In put and Out Put

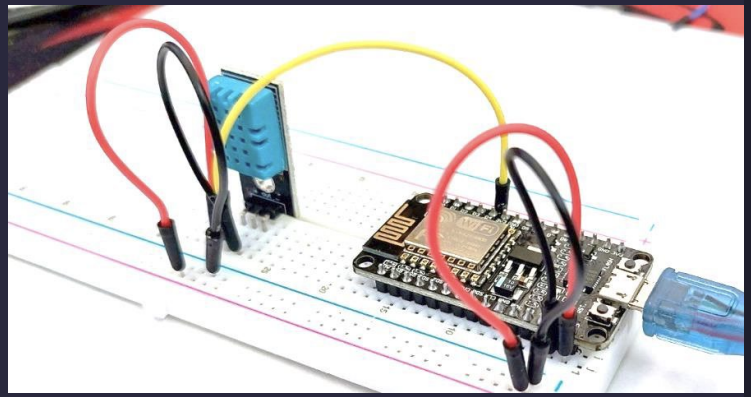
Dr. Jirapipat Thanyaphongphat

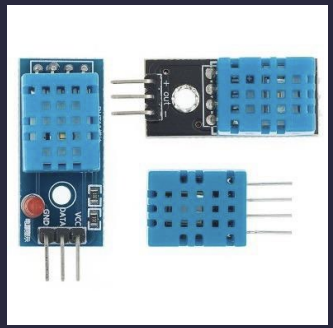
/TABLE OF CONTENTS

/01

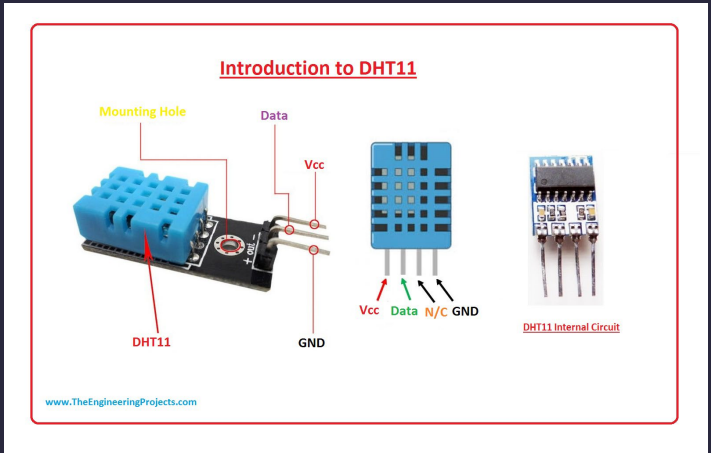
/Temperature and Humidity Sensors

Recommendation for humidity and temperature sensor.





Main features of DHT11



The DHT11 sensor is used to measure temperature and relative humidity in the air. It is an affordable option suitable for experimentation. The main features of the DHT11 are as follows:

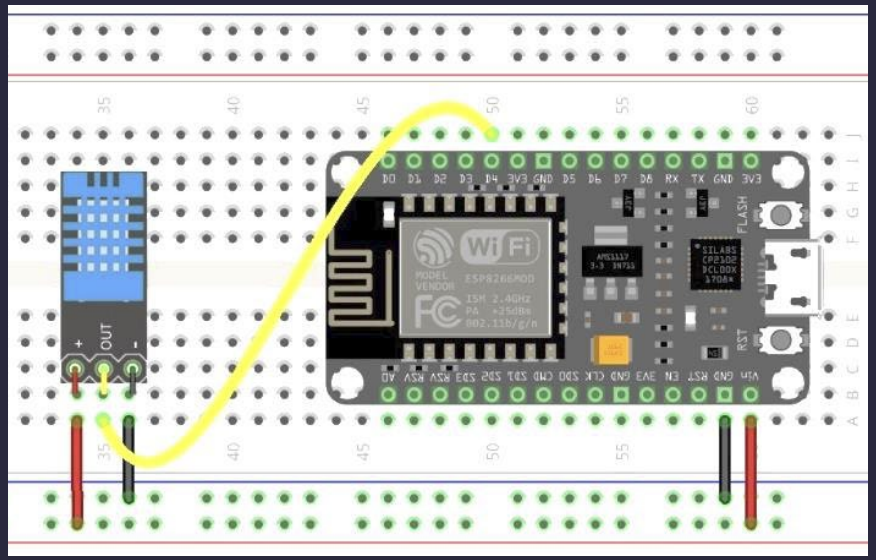
- Power Supply: 3 - 5.5V

-Temperature Measurement Range: 0 - 50 degrees Celsius with an accuracy of +/- 2 degrees.

- Humidity Measurement Range: 20 - 90% with an accuracy of +/- 5%.

- Measurement Time: 1 second.

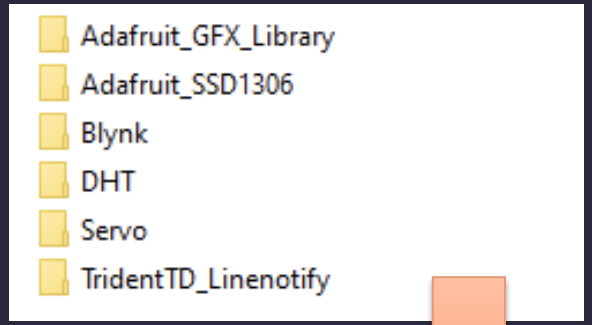
Wiring

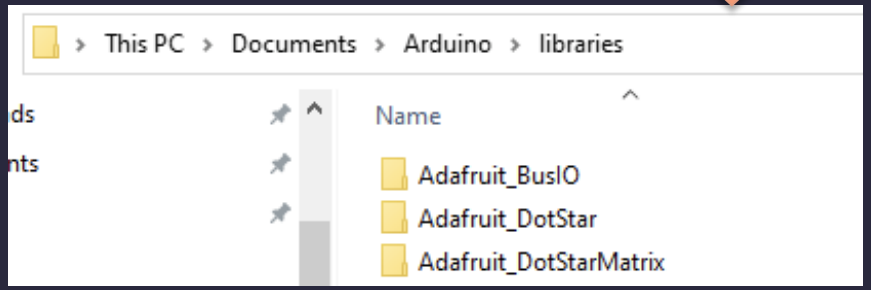


DHT11 Module	NodeMCU ESP8266
+	Vin
-	GND
Out	D4

Include Library

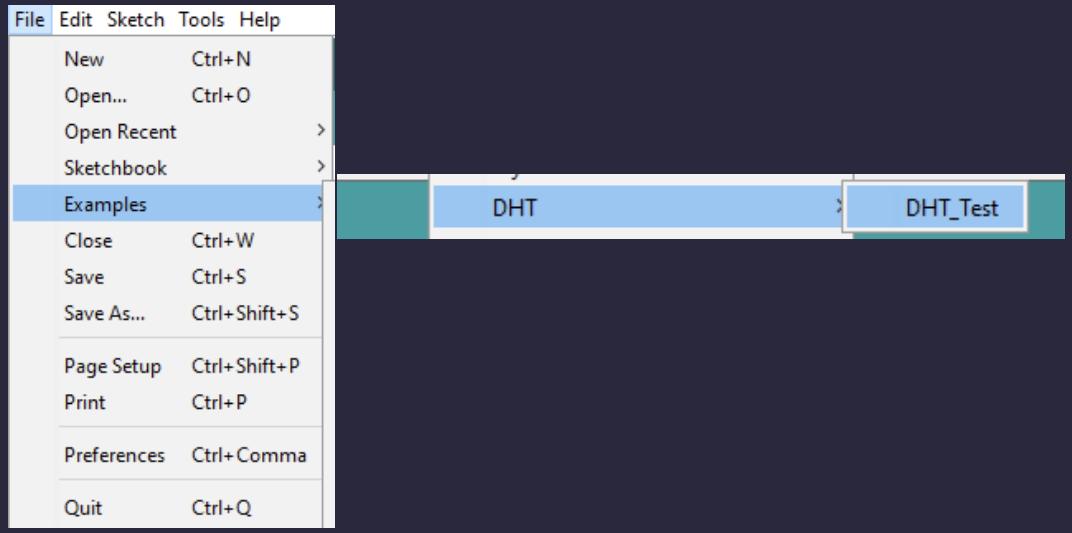
Copy all files in the 'libraries' folder to the Arduino IDE library storage location, which is typically found at C:\Users.....\Documents\Arduino\libraries.





Coding

Open the DHT11 sensor usage example file in Arduino IDE by navigating to: File > Examples > DHT > DHT_Test



Coding

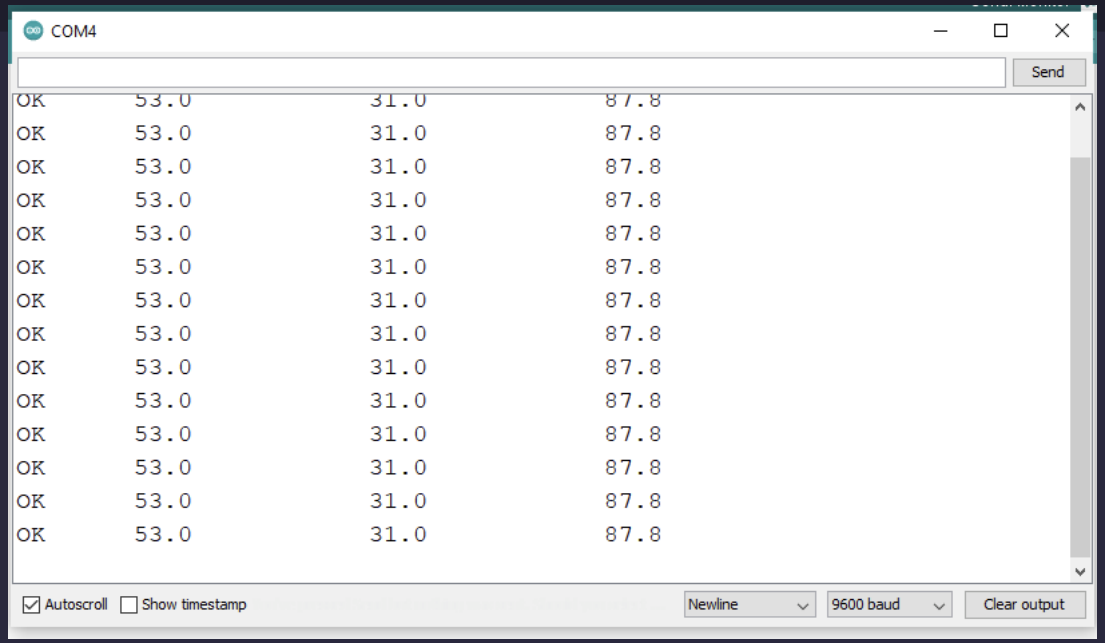
```ino
#include "DHT.h"
DHT dht;
void setup()
{
  Serial.begin(9600);
  Serial.println();
  Serial.println("Status\tHumidity (%)\tTemperature (C)\t(F)");

  dht.setup(2); // GPIO2 pin D4
}
void loop()
{
  delay(dht.getMinimumSamplingPeriod());

  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();

  Serial.print(dht.getStatusString());
  Serial.print("\t");
  Serial.print(humidity, 1);
  Serial.print("\t\t");
  Serial.print(temperature, 1);
  Serial.print("\t\t");
  Serial.println(dht.toFahrenheit(temperature), 1);
}
```

Test



*** Set the data transmission rate to 9600 baud.

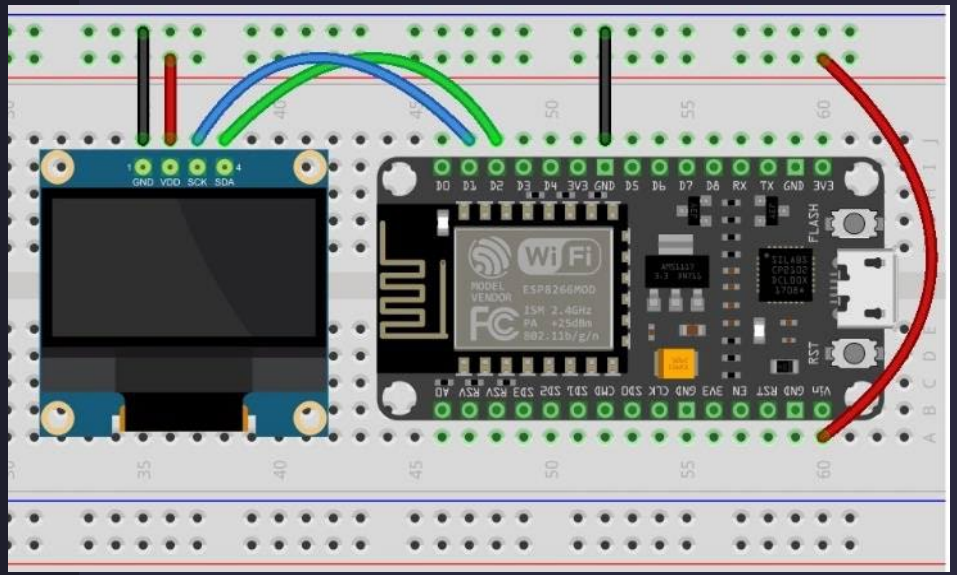
/02

/Displaying text on the OLED 0.96" 128x64 Display

The main features of the OLED 0.96” 128x64 Display

OLED (Organic Light Emitting Diodes) is a type of display that resembles a thin film. It consists of materials that can emit light when supplied with electrical energy, a process known as electroluminescence. Unlike traditional displays, OLEDs do not require a backlight, and there is no light emission in areas that display the color black, resulting in deep black levels. Additionally, OLED displays are energy-efficient.

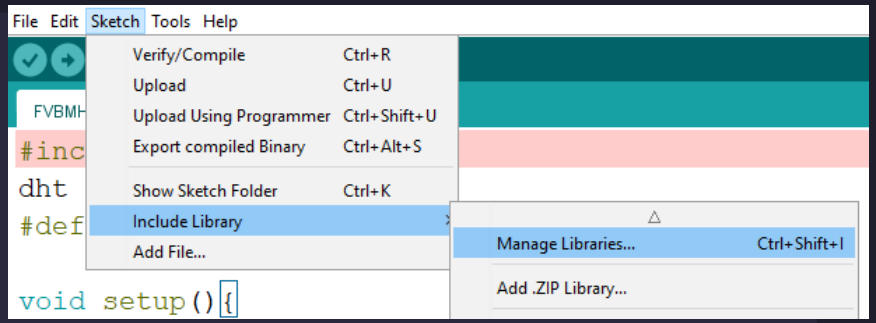
Wiring



DHT11 Module	NodeMCU ESP8266
VCC	Vin
GND	GND
SCL	D1
SDA	D2

Include Library

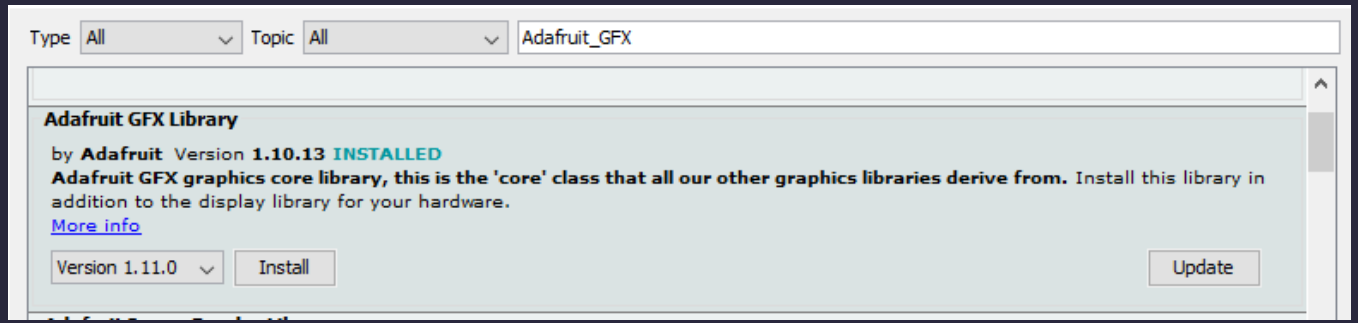
1. Open Arduino IDE and go to Sketch > Include Library, then select Manage Libraries as shown in the image.



2. Type "adafruit ssd1306" in the "Filter your search.." box to search for and install the library. The library "Adafruit SSD1306" should appear for installation as shown in the image.

Include Library

3. Select the latest version (in the image, it's 2.5.3), then click on "Install".
4.Type "Adafruit_GFX" in the "Filter your search..." box to search for and install the "Adafruit_GFX" library. The library named "Adafruit_GFX" will appear as shown in the image.



5.Select the latest version (which is 1.11.0 as shown in the picture) and click on "Install."

Coding

Type this code into Arduino IDE

OLED-Display

```
#include <SPI.h>
#include <Wire.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>
Adafruit_SSD1306 display = Adafruit_SSD1306(128, 64, &Wire);

void setup()
{
Serial.begin(9600);
display.begin(SSD1306_SWITCHCAPVCC, 0x3c); //สั่งให้จอ OLED เริ่มทำงานที่ Address 0x3C
}

void loop() {

display.clearDisplay(); // ลบภาพในหน้าจอทั้งหมด
display.setCursor(2,0); // กำหนดตำแหน่งจุดเริ่มต้นที่จะแสดงผล (x,y) = (แนวนอน,แนวตั้ง)
display.setTextSize(1); // กำหนดขนาดตัวอักษร
display.setTextColor(WHITE); // กำหนดสีตัวอักษร
display.println("OLED 0.96 First Time"); // แสดงผลข้อความ

display.setCursor(5,15); // กำหนดตำแหน่งจุดเริ่มต้นที่จะแสดงผล (x,y) = (แนวนอน,แนวตั้ง)
display.setTextSize(2); // กำหนดขนาดตัวอักษร
display.setTextColor(BLACK, WHITE); //กำหนดข้อความสีดำ ฉากหลังสีขาว
display.println("  Aj.Don  "); // แสดงผลข้อความ Aj.Don
```

Coding

```
26 display.setCursor(0,38);
27 display.setTextSize(1); // กำหนดขนาดตัวอักษร
28 display.setTextColor(WHITE); // กำหนดสีตัวอักษร
29 display.println("128 x 64 Pixels 0.96 "); // แสดงผลข้อความ 128 x 64 Pixels 0.96'
30
31 display.setCursor(0,52);
32 display.setTextSize(1);
33 display.setTextColor(WHITE);
34 display.println("CAMT CMU"); // แสดงผลข้อความ
35 display.display();
36
37 }
```

Test

Work :

Try modifying the program to display the text "Student Name" and the name of the school.

Q/A