Project: Temperature and Humidity Monitor

For this project, we will interface the **DHT11** sensor with your **ESP32** to read and display temperature and humidity data in the Serial Monitor.

1. Connections

The DHT11 usually has 3 or 4 pins. If you are using the 3-pin module version, it includes a built-in resistor.

ESP32 Pin	DHT11 Pin	Description
3.3V	**VCC**	Power Supply
GND	**GND**	Ground
GPIO 4	**DATA/OUT**	Data Signal

2. Libraries that are needed to be downloaded

You need to install these two libraries from the Arduino Library Manager.
Go to Tools > Manage Libraries and install:

1. **DHT sensor library** by Adafruit.
2. **Adafruit Unified Sensor** by Adafruit.

3. Code

How it works

The code uses the DHT library to communicate with the sensor via a single-wire protocol on GPIO 4. It pulls a "sample" every 2 seconds (the DHT11 is a bit slow), checks if the reading is valid, and then outputs the values.

Steps to connect

1. Wire the sensor as shown in the table above.
2. Connect your ESP32 to your computer.
3. In Arduino IDE, go to Tools > Board and select your ESP32 model.
4. Copy the code below, upload it, and open the **Serial Monitor** (Tools > Serial Monitor and set to 9600 baud).

Code

```c
#include "DHT.h"

#define DHTPIN 4      // Digital pin connected to the DHT sensor
#define DHTTYPE DHT11   // DHT 11

// a = Aim: Read and display environmental data
DHT dht(DHTPIN, DHTTYPE);

void setup() {
  Serial.begin(9600);
  Serial.println(F("DHT11 Initializing..."));
  dht.begin();
}

void loop() {
  // Wait a few seconds between measurements
  delay(2000);

  // Reading temperature or humidity takes about 250 milliseconds!
  float h = dht.readHumidity();
  float t = dht.readTemperature(); // Read temperature as Celsius (the default)

  // Check if any reads failed and exit early (to try again).
  if (isnan(h) || isnan(t)) {
    Serial.println(F("Failed to read from DHT sensor!"));
    return;
  }

  Serial.print(F("Humidity: "));
  Serial.print(h);
  Serial.print(F("%  Temperature: "));
  Serial.print(t);
  Serial.println(F("°C"));
}
```

4. What to expect

✓ After uploading, open your **Serial Monitor**.
✓ Every 2 seconds, you will see a new line appearing with the current **Humidit**y and **Temperature**.
✓ If you breathe on the sensor, you should see the humidity percentage rise almost immediately.

Note: If you get weird results in the serial monitor, check if the baud rate is set to 9600 and none of the connections are loose.