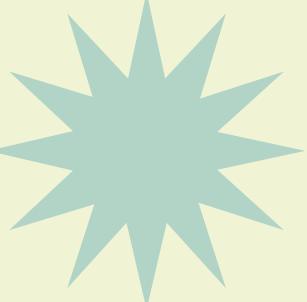


AUTOMATED INDOOR GARDEN



EE232 PRESENTATION

*Planting the Future: Today's
Efforts, Tomorrow's Harvest*



Presented by
Group-4

GROW WISE SQUAD



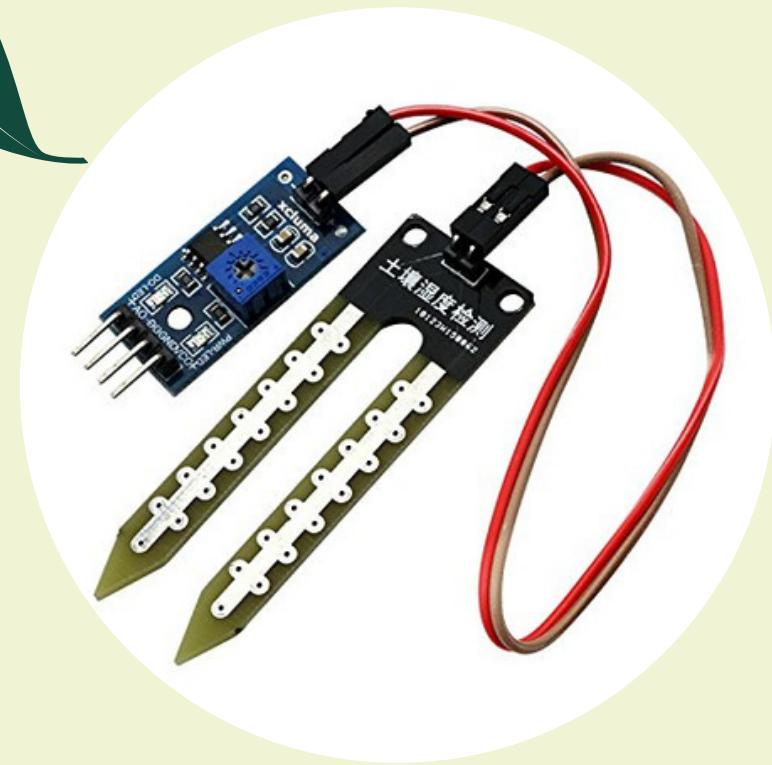
Introduction

Growing Goodness at Home:

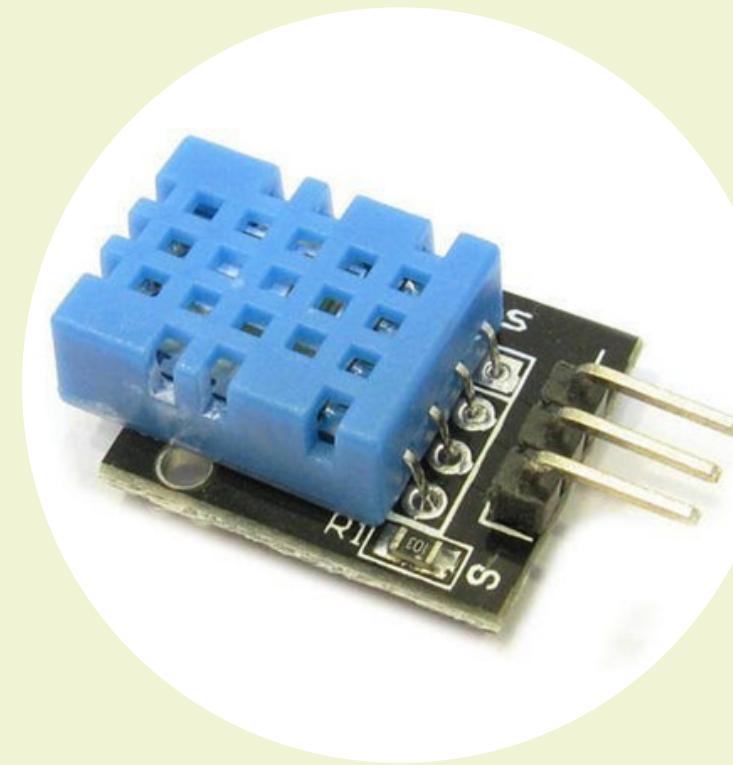
Our project is all about making it easy for anyone to grow their own fresh food indoors. We're using smart technology to take care of the plants, so you don't have to worry about a green thumb. Our goal is to bring nature into your home, making it simple, efficient, and fun for everyone to enjoy homegrown goodness.



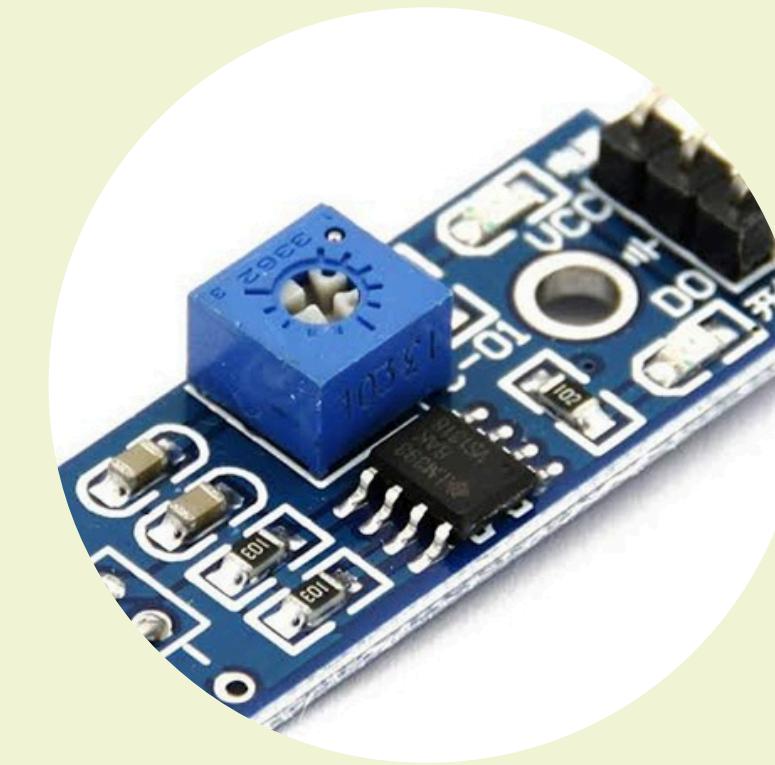
MOISTURE SENSOR



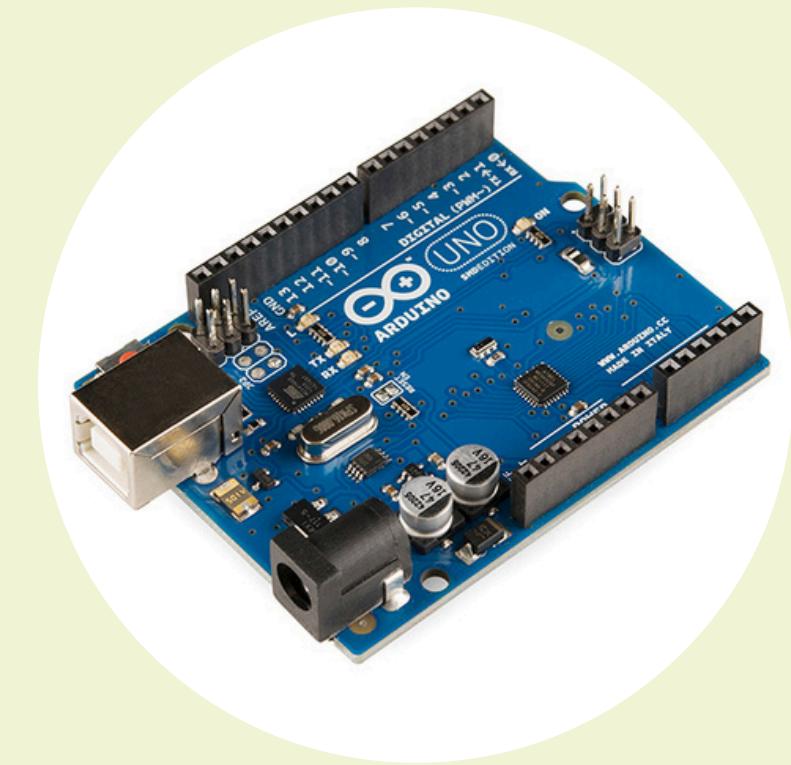
TEMPERATURE SENSOR



LIGHT SENSOR



ARDUINO UNO



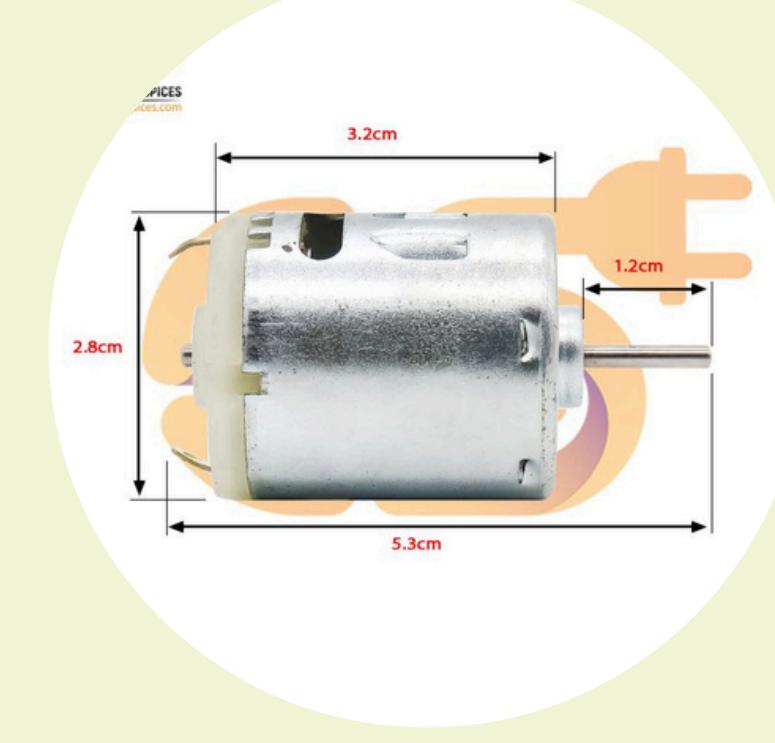
SENSORS AND HARDWARE COMPONENTS



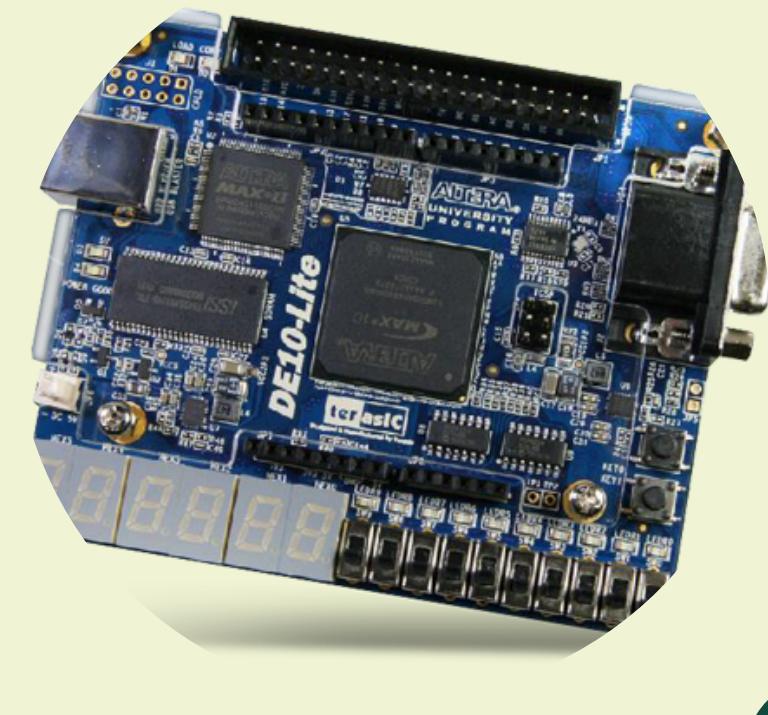
WATER PUMP



FAN



MOTOR



DE 10 LITE BOARD

temp1 | Arduino IDE 2.2.1

File Edit Sketch Tools Help

Arduino Uno

temp1.ino

```
1 const int analogMoisturePin = A0; // Define the analog pin for the moisture sensor
2 const int analogLightPin = A1; // Define the analog pin for the light sensor
3
4 #include <DHT.h>
5
6 #define dht_apin A2
7 #define DHTTYPE DHT11 // Define the type of DHT sensor (DHT11, DHT21, or DHT22)
8
9 DHT dht(dht_apin, DHTTYPE); // Initialize the DHT sensor
10
11 #define outputpin1 5
12 #define outputpin2 6
13 #define outputpin3 7
14
15 const int moistureThreshold = 60; // Set the moisture threshold (adjust as needed)
16 const int lightThreshold = 850; // Set the light threshold (adjust as needed)
17 const int humidityThreshold = 79; // Set the humidity threshold (adjust as needed)
18
19 int m, l, h;
20
21 void setup()
22 {
23     Serial.begin(9600); // Initialize the serial communication
24     dht.begin();
25 }
26
27 void loop()
28 {
29     int analogValue1 = analogRead(analogMoisturePin); // Read the analog value from the moisture sensor
30
31     // Convert the analog value to a digital value (0-1023) to a percentage value (0-100)
32     int moisturePercentage = map(analogValue1, 0, 1023, 0, 100);
```

Output

Sketch uses 5090 bytes (15%) of program storage space. Maximum is 32256 bytes.

Ln 17, Col 33 Arduino Uno on COM7 15:19 23-11-2023



Search



ENG
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15:19
23-11-2023

temp1 | Arduino IDE 2.2.1

File Edit Sketch Tools Help

Arduino Uno

temp1.ino

```
--  
21  
22 void loop() {  
23     int analogValue1 = analogRead(analogMoisturePin); // Read the analog value from the moisture sensor  
24  
25     // Convert the analog value to a digital value (0-1023) to a percentage value (0-100)  
26     int moisturePercentage = map(analogValue1, 0, 1023, 0, 100);  
27  
28     // Print the digital moisture value to the serial monitor  
29     /*Serial.print("Analog Value: ");  
30     Serial.print(analogValue1);  
31     Serial.print("\t Moisture Percentage: ");  
32     Serial.print(moisturePercentage);  
33     Serial.println("%");*/  
34  
35     if (moisturePercentage < moistureThreshold) {  
36         Serial.println("Moisture level is high.");  
37         m = 0;  
38     } else {  
39         Serial.println("Moisture level is low.");  
40         m = 1;  
41     }  
42  
43     delay(5000); // Delay for readability (adjust as needed)  
44 /*  
45     int analogValue2 = analogRead(analogLightPin); // Read the analog value from the light sensor  
46  
47     if (analogValue2 >= 0) {  
48         // Print the digital light value to the serial monitor  
49         //Serial.print("Analog Value: ");  
50         //Serial.println(analogValue2);  
51  
52 */  
53
```

Output

Sketch uses 2174 bytes (6%) of program storage space. Maximum is 32256 bytes.

Ln 33, Col 26 Arduino Uno on COM7 2 02:18 05-11-2023

temp1 | Arduino IDE 2.2.1

File Edit Sketch Tools Help

Arduino Uno

temp1.ino

```
50
51     delay(500); // Delay for readability (adjust as needed)
52
53     int analogValue2 = analogRead(analogLightPin); // Read the analog value from the light sensor
54
55     Serial.println(analogValue2);
56
57     if (analogValue2 < lightThreshold)
58     {
59         Serial.println("Light level is high.");
60         digitalWrite(outputpin2, LOW);
61     }
62     else
63     {
64         Serial.println("Light level is low.");
65         digitalWrite(outputpin2, HIGH);
66     }
67
68
69
70     delay(500); // Delay for readability (adjust as needed).
71
72     dht.read(dht_apin);
73
74     Serial.print("Current humidity: ");
75     Serial.print(dht.readHumidity());
76     Serial.print("% ");
77     if (dht.readHumidity() > humidityThreshold)
78     {
79         digitalWrite(outputpin3, LOW);
80     }
81     else{
82         digitalWrite(outputpin3, HCU);
83     }
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
```

Output

Sketch uses 5090 bytes (15%) of program storage space. Maximum is 32256 bytes.

Ln 17, Col 33 Arduino Uno on COM7 2 38

35°C Partly sunny

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23-11-2023

temp1 | Arduino IDE 2.2.1

File Edit Sketch Tools Help

Arduino Uno

temp1.ino

```
59     serial.println("Light level is high.");
60     digitalWrite(outputpin2, LOW);
61 }
62 else
63 {
64     Serial.println("Light level is low.");
65     digitalWrite(outputpin2, HIGH);
66 }
67
68
69
70 delay(500); // Delay for readability (adjust as needed).
71
72 dht.read(dht_apin);
73
74 Serial.print("Current humidity: ");
75 Serial.print(dht.readHumidity());
76 Serial.print("% ");
77 if (dht.readHumidity() > humidityThreshold)
78 {
79     digitalWrite(outputpin3, LOW);
80 }
81 else{
82     digitalWrite(outputpin3, HIGH);
83 }
84
85 Serial.println();
86
87
88
89 delay(500);
90 }
```

Output

Sketch uses 5090 bytes (15%) of program storage space. Maximum is 32256 bytes.

Ln 17, Col 33 Arduino Uno on COM7 2 38

35°C Partly sunny

Search

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23-11-2023

Project Navigator Files

Files

- abc VHD ./../ALL_VHDL_CODES/EE232.vhd
- abc VHD PROJECT_GRP4.vhd

Tasks Compilation

Task

- ✓ ▶ Compile Design
- ✓ ▶ Analysis & Synthesis
- ✓ ▶ Fitter (Place & Route)
- ✓ ▶ Assembler (Generate program)
- ✓ ▶ Timing Analysis
- ✓ ▶ EDA Netlist Writer
- Edit Settings
- Program Device (Open Programmer)

abc PROJECT_GRP4.vhd

Compilation Report - PROJECT_GRP4

```
1 Library IEEE;
2 use IEEE.STD_LOGIC_1164.ALL;
3 use IEEE.STD_LOGIC_UNSIGNED.ALL;
4 use WORK.EE232.ALL;
5
6 entity PROJECT_GRP4 is
7     Port (
8         m : in STD_LOGIC;          -- Moisture sensor input
9         l : in STD_LOGIC;          -- Light sensor input
10        h : in STD_LOGIC;          -- Humidity sensor input
11        sw0 : in STD_LOGIC;        -- Switch SW0 input
12        LED1 : out STD_LOGIC;
13        output_pins : out STD_LOGIC_VECTOR(3 downto 0) -- Output for motor and pump control
14    );
15 end PROJECT_GRP4;
16
17 architecture func of PROJECT_GRP4 is
18     signal m1, m2, l1, h1, h2 : STD_LOGIC;
19
20 begin
21     process(m, l, h, sw0)
22     begin
23         -- Control logic based on input signals
24         -- Modify the conditions based on the specific logic you want
25
26         if sw0 = '1' then -- Check if SW0 is turned on
27             if m = '1' then
28                 m1 <= '0'; -- Moisture level is high, so activate the pump
29                 m2 <= '0';
30             else
31                 m1 <= '1';
32                 m2 <= '0'; -- Moisture level is low, so activate the pump differently
33             end if;
34
35             if l = '1' then
36                 l1 <= '1'; -- Light level is high, so activate the motor
37             end if;
38         end if;
39     end process;
40 end func;
```

All Find... Find Next

Type	ID	Message
> i		Quartus Prime EDA Netlist Writer was successful. 0 errors, 1 warning
i		293000 Quartus Prime Full Compilation was successful. 0 errors, 25 warnings

System (47) Processing (133)

Project Navigator Files

Files

- abc VHDL ./ALL_VHDL_CODES/EE232.vhd
- abc VHDL PROJECT_GRP4.vhd

Tasks Compilation

Task

- ✓ ▶ Compile Design
- ✓ > ▶ Analysis & Synthesis
- ✓ > ▶ Fitter (Place & Route)
- ✓ > ▶ Assembler (Generate program)
- ✓ > ▶ Timing Analysis
- ✓ > ▶ EDA Netlist Writer
- Edit Settings

Program Device (Open Program)

PROJECT_GRP4.vhd

```

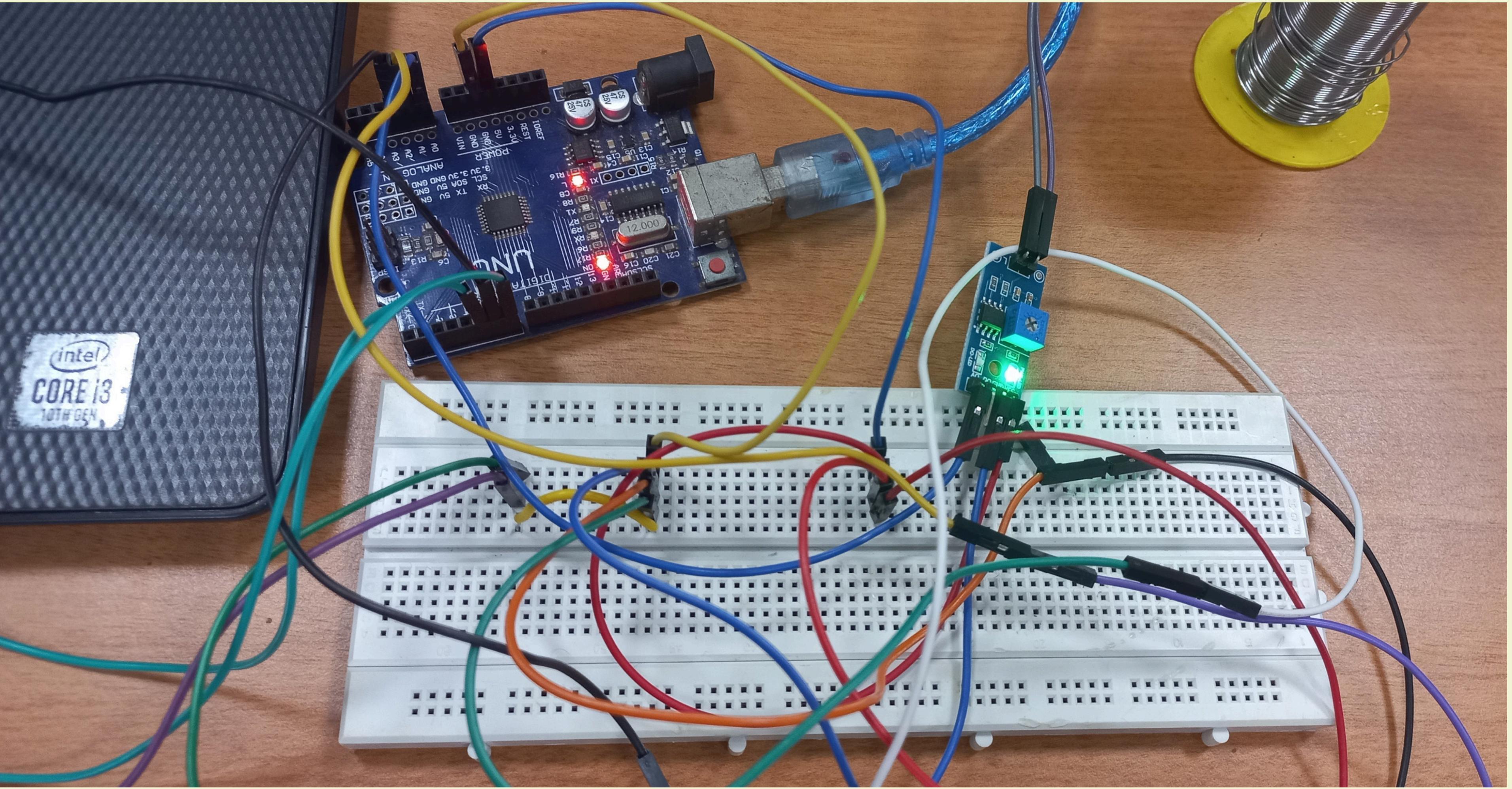
31      else
32          m1 <= '1';
33          m2 <= '0'; -- Moisture level is low, so activate the pump differently
34      end if;
35
36      if l = '1' then
37          ll <= '1'; -- Light level is high, so activate the motor
38      else
39          ll <= '0'; -- Light level is low
40      end if;
41
42      if h = '1' then
43          h1 <= '0'; -- Humidity level is high, so activate the motor
44          h2 <= '0';
45      else
46          h1 <= '1';
47          h2 <= '0'; -- Humidity level is low, so activate the motor differently
48      end if;
49
50      else
51          -- If SW0 is not turned on, set all outputs to '0'
52          m1 <= '0';
53          m2 <= '0';
54          ll <= '0';
55          h1 <= '0';
56          h2 <= '0';
57      end if;
58
59      -- Update output_pins based on input conditions
60      output_pins(0) <= m1; -- pump control
61      output_pins(1) <= m2;
62      output_pins(2) <= h1; -- motor control
63      output_pins(3) <= h2; -- combine the motor controls
64      LED1 <= ll;
65
66  end process;
67 end func;

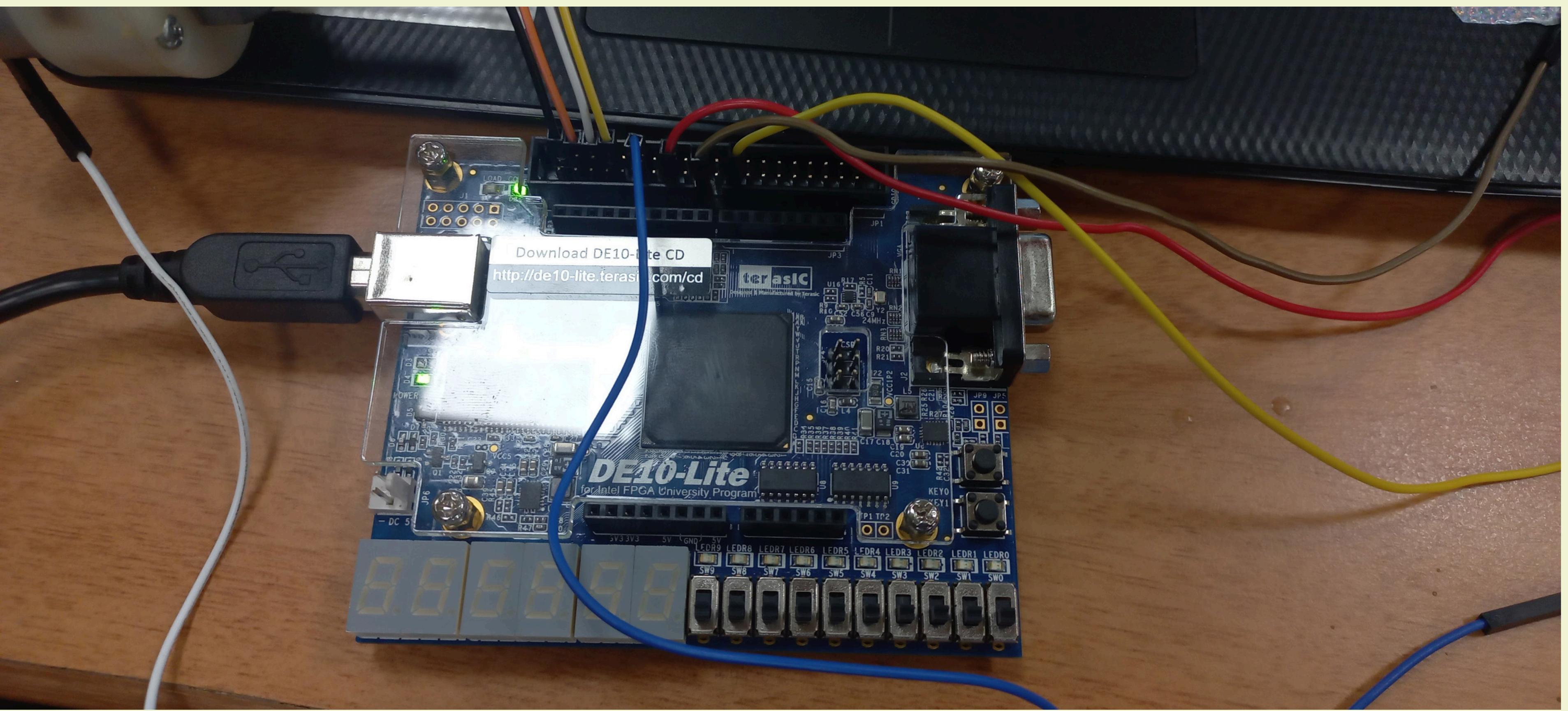
```

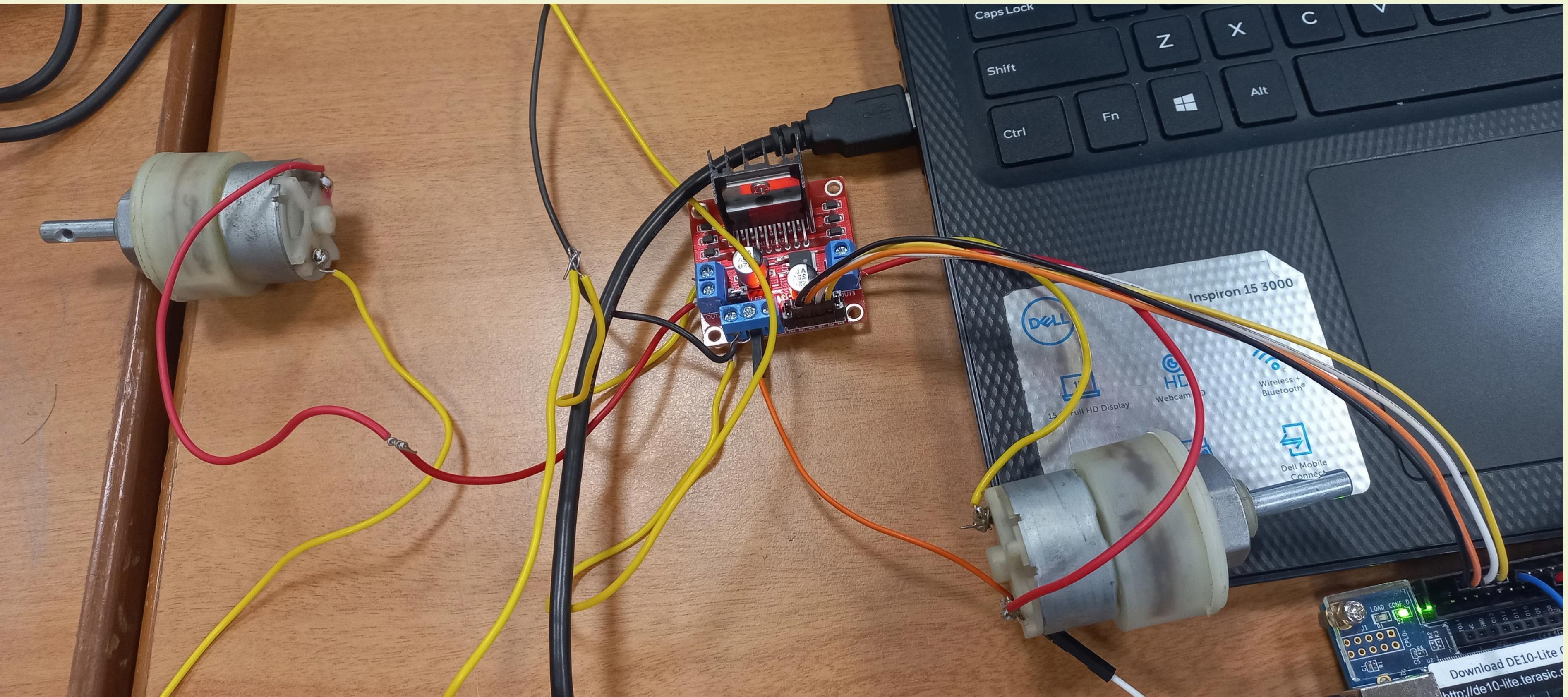
All Find... Find Next

Type	ID	Message
>	i	Quartus Prime EDA Netlist Writer was successful. 0 errors, 1 warning
i		293000 Quartus Prime Full Compilation was successful. 0 errors, 25 warnings

System (47) Processing (133)



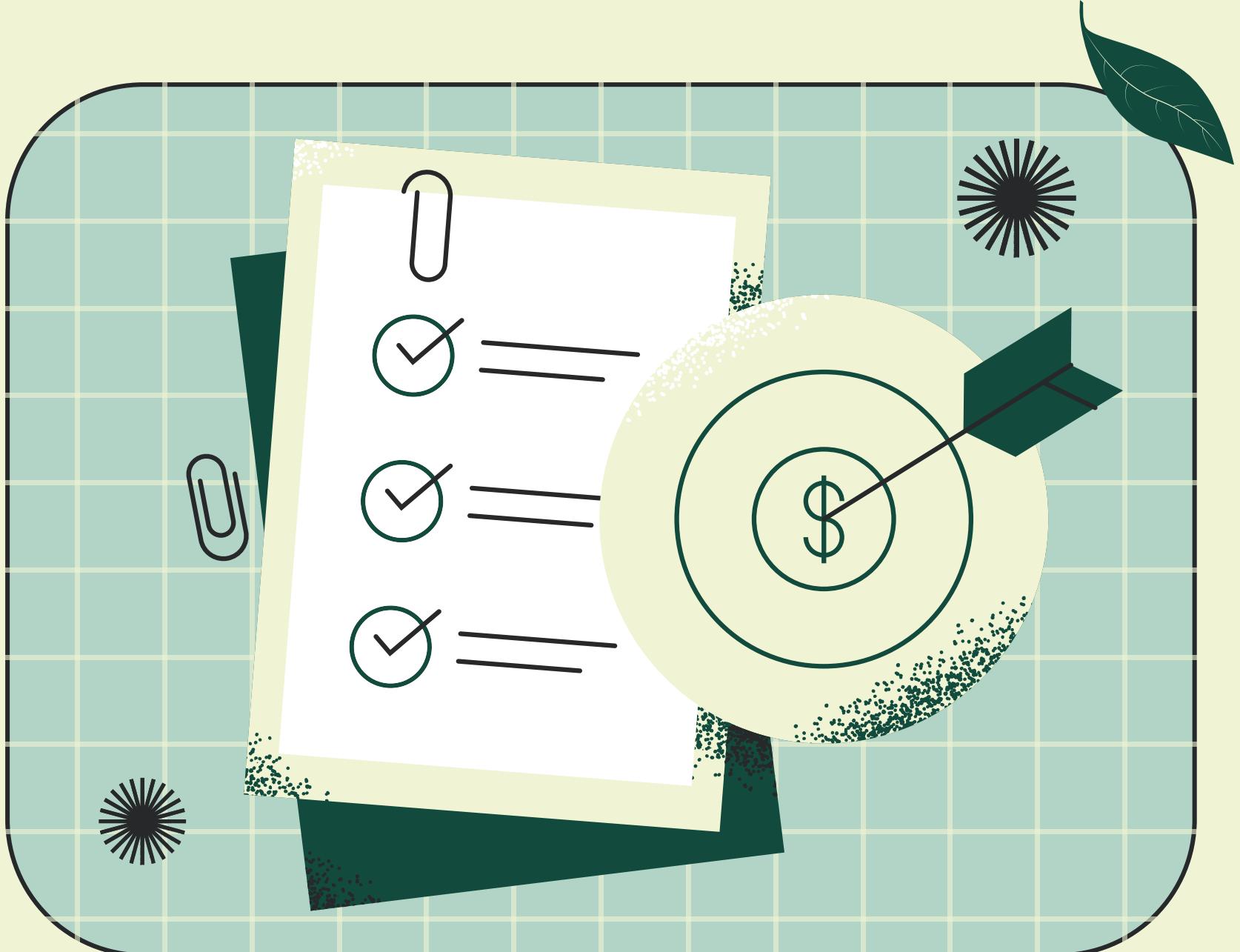




FUTURE GOALS *

In the future, we plan to integrate Bluetooth sensors for seamless communication within the indoor garden system. This will pave the way for a user-friendly mobile app, allowing remote control over environmental factors like humidity and lighting, enhancing accessibility and precision in managing the indoor garden environment.

Future Outlook



THANK

YOU