduino UNO

2. Follow the same connections of DHT11 from part 01

3. Open Arduino IDE or Visual Studio with Arduino IDE plugin

4. Enter the Code below

```
DHT11_Humidity.ino*   ⊸ ×
DHT11_Humidity
1    #include <LiquidCrystal_I2C.h>
2    #include <Wire.h>
3    #include <dht11.h>
4    LiquidCrystal_I2C lcd(0x27, 16, 2);
5    dht11 DHT;
6    #define DHT_pin 3
7
8    void setup(){
9        Serial.begin(9600);
10       lcd.init();
11       lcd.backlight();
12   }
13
14   void loop() {
15       lcd.clear();
16       lcd.setCursor(0, 0);
17       DHT.read(DHT_pin);
18       Serial.print("HUMIDITY: ");
19       lcd.print("HUMIDITY: ");
20       lcd.setCursor(0, 1);
21       Serial.print(DHT.humidity, 1);
22       lcd.print(DHT.humidity, 1);
23       Serial.println("%");
24       lcd.print("%");
25       delay(500);
26   }
```

5. Select the correct COM port for the Arduino

6. Verify, Save, and Upload the code to the Arduino

7. Test and observe the results

V.   Results and Discussion

In this experiment I used the DHT11 humidity and temperature sensor which was also used in laboratory #04 which you need to include a library in the Arduino code in order for the sensor to work and use the library functions for your code. I added a Serial.begin(9600) for the Serial monitor baud rate and using the Serial.print() functions to display the humidity value. For the LCD to work you also need a library in order for it to work, and define the LCD size (lcd(0x27, 16, 2)) and using the lcd.clear(), lcd.setCutsor(), and lcd.print() functions to display humidity value to the LCD.

VI.   Conclusion

After doing all the parts of the experiment, all the objectives in this experiment are achieved. By using the correct library and using its functions correctly by defining and calling the functions, I was able to create the code for this experiment, I run and tested the functionality of the code, sensor and the LCD and it worked with no errors and problems.