Task 9: To interface Bluetooth with Arduino and write a program to send sensor Data to Smartphone using Bluetooth

Aim

The aim of this task is to interface Bluetooth with Arduino using the HC-05 Bluetooth module and develop a program to send temperature and humidity data from the DHT11 sensor to a smartphone wirelessly. This task enables real-time monitoring and display of sensor data on the mobile device.

Apparatus Required:

- Arduino Uno with cable – 1 No
- HC-05 Bluetooth module -1 No
- DHT11 sensor – 1 No
- Jumper wires – As Required
- Breadboard – 1 No
- Resistor (1 K ohms and 2K Ohms) – 1 No
- Smartphone with Bluetooth capability
- Arduino Bluetooth controller Application for Mobile

Procedure:

Connect HC-05 Bluetooth Module to Arduino:

Connect VCC and GND pins of the HC-05 module to the 5V and GND pins on the Arduino, respectively.
Connect the TXD pin of the HC-05 module to the RX pin on the Arduino.
Connect the RXD pin of the HC-05 module to the TX pin on the Arduino.
Ensure that the HC-05 module is in AT mode for configuration.

Connect DHT11 Sensor to Arduino:

Connect the VCC pin of the DHT11 sensor to 5V on Arduino.
Connect the GND pin of the DHT11 sensor to GND on Arduino.
Connect the signal pin of the DHT11 sensor to a digital pin on Arduino (e.g., D2).

Installation Procedure:

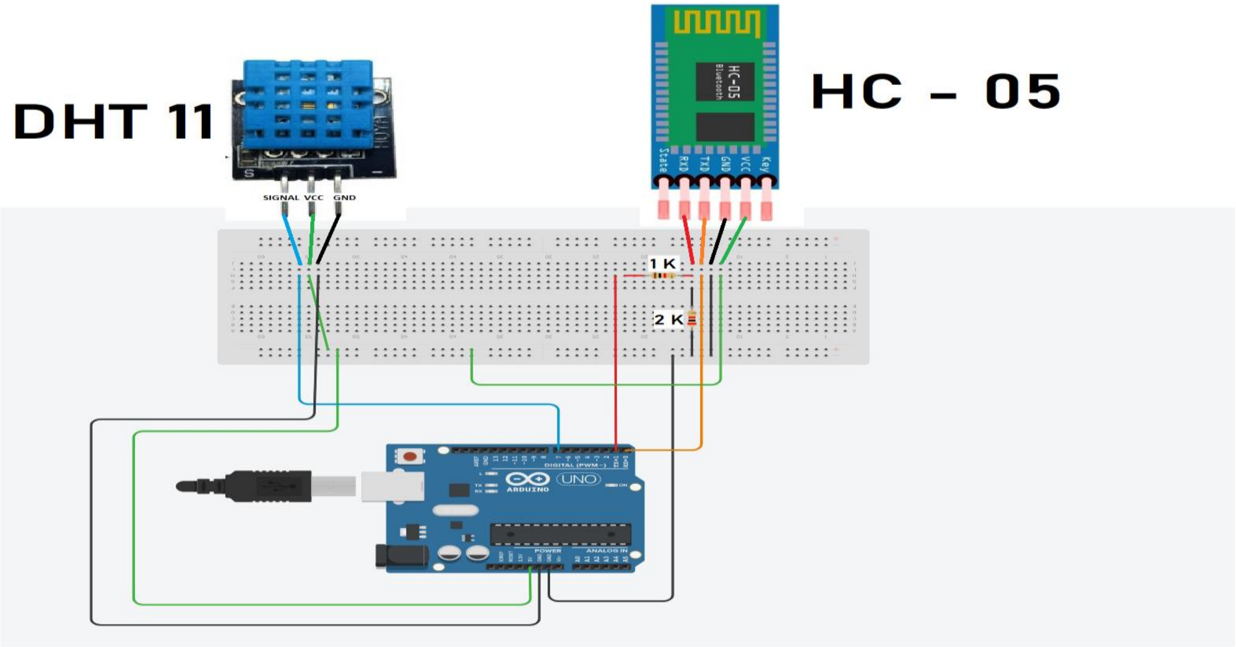
Install Arduino Bluetooth Controller Application from play store
Configure HC05 with Smartphone via turned on the Bluetooth in Phone and Default password for Bluetooth was (1234 or 0000)

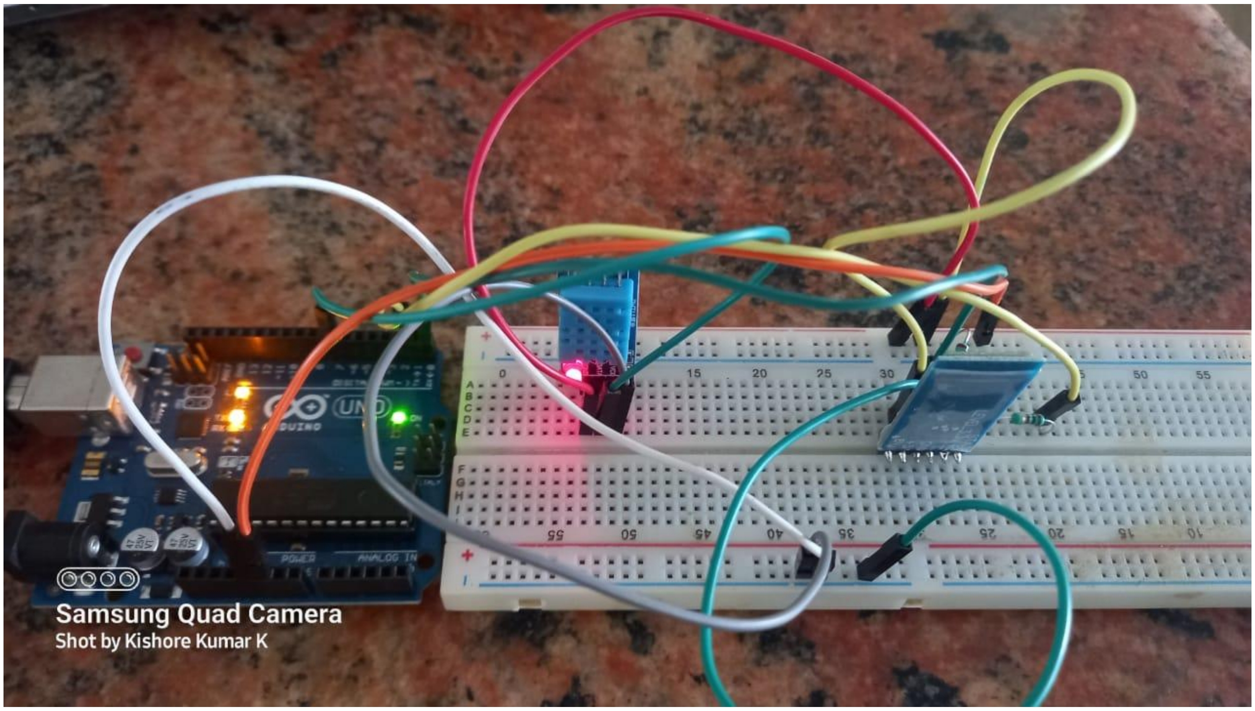
Program

```
#include "DHT.h"
```

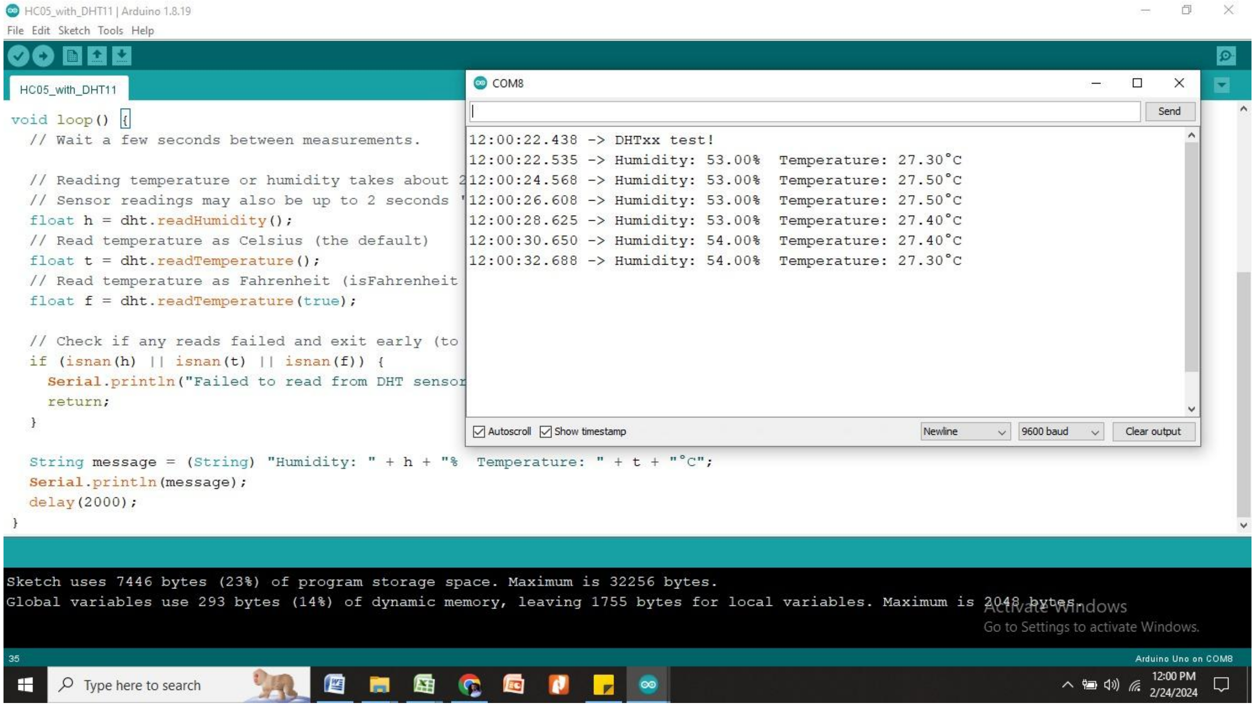
```
#define DHTPIN 7     // Digital pin connected to the DHT sensor
#define DHTTYPE DHT11   // DHT 11

DHT dht(DHTPIN, DHTTYPE); //Initialize the DHT component
void setup()
{
  Serial.begin(9600);
  Serial.println("DHTxx test!");
  dht.begin();
}
void loop() {
  // Wait a few seconds between measurements.
  // Reading temperature or humidity takes about 250 milliseconds!
  // Sensor readings may also be up to 2 seconds 'old' (its a very slow sensor)
  float h = dht.readHumidity();
  // Read temperature as Celsius (the default)
  float t = dht.readTemperature();
  // Read temperature as Fahrenheit (isFahrenheit = true)
  float f = dht.readTemperature(true);

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

  String message = (String) "Humidity: " + h + "%  Temperature: " + t + "°C";
  Serial.println(message);
  delay(2000);
}
```

Circuit Diagram





Output:

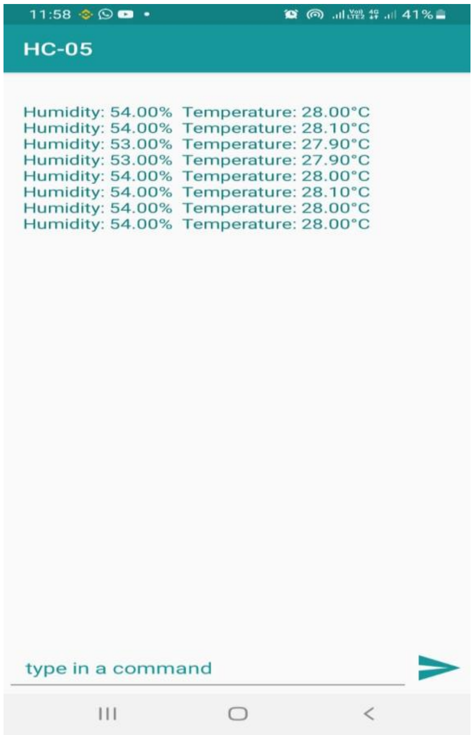


```
void loop() {
  // Wait a few seconds between measurements.

  // Reading temperature or humidity takes about 2
  // Sensor readings may also be up to 2 seconds '
  float h = dht.readHumidity();
  // Read temperature as Celsius (the default)
  float t = dht.readTemperature();
  // Read temperature as Fahrenheit (isFahrenheit
  float f = dht.readTemperature(true);

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

  String message = (String) "Humidity: " + h + "%  Temperature: " + t + "°C";
  Serial.println(message);
  delay(2000);
}
```

```
12:00:22.438 -> DHTxx test!
12:00:22.535 -> Humidity: 53.00%  Temperature: 27.30°C
12:00:24.568 -> Humidity: 53.00%  Temperature: 27.50°C
12:00:26.608 -> Humidity: 53.00%  Temperature: 27.50°C
12:00:28.625 -> Humidity: 53.00%  Temperature: 27.40°C
12:00:30.650 -> Humidity: 54.00%  Temperature: 27.40°C
12:00:32.688 -> Humidity: 54.00%  Temperature: 27.30°C
```

```
Sketch uses 7446 bytes (23%) of program storage space. Maximum is 32256 bytes.
Global variables use 293 bytes (14%) of dynamic memory, leaving 1755 bytes for local variables. Maximum is 2048 bytes.
```

Mobile View of DHT11 in Smartphone



```
Humidity: 54.00%  Temperature: 28.00°C
Humidity: 54.00%  Temperature: 28.10°C
Humidity: 53.00%  Temperature: 27.90°C
Humidity: 53.00%  Temperature: 27.90°C
Humidity: 54.00%  Temperature: 28.00°C
Humidity: 54.00%  Temperature: 28.10°C
Humidity: 54.00%  Temperature: 28.00°C
Humidity: 54.00%  Temperature: 28.00°C
```

Result

Thus the above task for Interface DHT11 with arduino for transfering Temperature and Humidity has sucessfully completed.