

# National Textile University, Faisalabad



## Department of Computer Science

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<b>Registration No:</b>	23-NTU-CS-1051
<b>Lab Report:</b>	Week 6 Home task
<b>Course Name:</b>	Embedded IoT Systems
<b>Submitted To:</b>	Sir Nasir Mahmood
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## Week 6 Home Task

### Task: Display of temperature, humidity, and LDR readings on OLED

Circuit pin map:

Device name	Pin name	Pin number
OLED	VCC	3.3 V
OLED	GND	GND
OLED	SCL	GPIO22
OLED	SDA	GPIO21
DHT	GND	GND
DHT	DATA	GPIO14
DHT	VCC	5.5 V
LDR	First side	GND
LDR	Second side	3.3 V
10K Resistor	First side	GND
10K Resistor	Second side	GPIO36

Code screenshots:

```
src > G+ main.cpp > ...
1  #include <Arduino.h>
2  #include <Wire.h>
3  #include <Adafruit_GFX.h>
4  #include <Adafruit_SSD1306.h>
5  #include <DHT.h>
6
7  // --- Pin configuration ---
8  #define DHTPIN 14      // DHT22 data pin
9  #define DHTTYPE DHT11 // Change to DHT11 if needed
10 #define LDR_PIN 34     // LDR analog input pin
11
12 #define SDA_PIN 21      // I2C SDA
13 #define SCL_PIN 22     // I2C SCL
14
15 // --- OLED setup ---
16 #define SCREEN_WIDTH 128
17 #define SCREEN_HEIGHT 64
18 Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);
19
20 // --- DHT sensor setup ---
21 DHT dht(DHTPIN, DHTTYPE);
22
23 // --- Setup function ---
24 void setup() {
25     Serial.begin(115200);
26     Serial.println("Hello, ESP32!");
27
28     // Initialize I2C on custom pins
29     Wire.begin(SDA_PIN, SCL_PIN);
30 }
```

```

31 // Initialize OLED
32 if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
33     Serial.println("SSD1306 allocation failed");
34     for (;;);
35 }
36 display.clearDisplay();
37 display.setTextColor(SSD1306_WHITE);
38 display.setTextSize(1);
39 display.setCursor(0, 0);
40 display.println("Initializing...");
41 display.display();
42
43 // Initialize DHT sensor
44 dht.begin();
45 delay(1000);
46 }
47
48 // --- Main loop ---
49 void loop() {
50     // Read temperature and humidity from DHT sensor
51     float temperature = dht.readTemperature();
52     float humidity = dht.readHumidity();
53
54     // Read LDR analog value and convert to voltage
55     int adcValue = analogRead(LDR_PIN);
56     float voltage = (adcValue / 4095.0) * 3.3;
57
58     // Check if DHT read failed
59     if (isnan(temperature) || isnan(humidity)) {
60         Serial.println("Error reading DHT22 sensor!");

```

```

61     return;
62 }
63
64 // Print values on Serial Monitor
65 Serial.print("Temperature: ");
66 Serial.print(temperature);
67 Serial.print(" °C | Humidity: ");
68 Serial.print(humidity);
69 Serial.print(" % | LDR ADC: ");
70 Serial.print(adcValue);
71 Serial.print(" | Voltage: ");
72 Serial.print(voltage, 2);
73 Serial.println(" V");
74
75 // Display readings on OLED
76 display.clearDisplay();
77 display.setTextSize(1);
78 display.setCursor(0, 0);
79 display.println("Hello IoT");
80 display.setCursor(0, 16);
81 display.print("Temp: ");
82 display.print(temperature);
83 display.println(" C");
84 display.setCursor(0, 28);
85 display.print("Humidity: ");
86 display.print(humidity);
87 display.println(" %");
88 display.setCursor(0, 40);

```

```

89     display.print("LDR ADC: ");
90     display.println(adcValue);
91     display.setCursor(0, 52);
92     display.print("Voltage: ");
93     display.print(voltage, 2);
94     display.println(" V");
95     display.display();
96
97     delay(2000); // update every 2 seconds
98 }

```

Code build success:

The screenshot shows the VS Code interface with the PlatformIO extension. The Explorer panel on the left shows the project structure, including the `src` directory containing `main.cpp`. The main editor displays the `main.cpp` file with the following code:

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19
20 // --- DHT sensor setup ---
```

The bottom panel shows the TERMINAL output, indicating a successful upload:

```
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 34.17 seconds =====
Terminal will be reused by tasks, press any key to close it.
```

Code upload success:

The screenshot shows the VS Code interface with the PlatformIO extension. The Explorer panel on the left shows the project structure, including the `src` directory containing `main.cpp`. The main editor displays the `main.cpp` file with the following code:

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The bottom panel shows the TERMINAL output, indicating a successful upload:

```
Writing at 0x0004d470... (91 %)
Writing at 0x00052858... (90 %)
Writing at 0x00057f61... (100 %)
Wrote 307024 bytes (172362 compressed) at 0x00010000 in 4.7 seconds (effective 520.0 kbit/s)...
Hash of data verified.
Leaving...
Hard resetting via RTS pin...
===== [SUCCESS] Took 15.56 seconds =====
Terminal will be reused by tasks, press any key to close it.
```

Output:

