Experiment No. - 6

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Branch: BE-CSE(LEET)
Semester: 6th
Subject Name: IOT Lab

UID: 21BCS8129
Section/Group:20BCS-ST-801/B
Date of Performance: 21/04/2023
Subject Code: 20CSP-358

1. **Aim:**

   Interfacing of Arduino with temperature sensor with real time application.

2. **Objective:**
   a. Learn about ultrasonic sensor in detail.
   b. Learn about IoT programming.
   c. Measure the temperature.
3. **Requirements:**
   a. Arduino Uno R3 board
   b. DH11 Temperature
   c. USB or 5V Power Supply
   d. Jumper Wires

4. **Procedure:**

Arduino:

It is an open-source electronics platform. It consists ATmega328 8-bit Micro controller. It can be able to read inputs from different sensors & we can send instructions to the micro controller in the Arduino. It provides Arduino IDE to write code & connect the hardware devices like Arduino boards & sensors.

DH11 Sensor:

DHT11 Module features a temperature & humidity sensor complex with a calibrated digital signal output. The exclusive digital-signal-acquisition technique and temperature & humidity sensing technology ensure high reliability and excellent long-term stability. This sensor includes an NTC for temperature measurement and a resistive-type humidity measurement component for humidity measurement. These are connected to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability, and cost-effectiveness.

DHT11 Module Pinout

The DHT11 module has a total of 3 pins. In which two are for power and one is for communication. The pinout of a DHT11 Sensor module is as follows:

- DATA Data pin for 1-wire communication.
- GND Ground Connected to Ground pin of the Arduino.
- VCC Provides power for the module, Connect to the 5V pin of the Arduino.

Interfacing DHT11 Sensor with Arduino

Now that we have completely understood how a DHT11 Sensor works, we can connect all the required wires to Arduino and write the code to get all the data out from the sensor.

Procedure:

Step 1: Connect the VCC and GND of the module to the 5V and GND pins of the Arduino

Step 2: Then connect the DATA pin to the Arduino's digital pin 2.

Step 3: We communicate with DHT11 through this pin.

Step 4: Now write a code in your Arduino IDE.

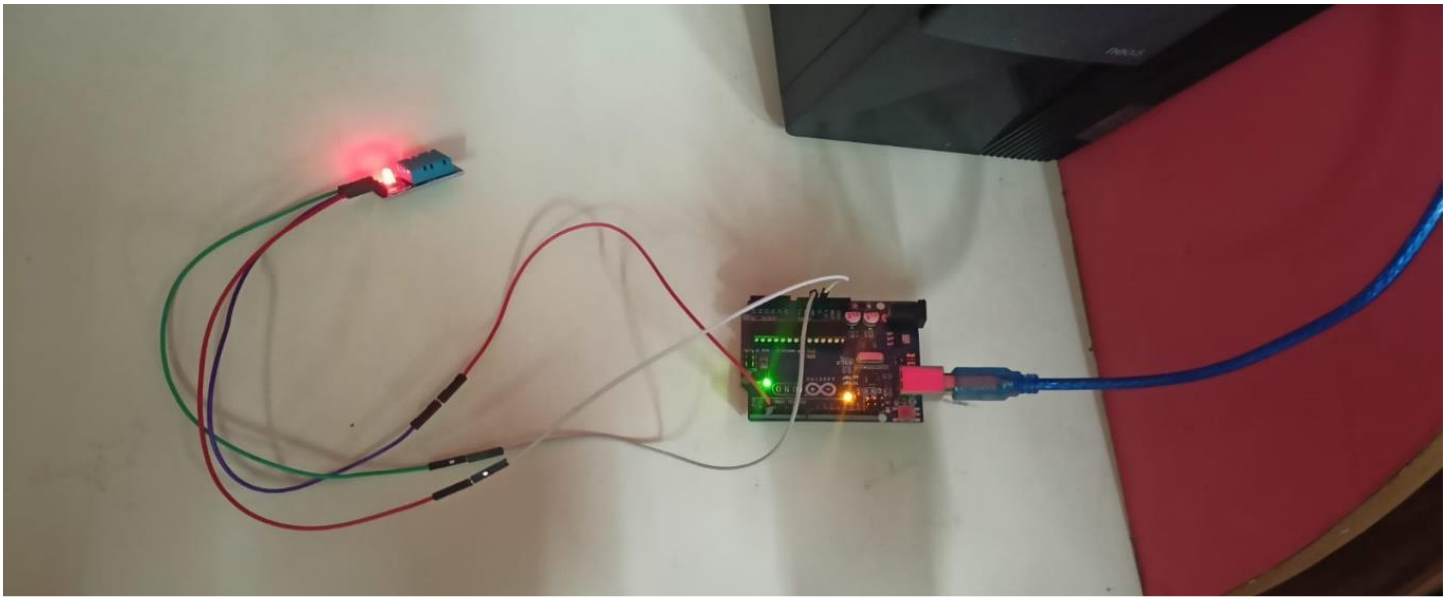
Step 5: Now connect your Arduino board to your laptop via USB jack and in your Arduino IDE, select your board and click on upload.

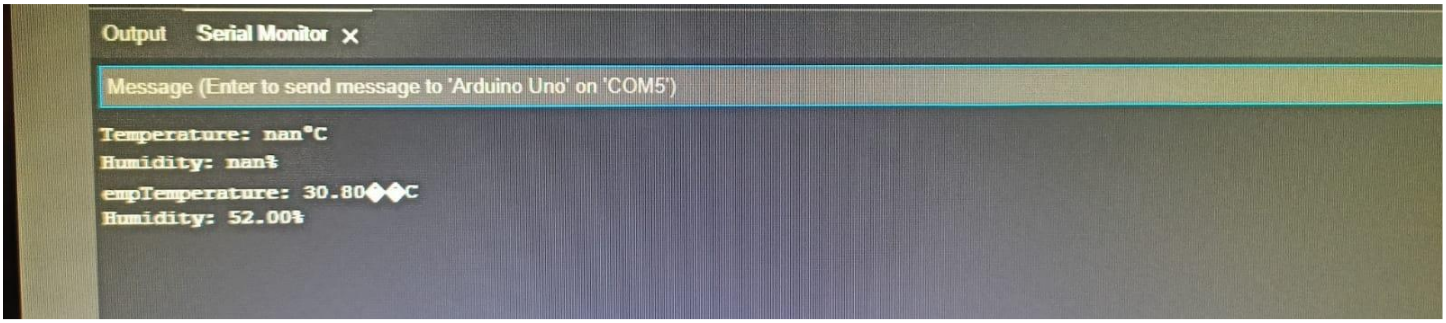
Step 6: Observe the output in the Serial monitor in Arduino IDE.

5. **Steps/Program:**

```
#include <Adafruit_Sensor.h>
#include <DHT.h>
#include <DHT_U.h>
#define DHTTYPE DHT11 // DHT 11
#define DHTPIN 2
DHT_Unified dht(DHTPIN, DHTTYPE);
uint32_t delayMS;
void setup() {
   Serial.begin(9600);
   dht.begin();
   sensor_t sensor;
   delayMS = sensor.min_delay / 1000;
}
void loop()
{
   sensors_event_t event;
   dht.temperature().getEvent(&event);
   Serial.print(F("Temperature: "));
   Serial.print(event.temperature);
   Serial.println(F("°C"));
   dht.humidity().getEvent(&event);
   Serial.print(F("Humidity: "));
   Serial.print(event.relative_humidity);
   Serial.println(F("%"));
   delay(delayMS);
}
```

6. **Output:**





Learning outcomes (What I have learnt):

- Learnt about temperature sensor in detail.
- Learnt about IoT programming.
- Measured the room temperature using a temperature sensor.

Evaluation Grid (To be created per the faculty's SOP and Assessment guidelines):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Worksheet completion including writing learning objectives/Outcomes. (To be submitted at the end of the day).		
2.	Post-Lab Quiz Result.		
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.		
	Signature of Faculty (with Date):	Total Marks Obtained:	