

# National Textile University, Faisalabad



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<b>Registration No:</b>	23-NTU-CS-1080
<b>Home Task:</b>	DHT and LDR combined (Week-6)
<b>Course Name:</b>	IoT and Embedded Systems
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# IoT & Embedded Systems

## Home Task

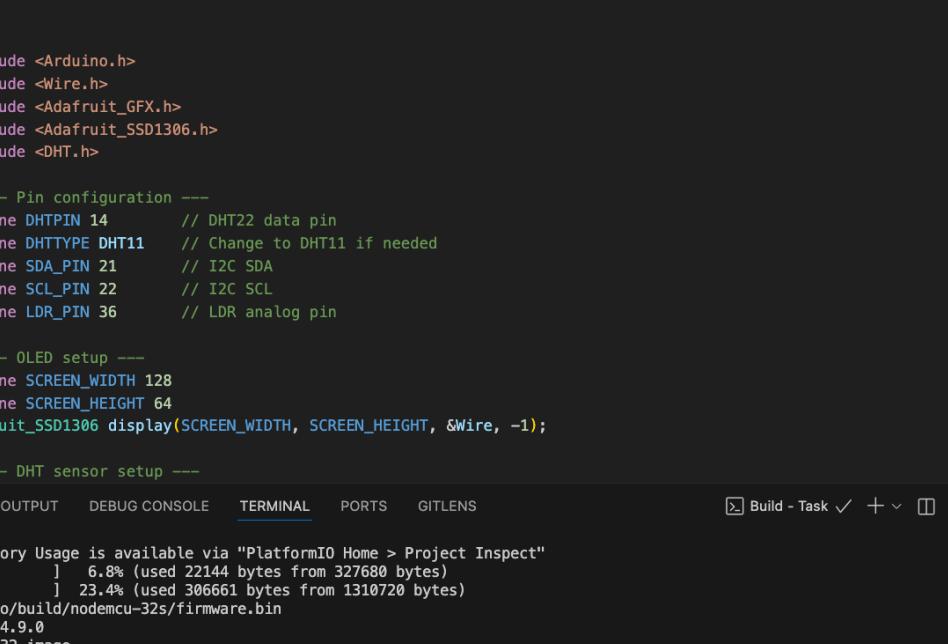
### Code Screenshot:



```
1 #include <Arduino.h>
2 #include <Wire.h>
3 #include <Adafruit_GFX.h>
4 #include <Adafruit_SSD1306.h>
5 #include <DHT.h>
6
7 #define DHTPIN 14
8 #define DHTTYPE DHT11
9 #define SDA_PIN 21
10 #define SCL_PIN 22
11 #define LDR_PIN 36
12
13 #define SCREEN_WIDTH 128
14 #define SCREEN_HEIGHT 64
15 Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);
16
17 DHT dht(DHTPIN, DHTTYPE);
18
19 void setup() {
20     Serial.begin(115200);
21     Serial.println("Hello, ESP32!");
22
23     Wire.begin(SDA_PIN, SCL_PIN);
24
25     if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
26         Serial.println("SSD1306 allocation failed");
27         for (;;);
28     }
29
30     display.clearDisplay();
31     display.setTextColor(SSD1306_WHITE);
32     display.setTextSize(1);
33     display.setCursor(0, 0);
34     display.println("Initializing...");
35     display.display();
36
37     dht.begin();
38     delay(1000);
39 }
40
```

```
41 void loop() {
42
43     int adcValue = analogRead(LDR_PIN);
44     float voltage = (adcValue / 4095.0) * 3.3;
45
46     float temperature = dht.readTemperature();
47     float humidity = dht.readHumidity();
48
49     if (isnan(temperature) || isnan(humidity)) {
50         Serial.println("Error reading DHT22 sensor!");
51         return;
52     }
53
54     Serial.print("Temperature: ");
55     Serial.print(temperature);
56     Serial.print(" °C | Humidity: ");
57     Serial.print(humidity);
58     Serial.print(" % | LDR: ");
59     Serial.print(adcValue);
60     Serial.print(" | Voltage: ");
61     Serial.print(voltage, 2);
62     Serial.println(" V");
63
64     display.clearDisplay();
65     display.setTextSize(1);
66
67     display.setCursor(0, 0);
68     display.println("Hello IoT");
69
70     display.setCursor(0, 16);
71     display.print("Temp: ");
72     display.print(temperature);
73     display.println(" °C");
74
75     display.setCursor(0, 32);
76     display.print("Humidity: ");
77     display.print(humidity);
78     display.println(" %");
79
80     display.setCursor(0, 48);
81     display.print("Voltage: ");
82     display.print(voltage, 2);
83     display.println(" V");
84
85     display.display();
86
87     delay(2000);
88 }
```

## Code Build Output:



src > C+ main.cpp > ...

```
1
2
3
4  #include <Arduino.h>
5  #include <Wire.h>
6  #include <Adafruit_GFX.h>
7  #include <Adafruit_SSD1306.h>
8  #include <DHT.h>
9
10 // --- Pin configuration ---
11 #define DHTPIN 14          // DHT22 data pin
12 #define DHTTYPE DHT11       // Change to DHT11 if needed
13 #define SDA_PIN 21          // I2C SDA
14 #define SCL_PIN 22          // I2C SCL
15 #define LDR_PIN 36          // LDR analog pin
16
17 // --- OLED setup ---
18 #define SCREEN_WIDTH 128
19 #define SCREEN_HEIGHT 64
20 Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);
21
22 // --- DHT sensor setup ---
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS GITLENS

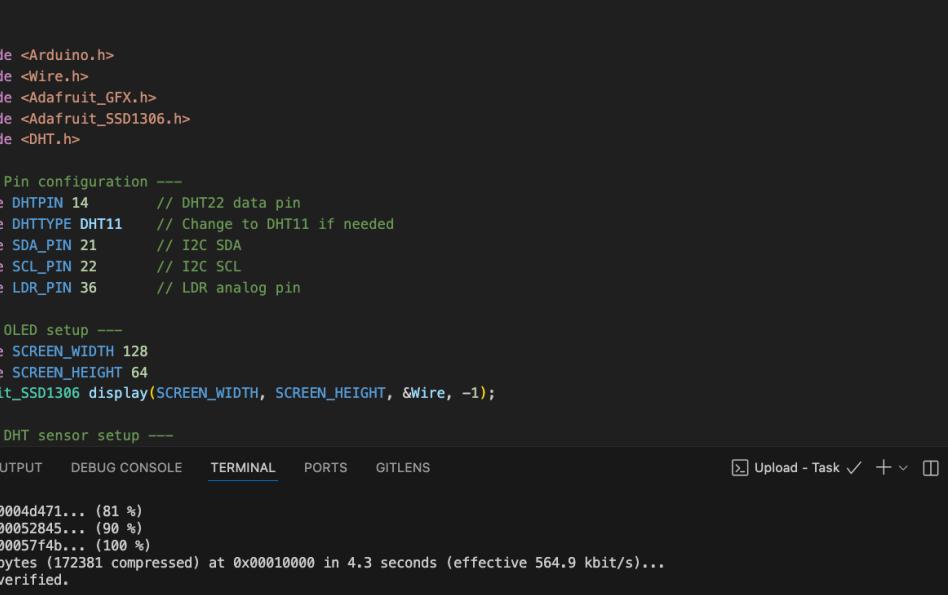
Build - Task

Advanced Memory Usage is available via "PlatformIO Home > Project Inspect"  
RAM: [= ] 6.8% (used 22144 bytes from 327680 bytes)  
Flash: [= ] 23.4% (used 306661 bytes from 1310720 bytes)  
Building .pio/build/nodemcu-32s/firmware.bin  
esptool.py v4.9.0  
Creating esp32 image...  
Merged 2 ELF sections  
Successfully created esp32 image.

===== [SUCCESS] Took 11.38 seconds =====

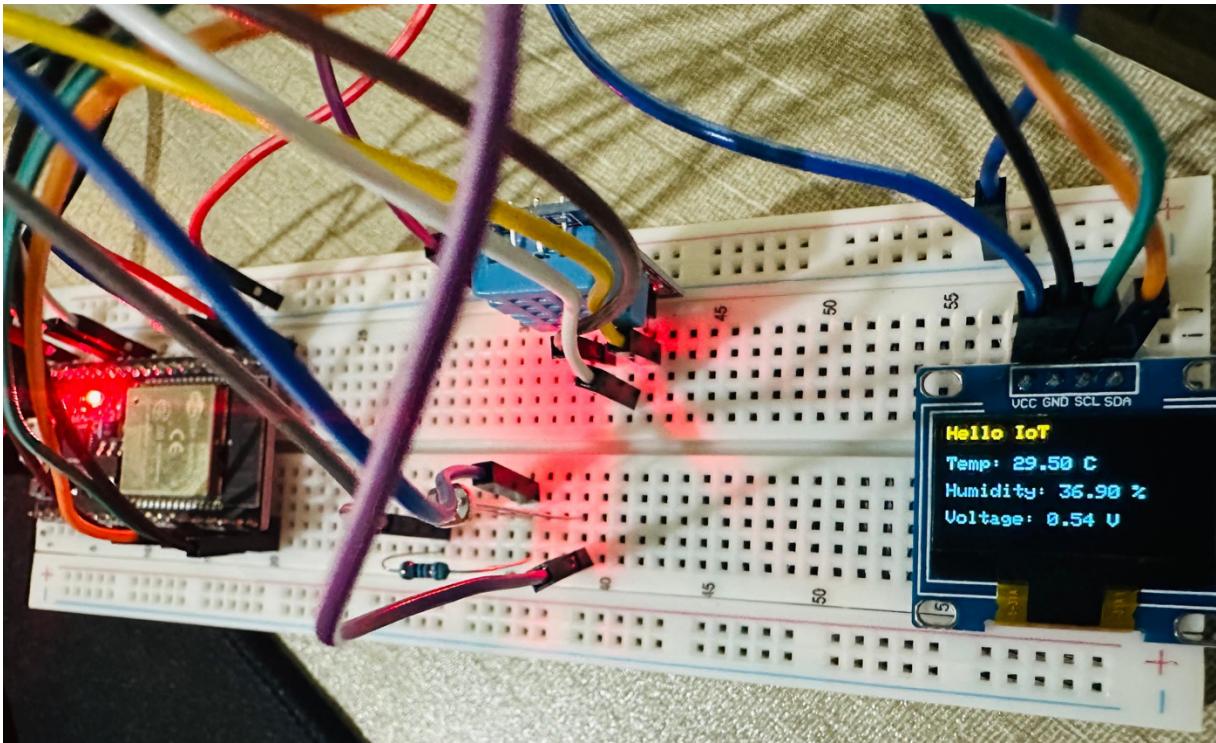
\* Terminal will be reused by tasks, press any key to close it.

## Code Upload Output:



The screenshot shows the PlatformIO IDE interface. The top navigation bar includes 'PIO Home', 'C++ main.cpp U X', 'Build Output.png U', and a set of icons for file operations. The main workspace displays the 'main.cpp' file with code for an Arduino project. The code includes includes for Arduino.h, Wire.h, Adafruit\_GFX.h, Adafruit\_SSD1306.h, and DHT.h. It defines pins for DHT22 (DHTPIN 14), DHT11 (DHTTYPE DHT11), I2C SDA (SDA\_PIN 21), I2C SCL (SCL\_PIN 22), and an LDR analog pin (LDR\_PIN 36). It also sets up an Adafruit\_SSD1306 display with a width of 128 and height of 64. The code concludes with a DHT sensor setup. Below the code editor are tabs for 'PROBLEMS', 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL', 'PORTS', and 'GITLENS'. The 'TERMINAL' tab is active, showing the build output. The output indicates the writing of data to memory at addresses 0x0004d471, 0x00052845, and 0x00057f4b, reaching 100% completion. It shows the transmission of 307024 bytes (172381 compressed) at 0x00010000 in 4.3 seconds (effective 564.9 kbit/s). The message 'Hash of data verified.' is also present. The terminal concludes with 'Leaving...', 'Hard resetting via RTS pin...', and a success message: '==== [SUCCESS] Took 11.32 seconds ====='. A note at the bottom states: 'Terminal will be reused by tasks, press any key to close it.'

## Hardware Output:



## Circuit Pin Map:

Device Name	Pin Name	Pin Number
OLED	Ground	GND
OLED	VCC	3.3v
OLED	SDA	21
OLED	SCL	22
LDR	VCC	3.3
LDR	Second Pin	10k Resister
10k Resister	One side pin	GND

<b>10k Resister</b>	<b>Second side pin</b>	<b>36</b>
<b>DHT</b>	<b>VCC</b>	<b>5</b>
<b>DHT</b>	<b>Data Pin</b>	<b>14</b>
<b>DHT</b>	<b>Ground</b>	<b>GND</b>