Humidity and Temperature Measurement using DHT11 Sensor: Interface a DHT11 sensor with Arduino and monitor temperature and humidity on serial monitor.

OBJECTIVES:

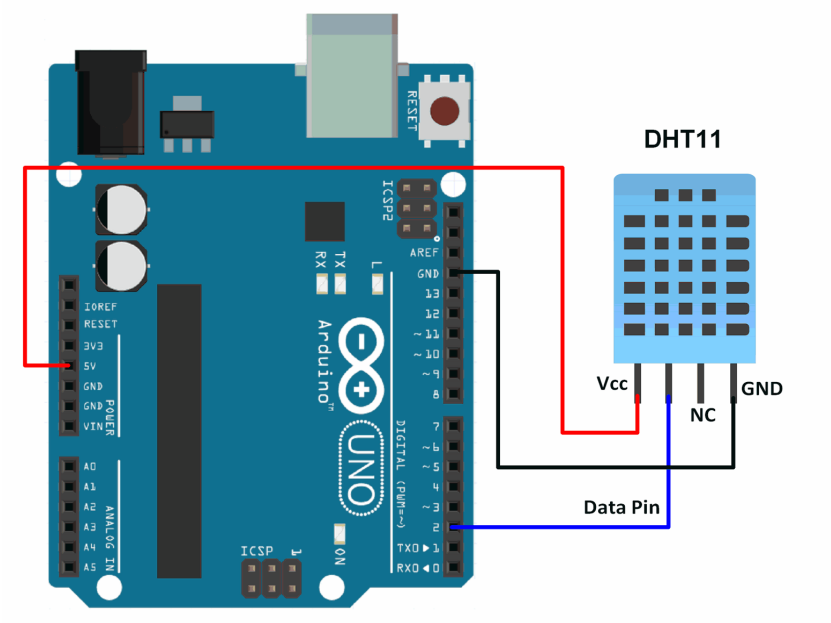
1. To understand Arduino UNO board
2. To understand the application of DHT11 sensor module
3. To learn the principle of temperature and humidity sensor

Theory:

The DHT11 sensor The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin (no analog input pins needed). It measures temperature and humidity. It uses a thermistor and a capacitive humidity sensor to provide calibrated digital output. Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

DHT11 Pin Configuration:

1. VCC: Power input (3.3V or 5V)
2. GND: Ground
3. Data: Digital output pin
4. Supports communication with sensors using GPIO pins.
5. Compatible with the Arduino IDE for programming.



Procedure:

1. Connect DHT11 with Arduino UNO.

2. Download the DHT11/DHT22 library on Arduino IDE library manager.

3. Select the Arduino UNO board and port from the Tools Menu.

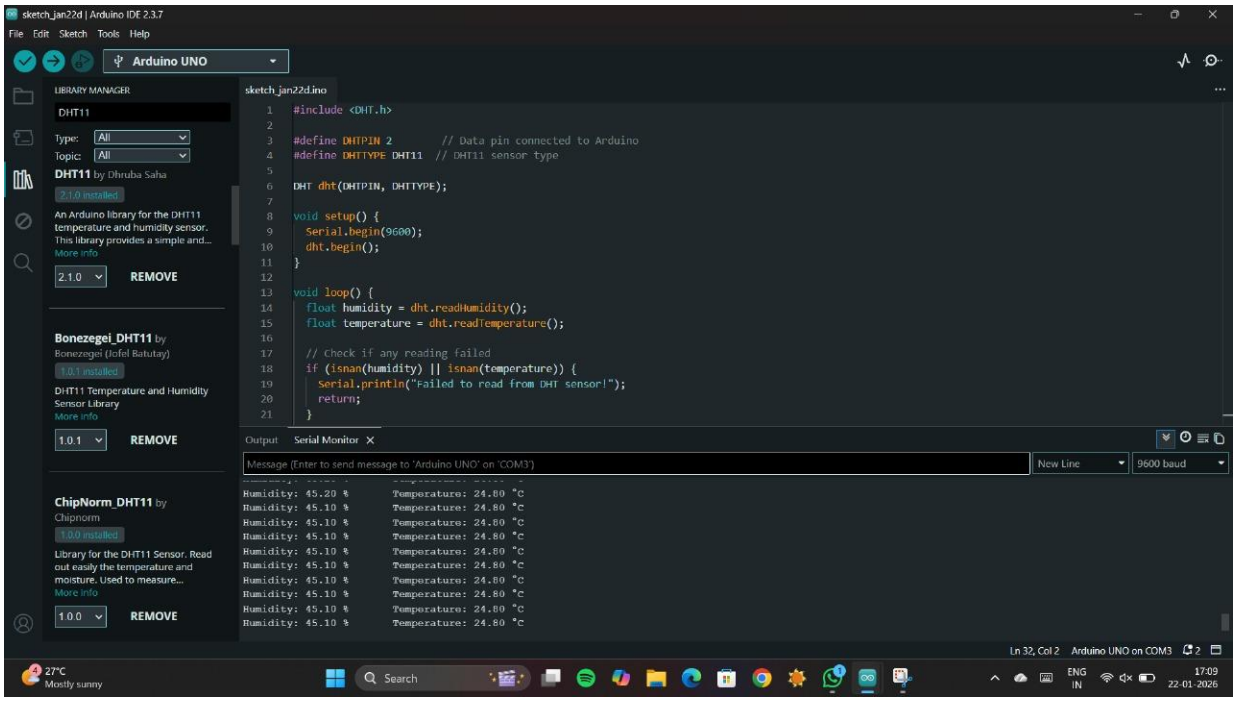
4. Write a program to show the temperature and humidity on serial monitor.

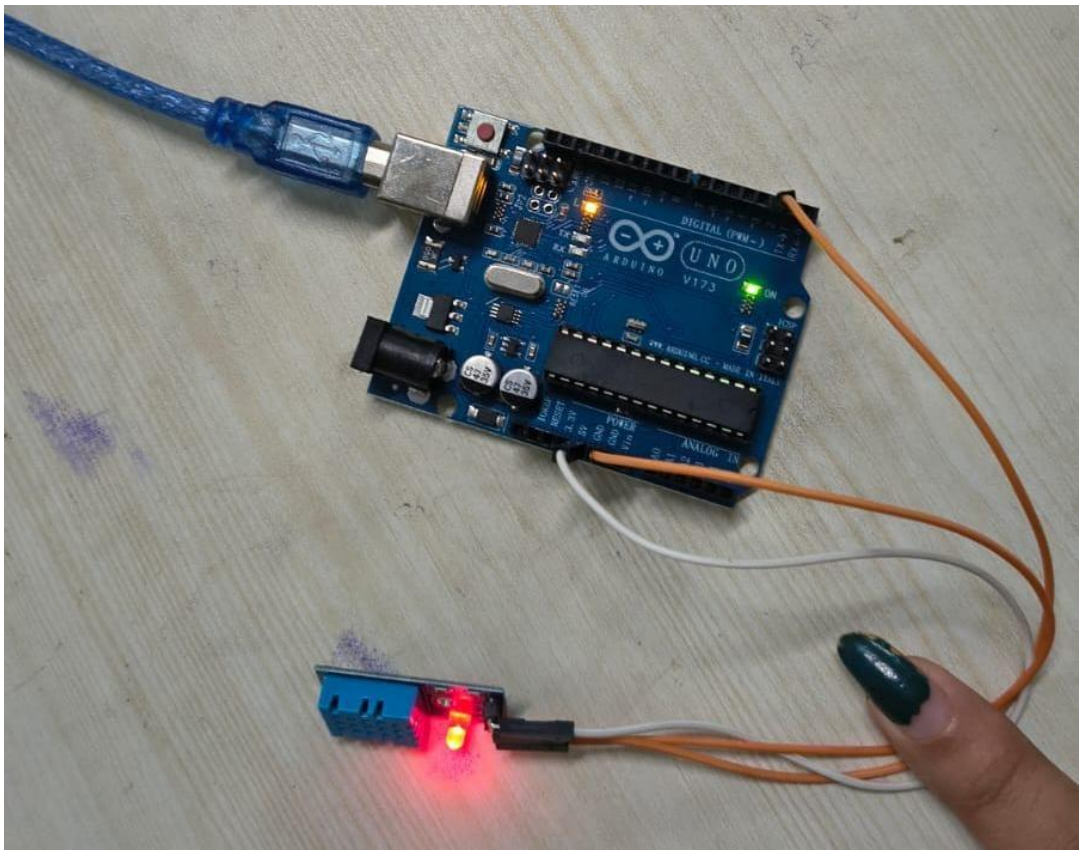
5. Compile the code and Upload it to Arduino IDE board.

Code:

```
#include <DHT.h>
#define DHTPIN 2
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
void setup() {
  Serial.begin(9600);
  dht.begin();
}
void loop() {
  float humidity = dht.readHumidity();
  float temperature = dht.readTemperature();
  if (isnan(humidity) || isnan(temperature)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }
  Serial.print("Humidity: ");
  Serial.print(humidity);
  Serial.print(" %\t");
  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.println(" °C");
  delay(2000);
}
```

Output:


sketch_jan22d | Arduino IDE 2.3.7
File Edit Sketch Tools Help
Arduino UNO
LIBRARY MANAGER
DHT11
Type: All
Topic: All
DHT11 by Dhruba Saha
2.1.0 installed
An Arduino library for the DHT11 temperature and humidity sensor. This library provides a simple and...
More info
2.1.0
REMOVE
Bonezegei_DHT11 by Bonezegei (Jofel Batutay)
1.0.1 installed
DHT11 Temperature and Humidity Sensor Library
More info
1.0.1
REMOVE
ChipNorm_DHT11 by Chipnorm
1.0.0 installed
Library for the DHT11 Sensor. Read out easily the temperature and moisture. Used to measure...
More info
1.0.0
REMOVE
sketch_jan22d.ino
#include <DHT.h>
#define DHTPIN 2 // Data pin connected to Arduino
#define DHTTYPE DHT11 // DHT11 sensor type
DHT dht(DHTPIN, DHTTYPE);
void setup() {
Serial.begin(9600);
dht.begin();
}
void loop() {
float humidity = dht.readHumidity();
float temperature = dht.readTemperature();
// Check if any reading failed
if (isnan(humidity) || isnan(temperature)) {
Serial.println("Failed to read from DHT sensor!");
return;
}
Output Serial Monitor
Message (Enter to send message to 'Arduino UNO' on 'COM3')
New Line
9600 baud
Humidity: 45.20 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Humidity: 45.10 % Temperature: 24.80 °C
Ln 32, Col 2 Arduino UNO on COM3
27°C
Mostly sunny
Search
ENG
IN
17:09
22-01-2026


DIGITAL (PWM~)
UNO
ARDUINO
V173
ON
POWER
ANALOG IN