

COAL SEMESTER PROJECT HARDWARE :

Group Members :

1. K17-3850
2. K17-3865
3. K17-3876
4. K17-3616

- Soil Moisture Sensor
- Digital Temp & Humidity Sensor (DHT-22)
- Arduino UNO R3
- Bluetooth device HC-05
- Wires
- Power Supply 5V
- Breadboard



Breadboard



Wires



Temperature & humidity Sensor



Arduino UNO



Soil Moisture sensor



Bluetooth Device

Topic: Temperature, Humidity and Soil Moisture Sensing Device

Introduction:

In this project we made a device which will be use to measure Temperature, Humidity and Soil moisture using different sensors attached to the device. The sensors are connected to Arduino, which is connected to Android Application via Bluetooth.

Working :

After receiving the data from sensors, Arduino will transmit the data via Bluetooth to the Android App, then the measurements will be displayed on android app and also can be saved for later use which will be helpful for a person to analyze and store the data on the phone for future use. We will use C++ programming language to program the Arduino.

Objective:

To see the interfacing between hardware and software components, and to analyze about how the data transmission works between software and hardware or how the software/ hardware boundry is crossed for better understanding of hardware.

Uses:

Farmers can use this device in the field to check if the environment is perfect for a certain crops or not. If not he can take quick measures to save the crops, or else he can plant different crops which is suitable to the environment. A simple walk around the field with an android device can connect the application with the device via bluetooth, due to which data will be collected immediately. Moreover, this device will not only help to check the crops but will also provide financial benefits i.e saving crops will automatically save money. Furthermore, tree plantation process can also take advantage of this device to check whether the current environment is proper to plant certain tree species or not.

Components with Cost:

- Digital Temp & Humidity Sensor (DHT-22) : 650rs
- Soil Moisture Sensor : 350rs
- Arduino UNO R3 : 570rs
- Bluetooth Device HC-05 : 500rs
- Android App : free
- Breadboard : 150rs
- Batteries : 100rs
- Storage Device : free
- Wires : 140rs

Total Cost Approx. = 2200rs

ARDUINO CODE

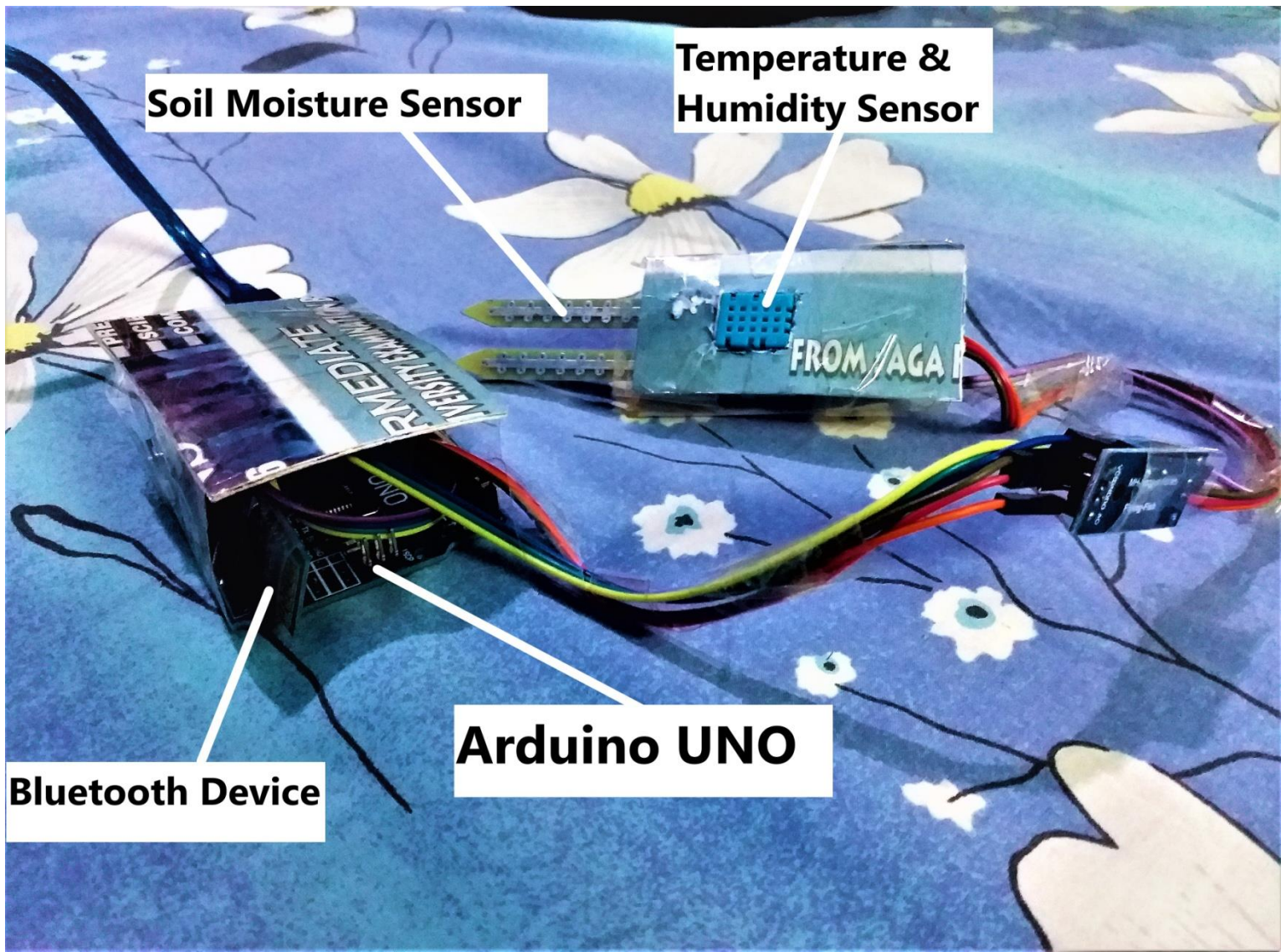
```
#include <SoftwareSerial.h>
#include "dht.h"
#define dht_apin A0 // connected to dht temp and humidity
SoftwareSerial bluetooth(10,11); // rx | tx // rx at 10 and tx at 11
int sensor_pin = A1; // soil moisture pin
int output_value ;
byte inchar; // inout from device to bluetooth
dht DHT; // object to read temp and humidity sensor data
void setup()
{
  Serial.begin(9600);
  bluetooth.begin(9600);
  delay(1000);
}
void loop()
{
  if(bluetooth.available() >0)
  {
    DHT.read11(dht_apin);
    inchar=bluetooth.read(); // read from device
    if(inchar=='1')
    {
      output_value= analogRead(sensor_pin);
      output_value = map(output_value,550,0,0,100);
      Serial.print("Mositure : ");
      Serial.println(output_value);
      Serial.println("%");
      bluetooth.println(output_value); // send output value or soil moisture value
    }
    else if(inchar=='2')
    {
      Serial.print("temperature = ");
      Serial.println(DHT.temperature);
      Serial.println("C ");
      bluetooth.println(DHT.temperature); // send temperature value
    }
    else if(inchar=='3')
    {
      Serial.print("Current humidity = ");
      Serial.println(DHT.humidity);
      Serial.print("% ");
      bluetooth.println(DHT.humidity); // send humdity value
    }
  }
  delay(1000);
}
```

Soil Moisture Sensor

Temperature & Humidity Sensor

Arduino UNO

Bluetooth Device





BLUETOOTH : ***NOT CONNECTED***

BLUETOOTH DEVICES ^

SOIL
MOISTURE

TEMPERATURE

HUMIDITY

SAVE DATA

DISPLAY DATA



BLUETOOTH : *CONNECTED*

BLUETOOTH DEVICES ^

36 % moisture

SOIL
MOISTURE

TEMPERATURE

HUMIDITY

SAVE DATA

DISPLAY DATA

DATE & TIME

DATA

2019/1/2/Wednesday	11/2	-19
2019/1/2/Wednesday	11/10	28
2019/1/3/Thursday	20/29	-19
2019/1/3/Thursday	23/13	-15
2019/1/3/Thursday	23/14	-15
2019/1/3/Thursday	23/20	36

BLUETOOTH : *CONNECTED*

BLUETOOTH DEVICES ^

26.00 ° Celsius

SOIL
MOISTURE

TEMPERATURE

HUMIDITY

SAVE DATA

DISPLAY DATA

DATE & TIME

DATA

2019/1/2/Wednesday	5/8	26.00
2019/1/2/Wednesday	9/6	25.00
2019/1/2/Wednesday	9/19	27.00
2019/1/2/Wednesday	9/29	24.00
2019/1/2/Wednesday	9/31	25.00
2019/1/2/Wednesday	10/38	24.00
2019/1/2/Wednesday	10/39	24.00
2019/1/2/Wednesday	11/2	24.00
2019/1/2/Wednesday	11/10	26.00
2019/1/3/Thursday	20/29	26.00



BLUETOOTH : *CONNECTED*

BLUETOOTH DEVICES ^

58.00 % humidity

SOIL
MOISTURE

TEMPERATURE

HUMIDITY

SAVE DATA

DISPLAY DATA

DATE & TIME

DATA

2019/1/2/Wednesday	10/38	67.00
2019/1/2/Wednesday	10/39	67.00
2019/1/2/Wednesday	11/2	71.00
2019/1/2/Wednesday	11/10	73.00
2019/1/3/Thursday	20/29	60.00
2019/1/3/Thursday	23/14	58.00

Scratch script for a game or simulation. The script is complex, involving multiple loops, conditionals, and calls to external APIs or libraries. It includes a 'Show Warnings' block at the bottom left.

Scratch script for a game or simulation. The script is complex, involving multiple loops, conditionals, and calls to external APIs or libraries. It includes a 'Show Warnings' block at the bottom left.

Scratch script for a game or simulation. The script is complex, involving multiple loops, conditionals, and calls to external APIs or libraries. It includes a 'Show Warnings' block at the bottom left.

Scratch script for data collection and file saving.

Script 1 (Left):

- When green flag clicked, go to frame 1 and click.
- Read from file named "soil.txt" and store in "soilField".
- Read from file named "temp.txt" and store in "tempField".
- Read from file named "humidity.txt" and store in "humidityField".
- Check which tree can grow in this environment.
- Set global variable "globalSol" to "soilField" and "globalTemperature" to "tempField" and "globalHumidity" to "humidityField".
- When "globalSol" is not empty and "globalTemperature" is not empty and "globalHumidity" is not empty, then:
 - Set "globalSol" to "soilField".
 - Set "globalTemperature" to "tempField".
 - Set "globalHumidity" to "humidityField".
 - Append to file "File1" with text: "globalSol", "globalTemperature", "globalHumidity", "globalSol", "globalTemperature", "globalHumidity".
- When "globalSol" is empty, then:
 - Append to file "File2" with text: "globalSol", "globalTemperature", "globalHumidity".
- When "globalHumidity" is empty, then:
 - Append to file "File3" with text: "globalSol", "globalTemperature", "globalHumidity".

Script 2 (Right):

- When green flag clicked, go to frame 1 and click.
- Set global variable "globalSol" to "soilField" and "globalTemperature" to "tempField" and "globalHumidity" to "humidityField".
- When "globalSol" is not empty and "globalTemperature" is not empty and "globalHumidity" is not empty, then:
 - Set "globalSol" to "soilField".
 - Set "globalTemperature" to "tempField".
 - Set "globalHumidity" to "humidityField".
 - Append to file "File1" with text: "globalSol", "globalTemperature", "globalHumidity", "globalSol", "globalTemperature", "globalHumidity".
- When "globalSol" is empty, then:
 - Append to file "File2" with text: "globalSol", "globalTemperature", "globalHumidity".
- When "globalHumidity" is empty, then:
 - Append to file "File3" with text: "globalSol", "globalTemperature", "globalHumidity".

Scratch script for data collection and file saving.

Script 1 (Left):

- When green flag clicked, go to frame 1 and click.
- Set global variable "globalTemperature" to "soilField" and "globalHumidity" to "tempField".
- When "globalTemperature" is not empty and "globalHumidity" is not empty, then:
 - Set "globalTemperature" to "soilField".
 - Set "globalHumidity" to "tempField".
 - Append to file "File1" with text: "globalTemperature", "globalHumidity", "globalTemperature", "globalHumidity".
- When "globalTemperature" is empty, then:
 - Append to file "File2" with text: "globalTemperature", "globalHumidity".
- When "globalHumidity" is empty, then:
 - Append to file "File3" with text: "globalTemperature", "globalHumidity".

Script 2 (Right):

- When green flag clicked, go to frame 1 and click.
- Set global variable "globalTemperature" to "soilField" and "globalHumidity" to "tempField".
- When "globalTemperature" is not empty and "globalHumidity" is not empty, then:
 - Set "globalTemperature" to "soilField".
 - Set "globalHumidity" to "tempField".
 - Append to file "File1" with text: "globalTemperature", "globalHumidity", "globalTemperature", "globalHumidity".
- When "globalTemperature" is empty, then:
 - Append to file "File2" with text: "globalTemperature", "globalHumidity".
- When "globalHumidity" is empty, then:
 - Append to file "File3" with text: "globalTemperature", "globalHumidity".

Scratch script for data collection and file saving.

Script 1 (Left):

- When green flag clicked, go to frame 1 and click.
- Set global variable "globalTemperature" to "soilField" and "globalHumidity" to "tempField".
- When "globalTemperature" is not empty and "globalHumidity" is not empty, then:
 - Set "globalTemperature" to "soilField".
 - Set "globalHumidity" to "tempField".
 - Append to file "File1" with text: "globalTemperature", "globalHumidity", "globalTemperature", "globalHumidity".
- When "globalTemperature" is empty, then:
 - Append to file "File2" with text: "globalTemperature", "globalHumidity".
- When "globalHumidity" is empty, then:
 - Append to file "File3" with text: "globalTemperature", "globalHumidity".

Script 2 (Right):

- When green flag clicked, go to frame 1 and click.
- Set global variable "globalTemperature" to "soilField" and "globalHumidity" to "tempField".
- When "globalTemperature" is not empty and "globalHumidity" is not empty, then:
 - Set "globalTemperature" to "soilField".
 - Set "globalHumidity" to "tempField".
 - Append to file "File1" with text: "globalTemperature", "globalHumidity", "globalTemperature", "globalHumidity".
- When "globalTemperature" is empty, then:
 - Append to file "File2" with text: "globalTemperature", "globalHumidity".
- When "globalHumidity" is empty, then:
 - Append to file "File3" with text: "globalTemperature", "globalHumidity".

get global soil = 2.0 50

get global humidity = 1.0 50 and = 1.0 0

get global soil = 2.0 50

get global soil = 2.0 50

get global soil = 2.0 50

0

Warnings

then

set Label5 = Text to 0

set Label6 = Text to 0

call conditions =

else

set Label5 = Text to 0

set Label6 = Text to 0

set TextBox1 = Text to PLEASE COLLECT ALL DATA AND THEN RET

when File1 ColText

do

set TextBox1 = Text to get text

when File2 ColText

do

set TextBox1 = Text to get text

when File3 ColText

do

set TextBox1 = Text to get text

when Button3 Click

do

set global temp = Label5 = Text

set Label5 = Text to 0

set Label6 = Text to 0

if

Label2 = Text = 0

CONNECT

then

call BluetoothClient1 SendText

text = 0

call procedure =

x = 1500

x2 = call Clock Now

set global humidity = call BluetoothClient1 ReceiveText

numberOfBytes = call BluetoothClient1 BytesAvailableToReceive

if

get global humidity = 2.0 and = 1.0

get global humidity = 2.0

get global temp =

then

set Label5 = Text to get global humidity

set Label6 = Text to % humidity

else

set global humidity = 1.0

if

get global humidity = 2.0

then

call File2

if

get global humidity = 2.0

then

call File3

+

-