

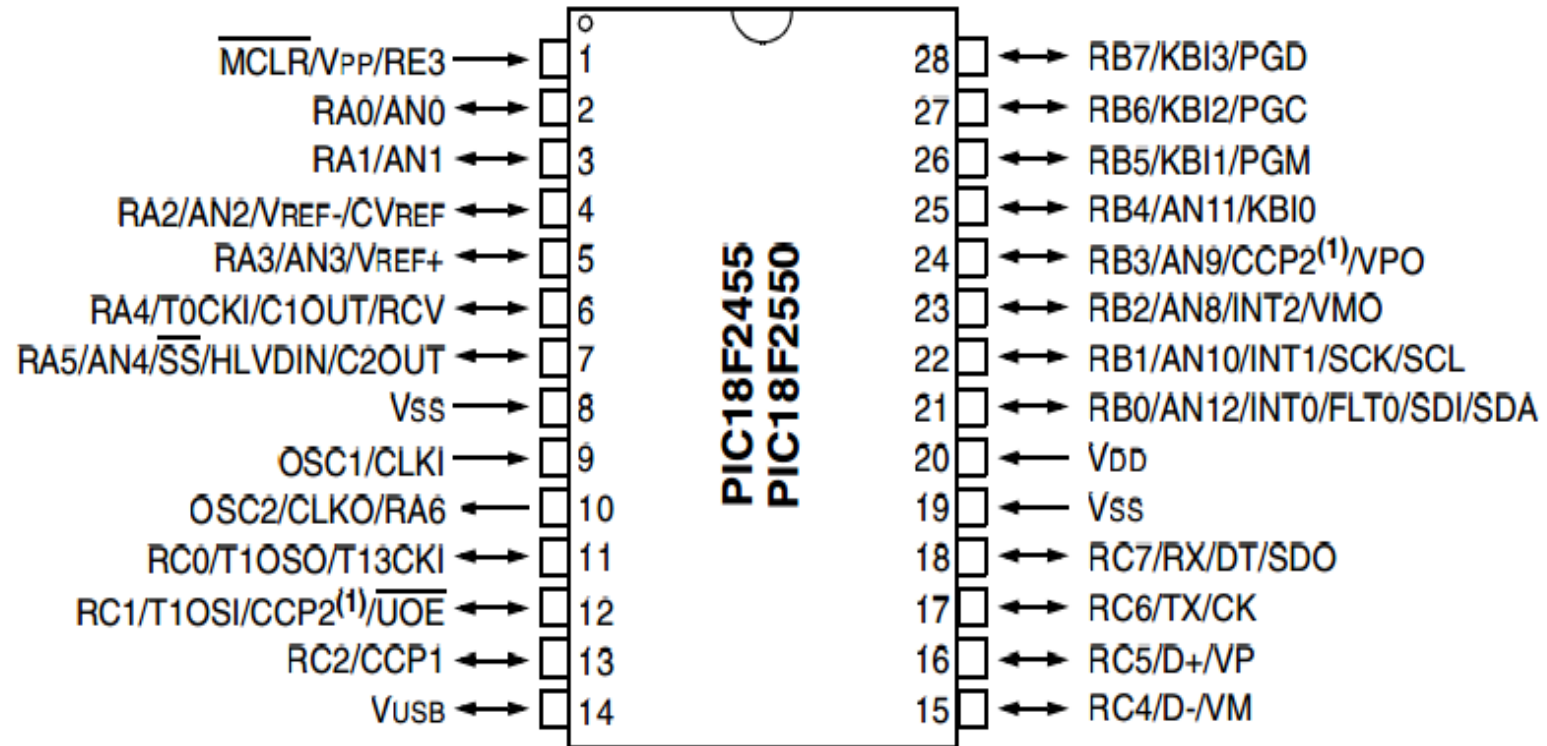


Greenhouse parameter Monitoring

A PIC microcontroller Project

PIC18F2550

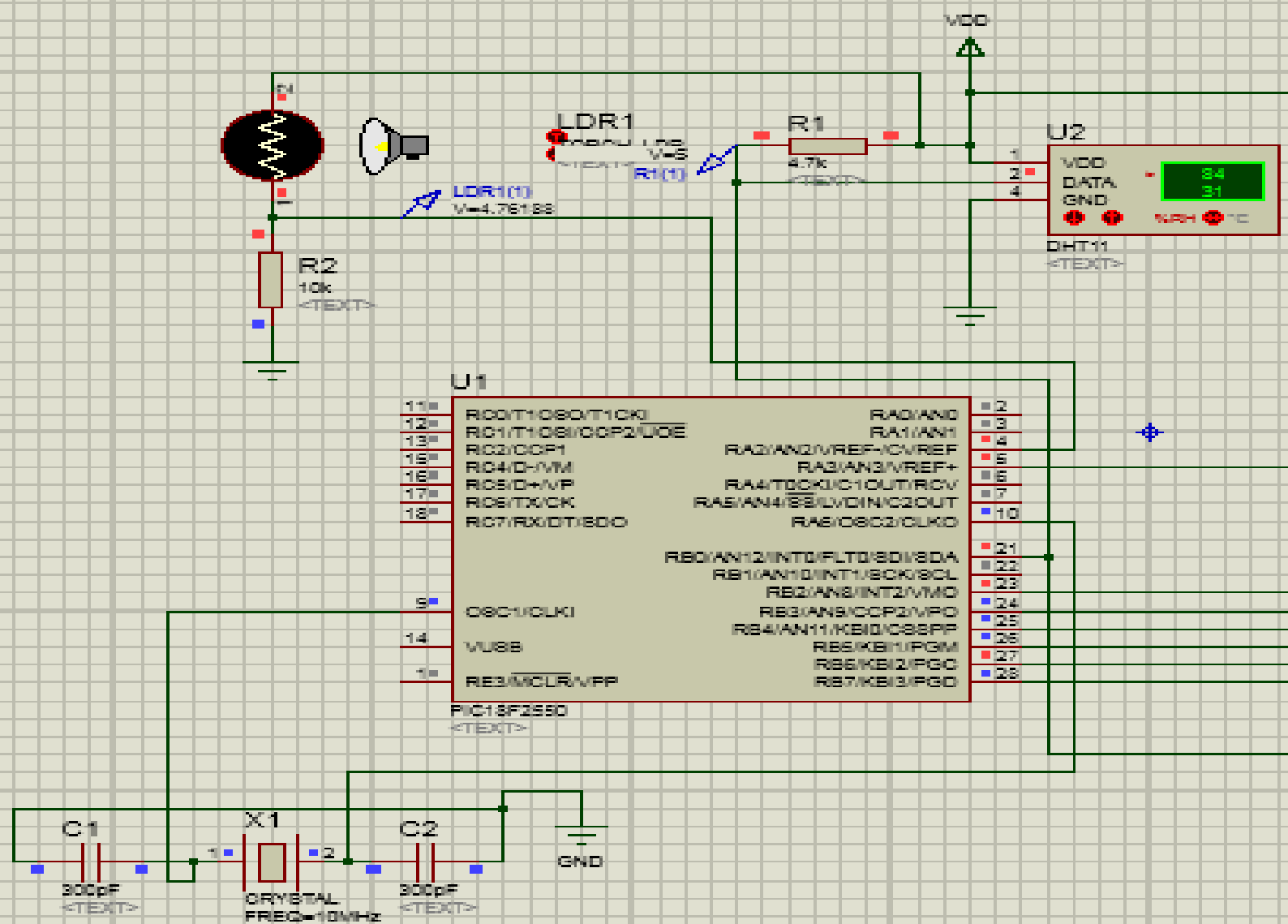
28-Pin PDIP, SOIC



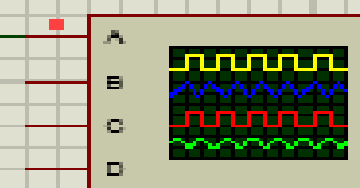
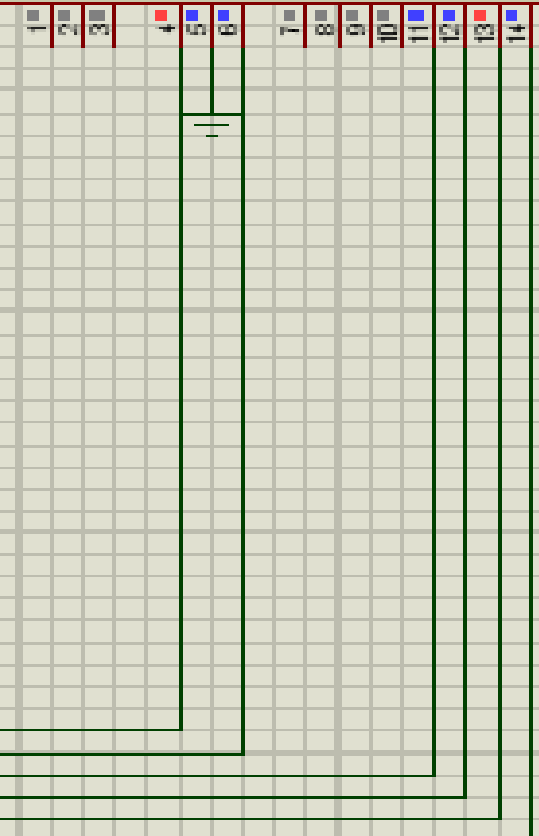


Simulation in Proteus

Hardware Components used : PIC18F2550, LCD, DHT11, LDR, OSCILOSCOPE



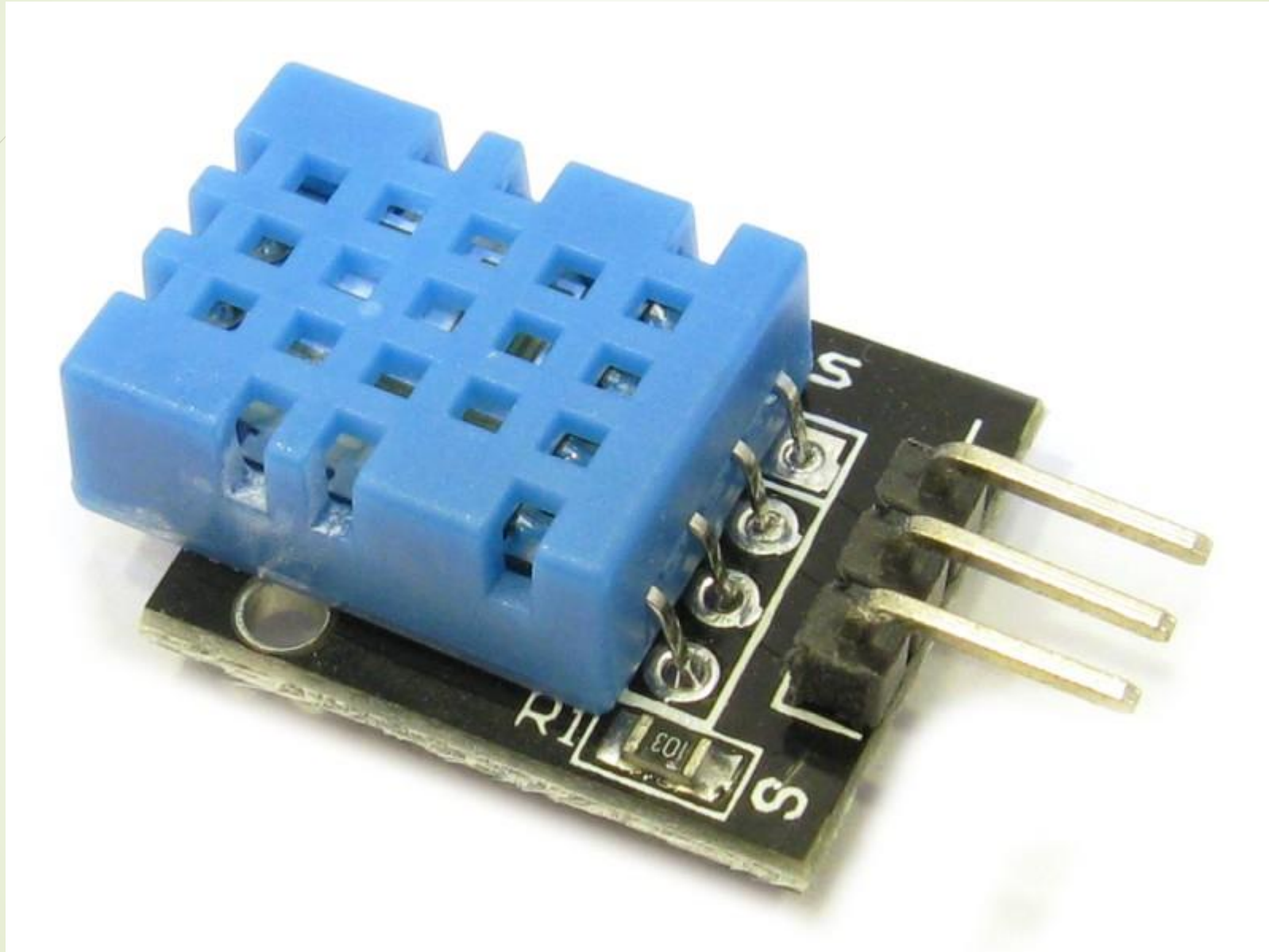
Temp. = 31
Hum. = 84



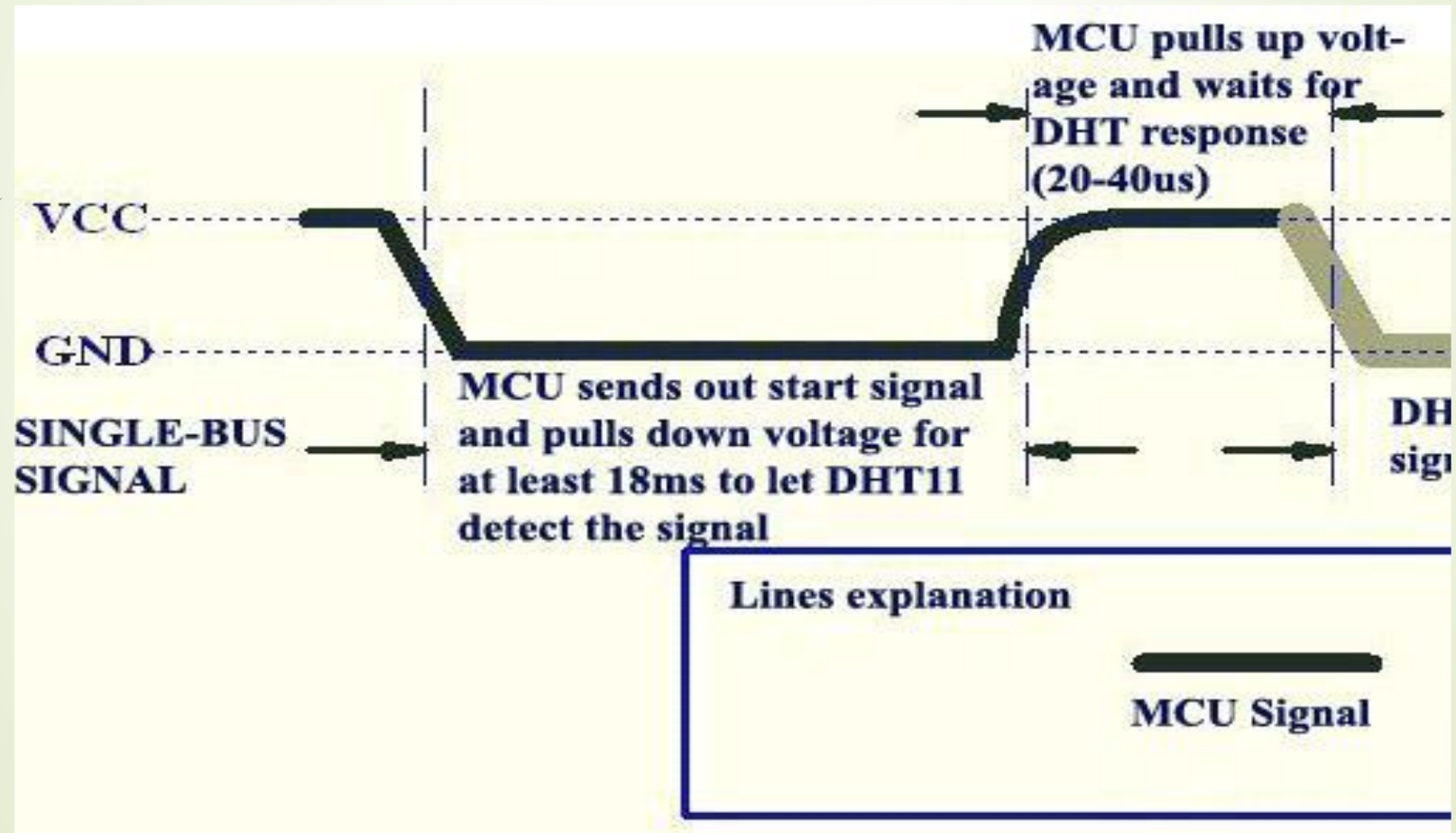


DHT 11 serial communication

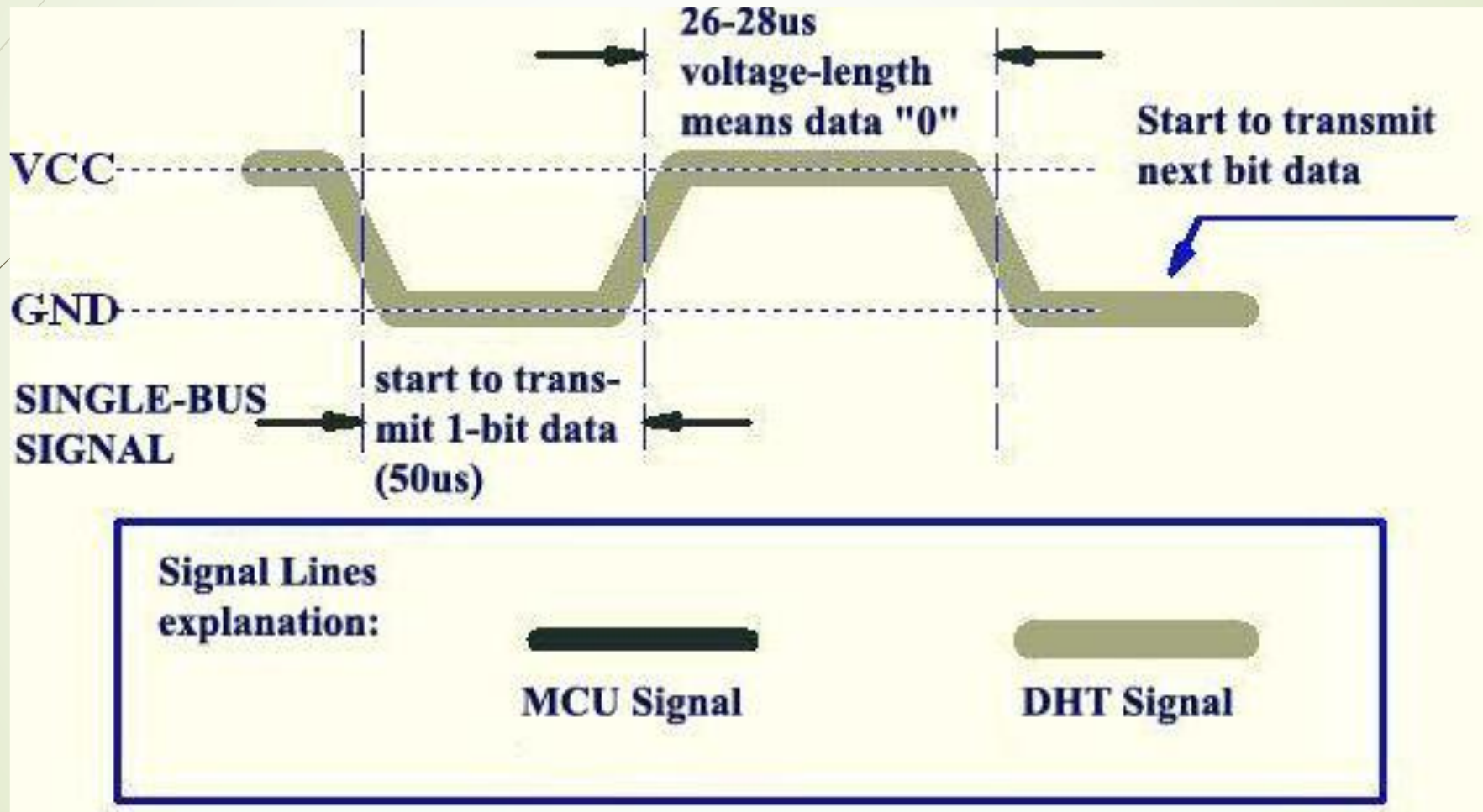
DHT 11



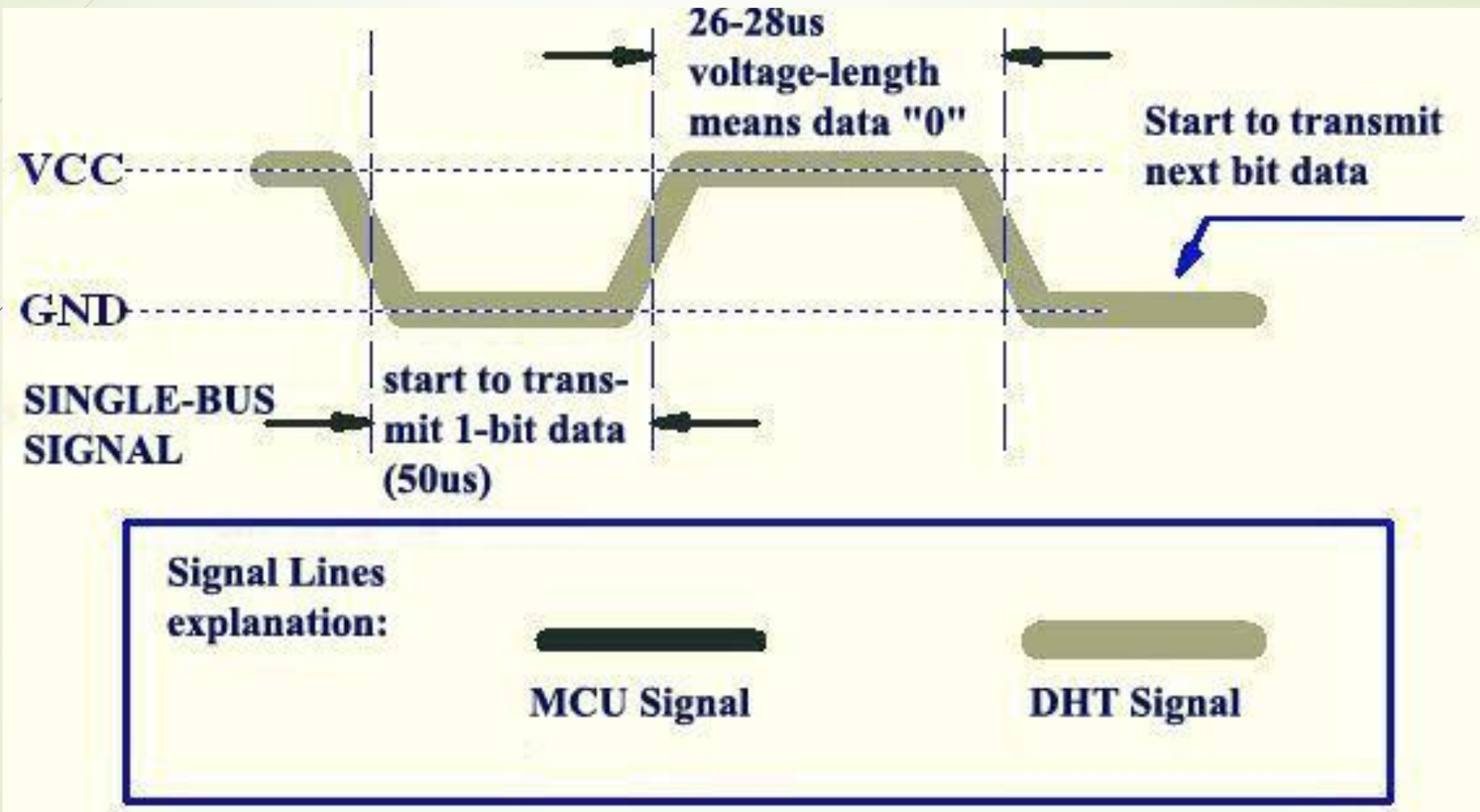
MCU Sends out Start Signal to DHT



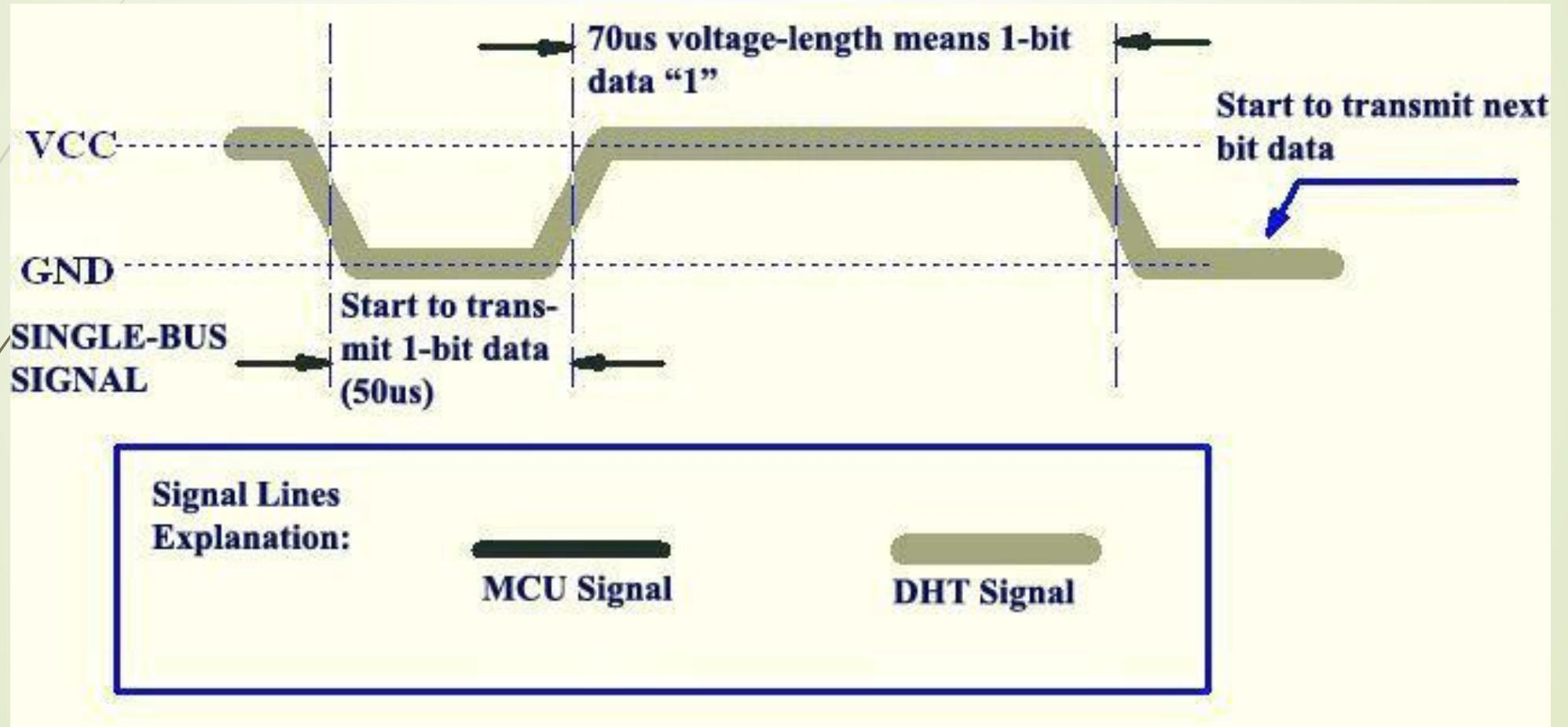
DHT Responses to MCU



Data '0' Indication



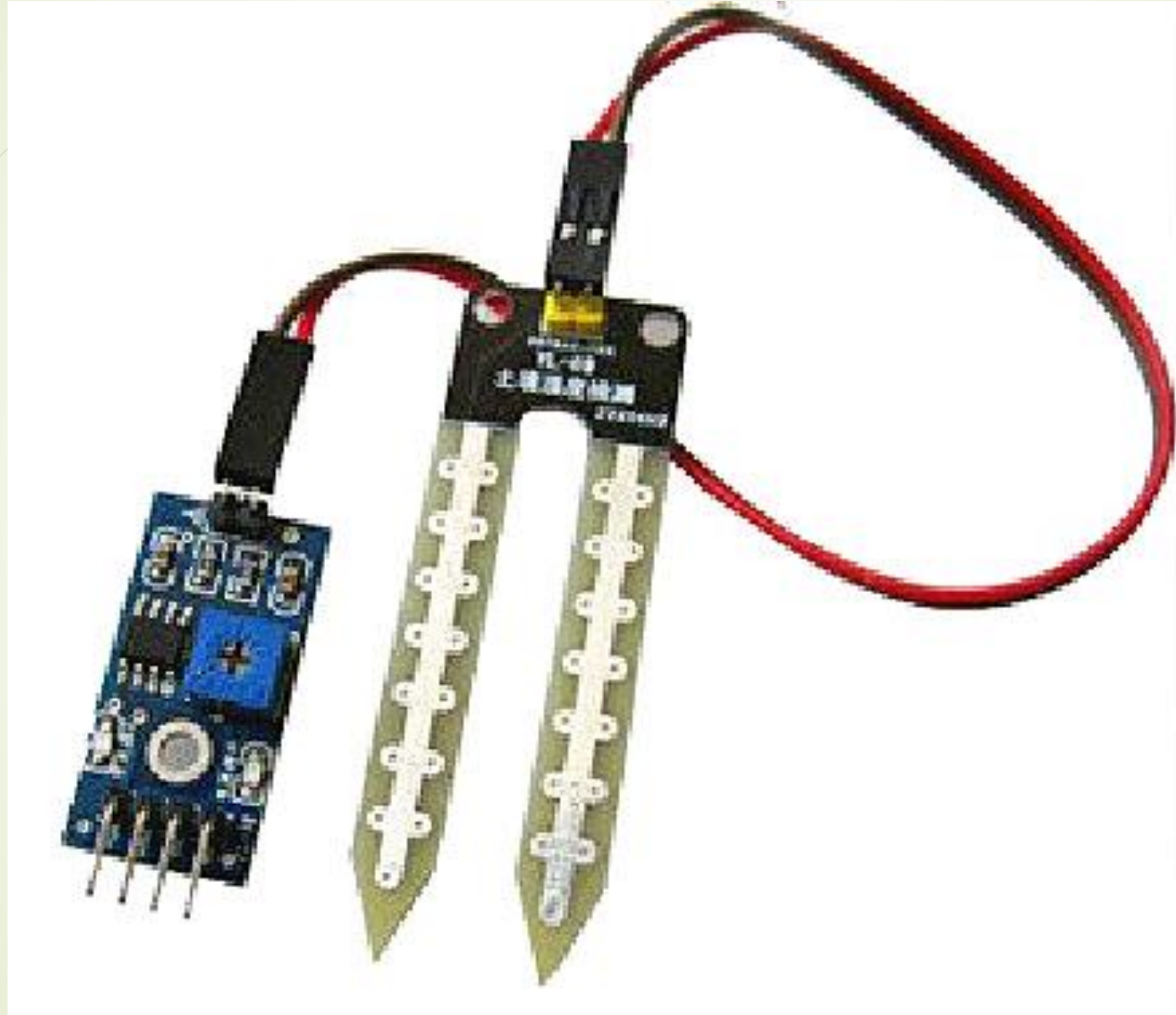
Data "1" Indication





Moisture Sensor

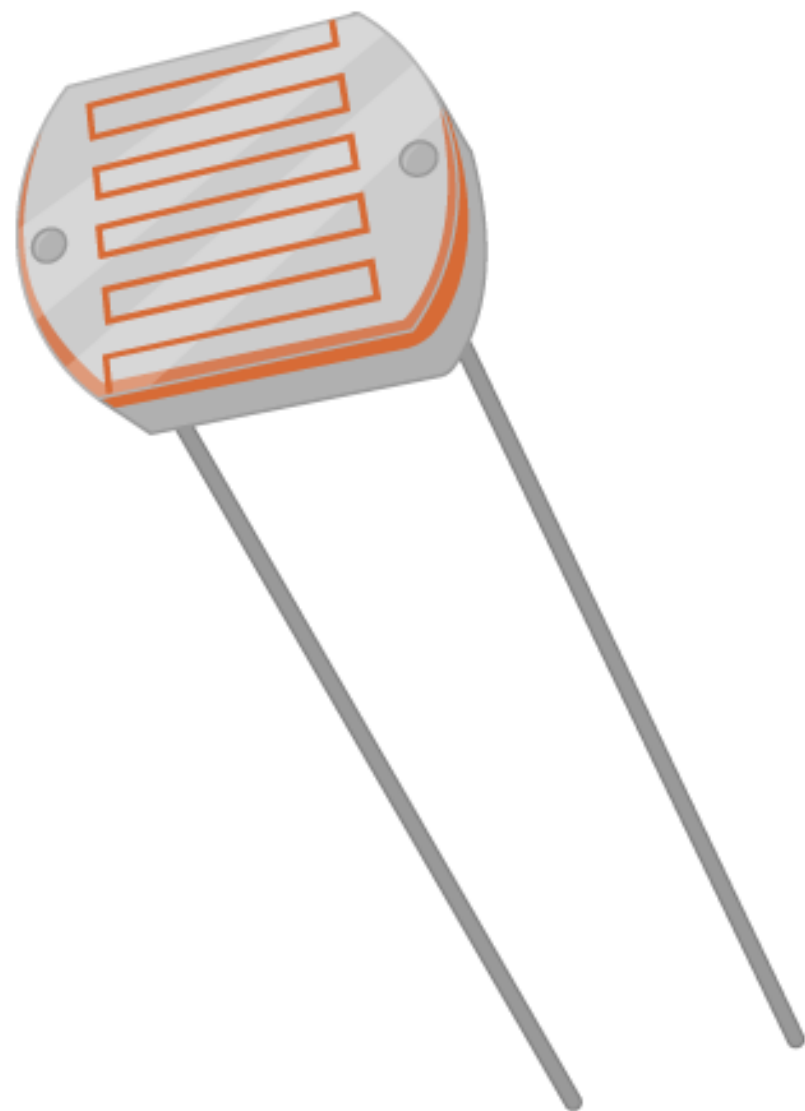
Sensor output=1023 for dry conditions, 250-400 for moist, 200 for wet conditions





LDR Sensor

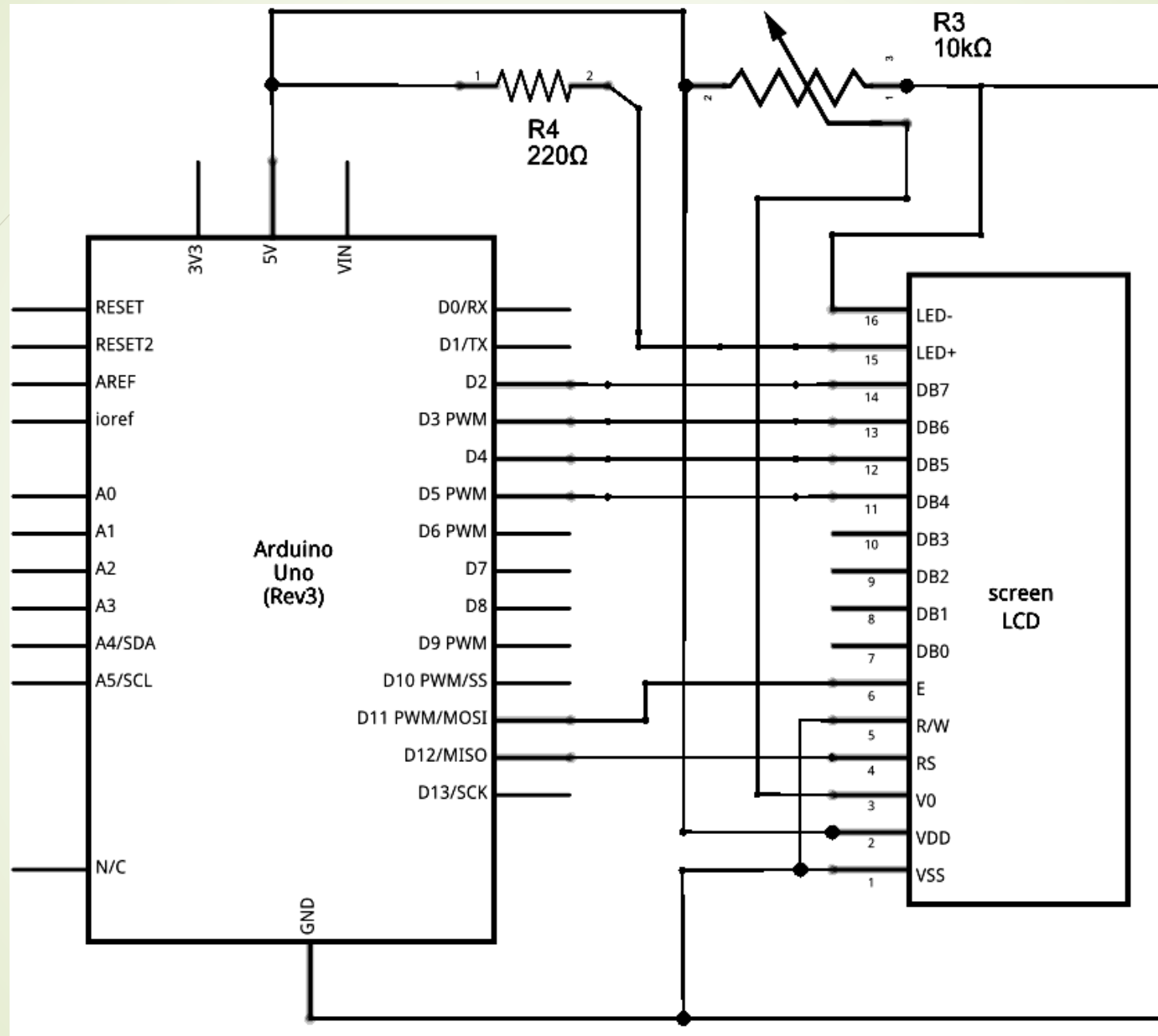
Light intensity sensor , o/p= Voltage , desirable= lux value, therefore conversion applied.





LCD Interfacing


With arduino





Working with PIC18F887

Used in simulation for proteus



```
#include <built_in.h>
#include "dht11.h"
#include "ldrWorking.c"
```

```
sbit LCD_RS at RB2_bit;
sbit LCD_EN at RB3_bit;
sbit LCD_D4 at RB4_bit;
sbit LCD_D5 at RB5_bit;
sbit LCD_D6 at RB6_bit;
sbit LCD_D7 at RB7_bit;
```

```
sbit LCD_RS_Direction at TRISB2_bit;
sbit LCD_EN_Direction at TRISB3_bit;
sbit LCD_D4_Direction at TRISB4_bit;
sbit LCD_D5_Direction at TRISB5_bit;
sbit LCD_D6_Direction at TRISB6_bit;
sbit LCD_D7_Direction at TRISB7_bit;
```



.....Contd.


```
//DHT11 DEFINITONS  
sbit DHT11_Pin at PORTB.B0;  
sbit DHT11_DIR at TRISB.B0;  
extern unsigned int DHT11_TMP;  
extern unsigned int DHT11_HUM;  
extern char DHT11_CHKSM;  
//END OF DHT11 DEFINITONS
```

```
long veri;  
int isi,nem;  
char bekleme=0;  
char txt[7];
```



.....Contd.

```
void main() {  
    ADCON1=0x0f;  
    TRISA = 0xFF; // PORTA is input as it receives values from ldr  
    lcd_init();  
    DHT11_init();  
  
    while(1)  
    {  
        Dht11_Start();  
        DHT11_Read();  
        .....  
    }
```

.....Contd.

```
if(DHT11_CHKSM==((DHT11_TMP>>8)+(DHT11_HUM>>8)+(DHT11_TMP
&0xff)+(DHT11_HUM&0xff))
{  Lcd_Cmd(_LCD_CURSOR_OFF);
   Lcd_Cmd(_LCD_CLEAR);
   lcd_out(1,1,"Temp.");
   Lcd_Out(2,1,"Hum.");
   inttostr(DHT11_TMP>>8,txt);
   lcd_out(1,8,txt);
   inttostr(DHT11_HUM>>8,txt);
   lcd_out(2,8,txt);
   delay_ms(1000);
}
```



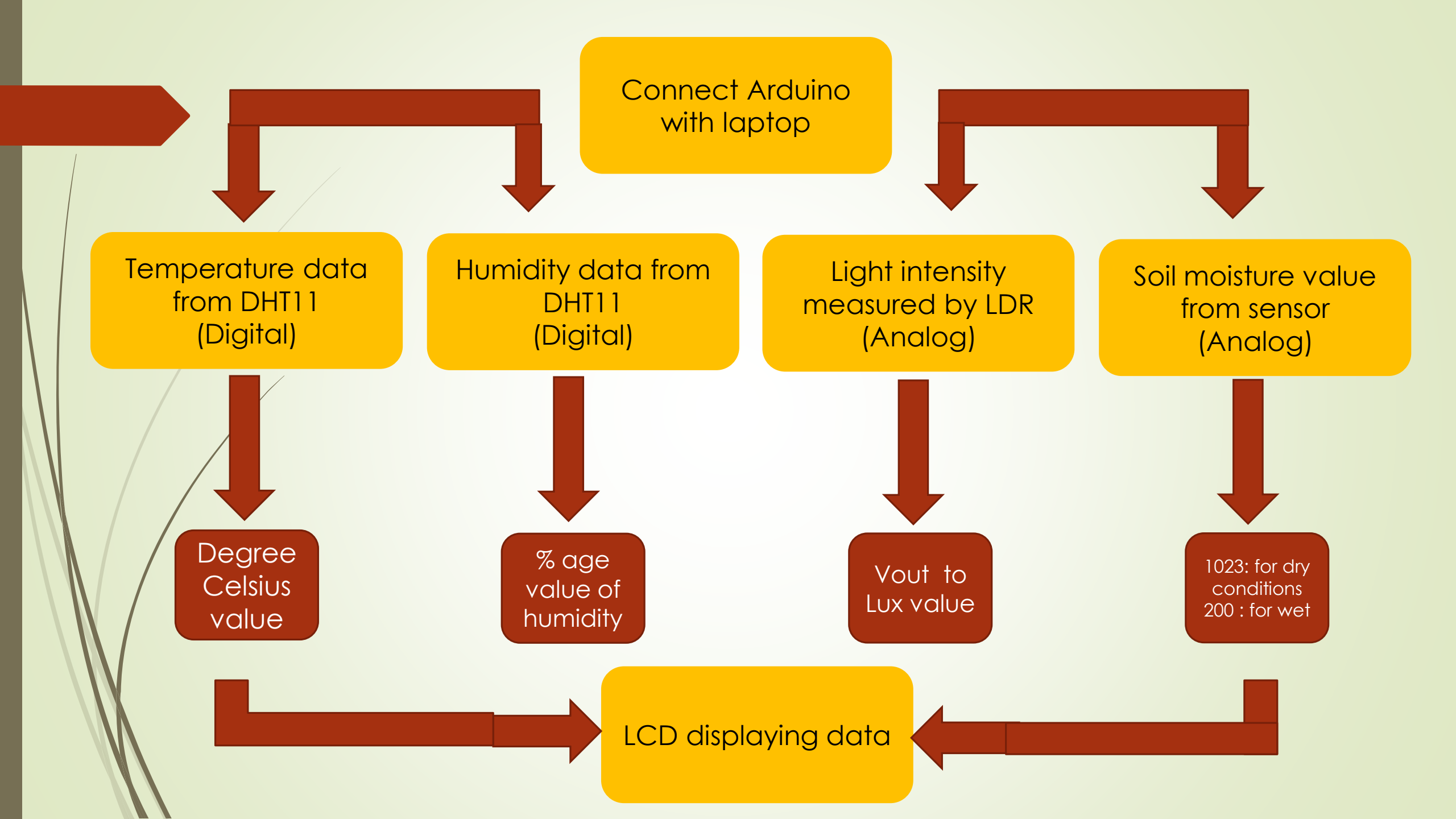
.....Contd.

```
Lcd_Cmd(_LCD_CLEAR);  
Lcd_Out(1, 1, "LDR :"); //Display string on LCD position 1,1  
adc_value = ADC_Read(2);  
ShowADC(1,7,adc_value);  
delay_ms(1000);  
}  
}
```



Working with Arduino

Hardware implementation done with arduino





```
#include <LiquidCrystal.h>
```

```
// DHT Temperature & Humidity Sensor
```

```
#include <Adafruit_Sensor.h>
```

```
#include <DHT.h>
```

```
#include <DHT_U.h>
```

```
#define DHTPIN      2
```

```
#define DHTTYPE     DHT11
```

```
.....
```



```
DHT_Unified dht(DHTPIN, DHTTYPE);
```

```
uint32_t delayMS;
```

```
LiquidCrystal lcd(12, 11, 5, 4, 3, 6);
```



```
int LDRpin = A0;
```

```
int LDRvalue = 0;
```


```
int moisturePin = A1;
```

```
int moistureValue = 0;
```

```
.....
```


```
void setup() {  
  Serial.begin(9600);  
  dht.begin();  
  lcd.setCursor(0, 0); // top left  
  lcd.begin(16, 2);  
  
  sensor_t sensor;  
  dht.temperature().getSensor(&sensor);  
  
  dht.humidity().getSensor(&sensor);  
  delayMS = sensor.min_delay / 1000;  
  
}
```




```
void loop() {  
  // Delay between measurements.  
  delay(delayMS);
```

```
  /***** DHT WORKING CODE *****/
```

```
    sensors_event_t event;  
    dht.temperature().getEvent(&event);  
    if (isnan(event.temperature)) {  
      Serial.println("Error reading temperature!");  
    }  
    else {  
      lcd.clear();  
      lcd.write("Temp: ");  
      lcd.print(event.temperature);  
      lcd.write(" *C");  
      delay(1000); }  
  }
```



```
// Get humidity event and print its value.
dht.humidity().getEvent(&event);
if (isnan(event.relative_humidity)) {
    Serial.println("Error reading humidity!");
}
else {
    lcd.clear();
    lcd.write("Humidity: ");
    lcd.print(event.relative_humidity);
    lcd.write("%");
    delay(1000);
}
```



```
/****** LDR WORKING CODE *****/
LDRvalue = analogRead(LDRpin); // read the value from the sensor
float Vout = (LDRvalue * 0.0048828125);
float RLDR = (10000.0 * (5 - Vout))/Vout;    // Equation to calculate
Resistance of LDR, [R-LDR =(R1 (Vin - Vout))/ Vout]
float Lux = (500 / RLDR);

lcd.clear();
lcd.write("Light: ");
lcd.print(Lux);
lcd.write(" lux");
delay(1000);

/****** END OF LDR *****/
```



```
/****** MOISTURE SENSOR CODE *****/
```

```
moistureValue = analogRead(moisturePin);  
Serial.print("MOISTURE VALUE: ");  
Serial.println(moistureValue); //prints the values coming from the sensor on  
the screen  
delay(100);  
lcd.clear();  
lcd.write("Moisture: ");  
lcd.print(moistureValue);  
lcd.write(" V");  
delay(1000);  
}
```

```
/****** END OF MOISTURE SENSOR *****/
```



Thank You!