

**Lab Sheet**  
**IA 3018 – Data Acquisition Systems**  
*Department of Instrumentation and Automation Technology*  
*University of Colombo*  
**Practical 04**

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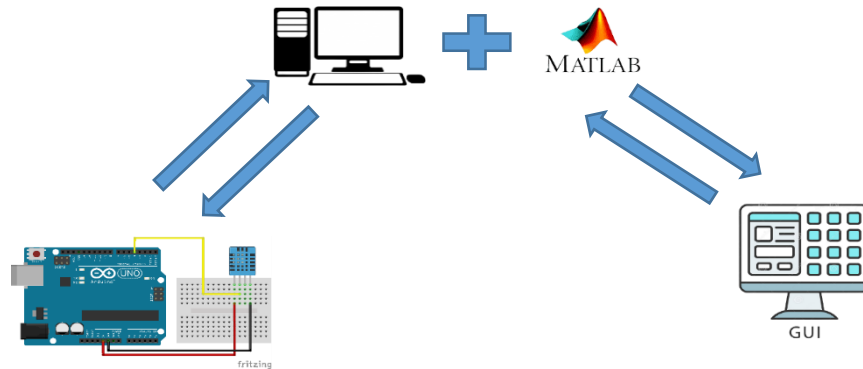


Figure 01:

**Part 01 – Read an analog data (Real time data) DHT11 Temperature/Humidity Sensor with Arduino and MATLAB**

1. Add the Arduino support package to MATLAB.
2. Connect the Arduino board to computer and record the COM port and board name.(Nano, UNO, Mega, Due)
3. Check the Arduino support package are working in MATLAB using above recorded data in part 2.
4. Create the circuit as figure 02.

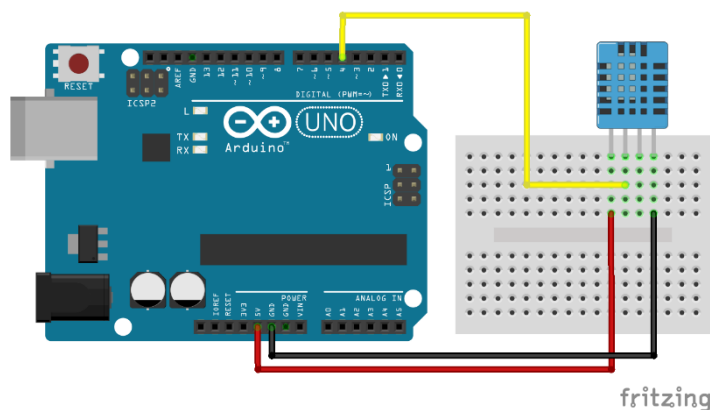


Figure 02: Circuit diagram

5. Write a bellow Arduino code for read the analog data and monitor the Temperature/Humidity values.

```
sketch_jun08a

#include <DHT.h>    // importa la Librerias DHT
#define DHTPIN 2
#define DHTTYPE DHT11

#include <Wire.h>

int sensor = 2;    // pin DATA de DHT22 a pin digital 2
int TEMPERATURA;
int HUMEDAD;

DHT dht(sensor, DHT11);

void setup() {

    Serial.begin(9600);    // inicializacion de monitor serial

    delay(1000);
    dht.begin();    // inicializacion sensor

}

void loop() {

    float temp=dht.readTemperature();
    float humi=dht.readHumidity();
    Serial.print(temp);
    Serial.print(humi);
    |
    delay(1000);
}
```

Figure 03: Arduino code

6. Upload the Arduino code to Arduino UNO board and check the code.
7. Open the Serial Monitor and check the output voltage values as figure 04.

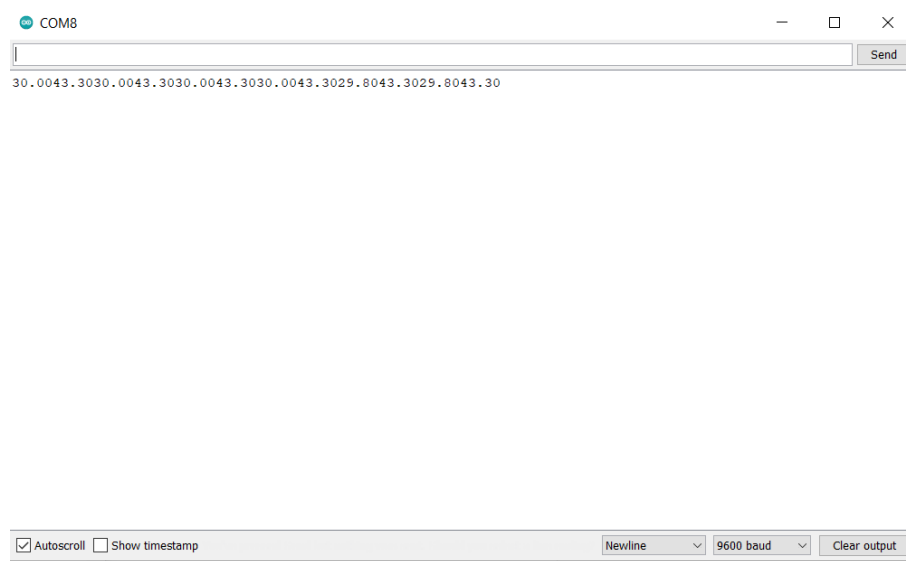


Figure 04: Arduino serial monitor

## **Part 02 – Read an analog data using dht11 and Arduino IDE**

1. Write a MATLAB code for plot the graph which is Temperature/Humidity vs Time as below figure 05.

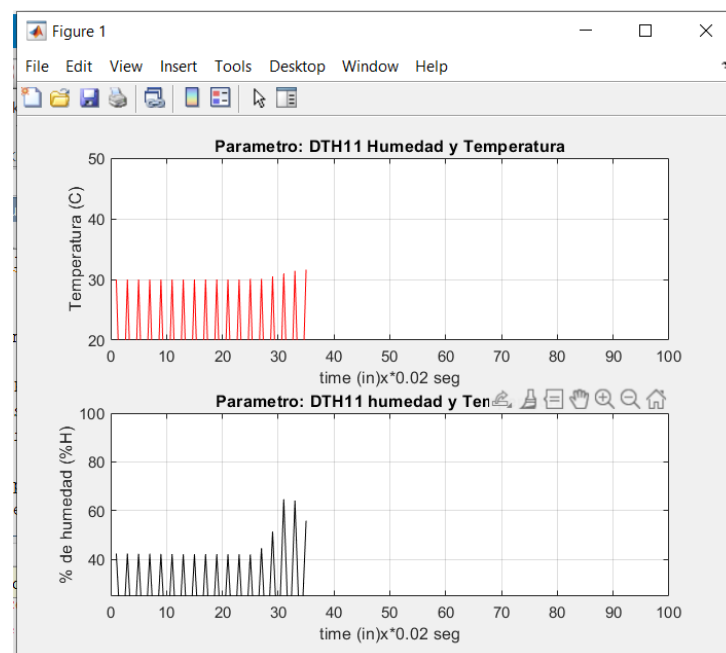


Figure 05: Temperature/Humidity graph

```
untitled.m x fscanf.m +
1 - Port=serial('COM8');
2 - time=100;
3 - i=1;
4 - while(i<time)
5 -
6 -     fopen(Port)
7 -     out= fscanf(Port)
8 -     Temp(i)=str2num(out(1:4));
9 -
10 -     subplot(211);
11 -     plot(Temp, 'r');
12 -
13 -     axis([0,time,20,50]);
14 -     title('DTH11 Temperatura');
15 -     xlabel('time (in)x*0.02 seg');
16 -     ylabel('Temperatura (C)');
17 -     grid
18 -     Humi(i)=str2num(out(5:9));
19 -
20 -     subplot(212);
21 -     plot(Humi, 'k');
22 -
23 -     axis([0,time,25,100]);
24 -     title('DTH11 humidity')
25 -     xlabel('time (in)x*0.02 seg');
26 -     ylabel('% de humedad (%H)');
27 -     grid
28 -
29 -     fclose(Port)
30 -     i=i+1;
31 -
32 -     i=i+1;
33 -     drawnow;
34 - end
35 - delete(Port)
36 - clear s
```

Figure 06: Matlab code

### **Part 03 - Create a GUI for displaying Temperature value on Matlab**

1. Open GUI window in Matlab.
2. Select blank GUI and save as “DHT!!”.
3. Add topic for the GUI using “Text” function and change the appearance.
4. Add another two “Text” function.
5. Record the Baud rate of Arduino COM port using Device Manger setting in computer.
6. Edit the GUI script.
7. Run the scrip and check the output.

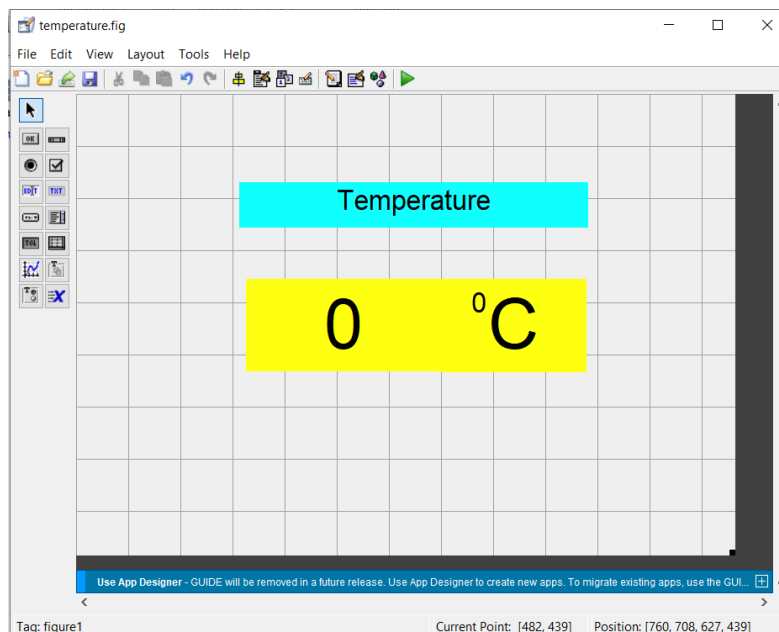


Figure 07: GUI editor

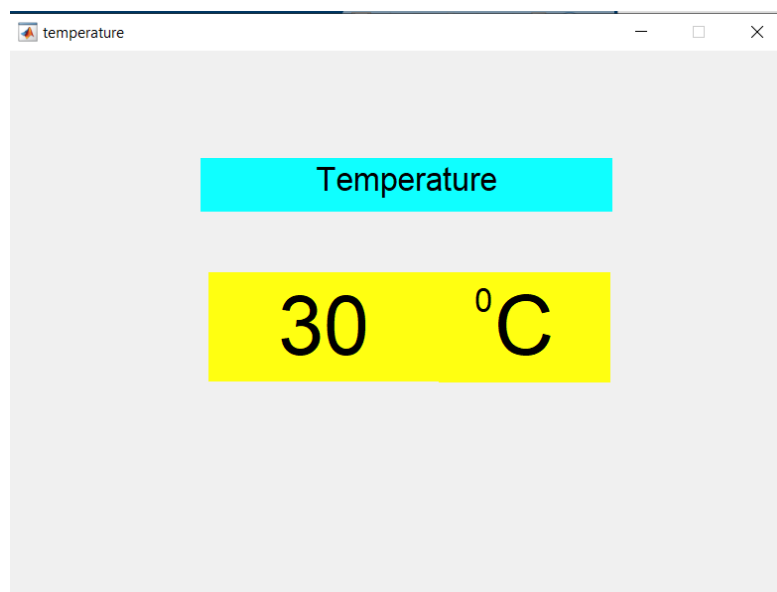


Figure 08: GUI output window