

JOBSHEET 3

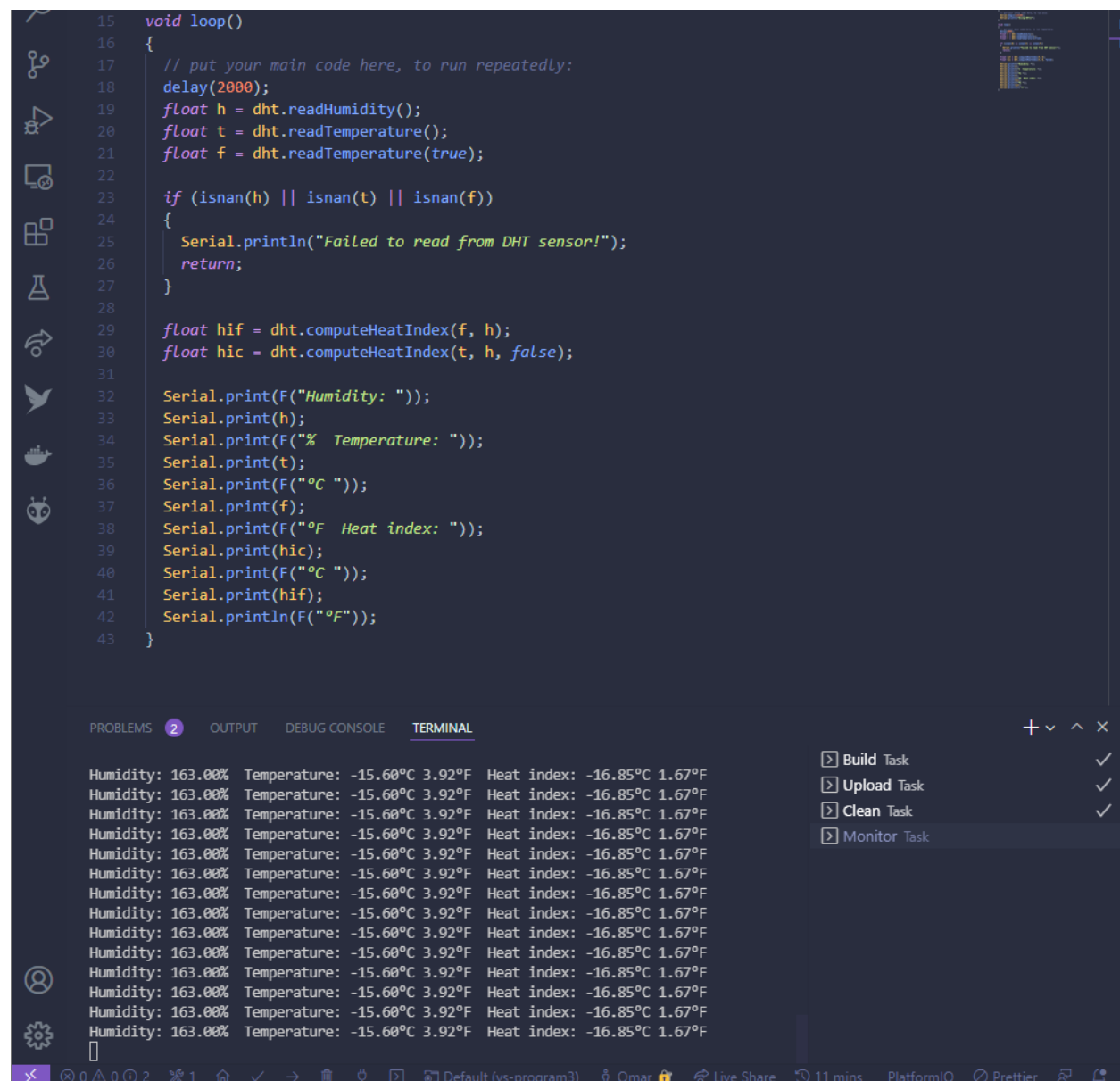
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Before we start the project, we should include the following libraries to work with DHT sensor:

```
15 ▾ lib_deps =
16   adafruit/Adafruit Unified Sensor @ ^1.1.4
17   adafruit/DHT sensor library@^1.4.3
18   winlinvip/SimpleDHT@^1.0.15
19   monitor_speed = 115200
```

Practicum 1:

Here is the code for practicum 1: we see that the readings as expected with the humidity and temperature degrees alongside the heat index value in Fahrenheit and Celsius



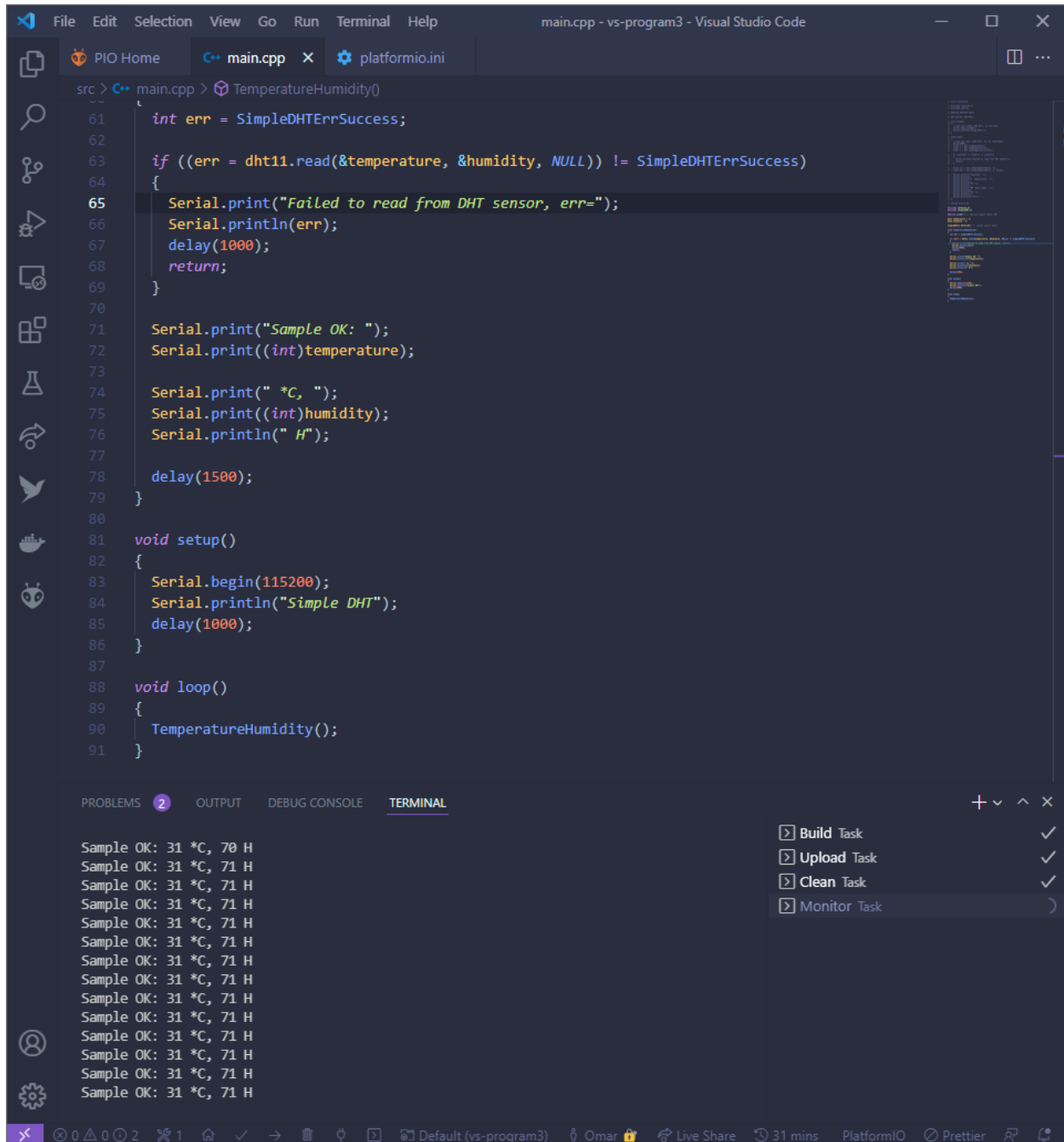
```
15 void loop()
16 {
17   // put your main code here, to run repeatedly:
18   delay(2000);
19   float h = dht.readHumidity();
20   float t = dht.readTemperature();
21   float f = dht.readTemperature(true);
22
23   if (isnan(h) || isnan(t) || isnan(f))
24   {
25     Serial.println("Failed to read from DHT sensor!");
26     return;
27   }
28
29   float hif = dht.computeHeatIndex(f, h);
30   float hic = dht.computeHeatIndex(t, h, false);
31
32   Serial.print(F("Humidity: "));
33   Serial.print(h);
34   Serial.print(F("% Temperature: "));
35   Serial.print(t);
36   Serial.print(F("°C "));
37   Serial.print(f);
38   Serial.print(F("°F Heat index: "));
39   Serial.print(hic);
40   Serial.print(F("°C "));
41   Serial.print(hif);
42   Serial.println(F("°F"));
43 }
```

Humidity: 163.00% Temperature: -15.60°C 3.92°F Heat index: -16.85°C 1.67°F
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Build Task ✓
Upload Task ✓
Clean Task ✓
Monitor Task

Practicum 2:

Using SimpleDHT library: this gives more accurate temperature values.



```
src > C++ main.cpp > TemperatureHumidity()
61 int err = SimpleDHTerrSuccess;
62
63 if ((err = dht11.read(&temperature, &humidity, NULL)) != SimpleDHTerrSuccess)
64 {
65     Serial.print("Failed to read from DHT sensor, err=");
66     Serial.println(err);
67     delay(1000);
68     return;
69 }
70
71 Serial.print("Sample OK: ");
72 Serial.print((int)temperature);
73
74 Serial.print(" *C, ");
75 Serial.print((int)humidity);
76 Serial.println(" H");
77
78 delay(1500);
79 }
80
81 void setup()
82 {
83     Serial.begin(115200);
84     Serial.println("Simple DHT");
85     delay(1000);
86 }
87
88 void loop()
89 {
90     TemperatureHumidity();
91 }
```

Sample OK: 31 *C, 70 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
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Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H
Sample OK: 31 *C, 71 H

Build Task ✓
Upload Task ✓
Clean Task ✓
Monitor Task)

Assignment 1:

Modify the code line in the practicum section so that temperature data appears in Kelvin and Reaumur units!

The image shows a Visual Studio Code editor window with a C++ project for a Raspberry Pi Pico. The main file is `main.cpp`, which contains the following code:

```
src > C++ main.cpp > TemperatureHumidity()
60 void convertToKelvin(byte temp)
61 {
62     kelvin = (int)temp + 273.15;
63 }
64
65 void convertToReaumur(byte temp)
66 {
67     reamur = (int)temp * 0.8;
68 }
69 void TemperatureHumidity()
70 {
71     int err = SimpleDHTerrSuccess;
72
73     if ((err = dht11.read(&temperature, &humidity, NULL)) != SimpleDHTerrSuccess)
74     {
75         Serial.print("Failed to read from DHT sensor, err=");
76         Serial.println(err);
77         delay(1000);
78         return;
79     }
80
81     Serial.print("Sample OK: ");
82     Serial.print((int)temperature);
83     Serial.print(" *C, ");
84     convertToKelvin(temperature);
85     convertToReaumur(temperature);
86     Serial.print(kelvin);
87     Serial.print(" *K, ");
88     Serial.print(reamur);
89     Serial.print(" *R, ");
90
91     Serial.print((int)humidity);
```

The terminal output shows the program running successfully, printing the following message 10 times:

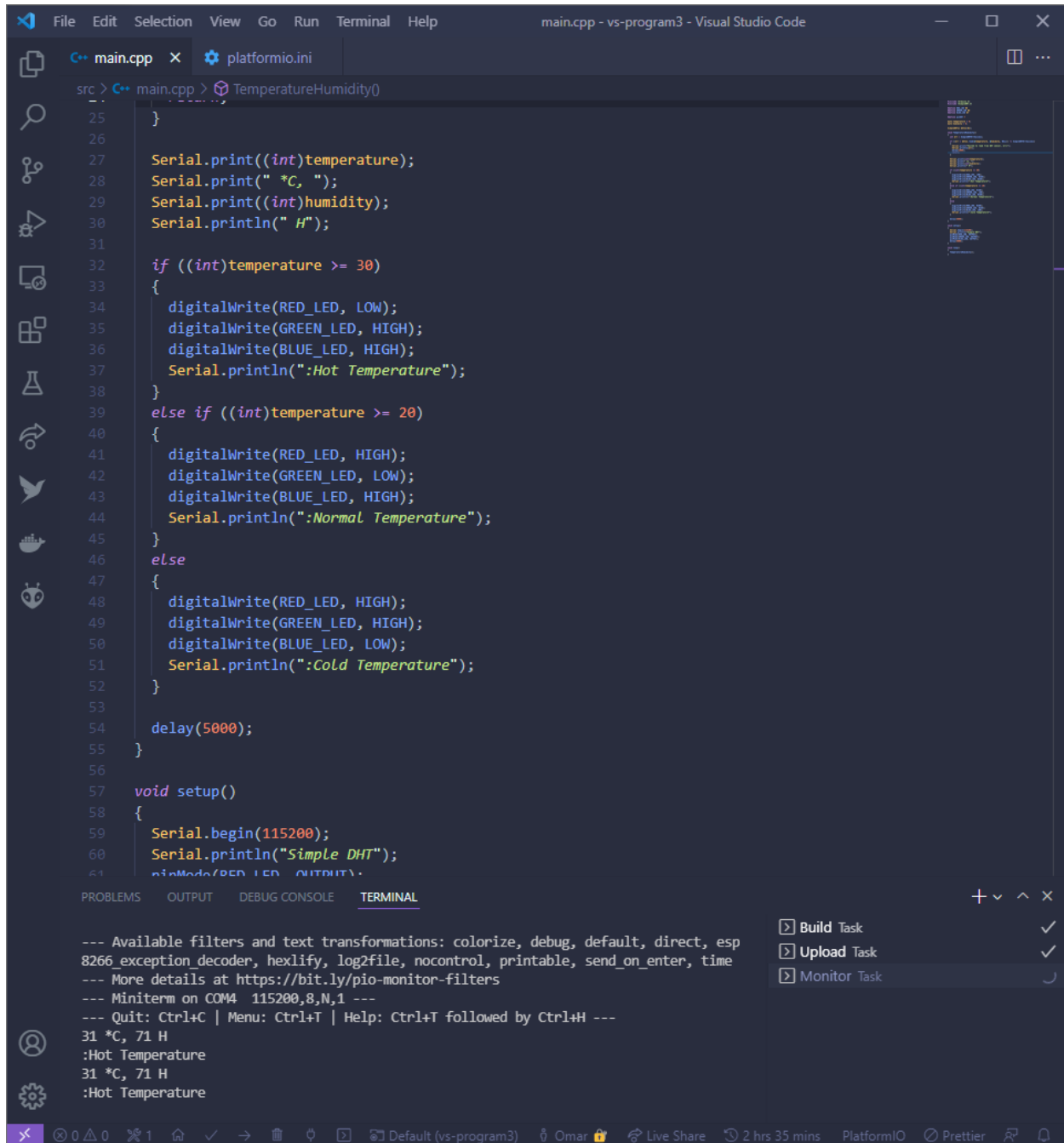
```
Sample OK: 32 *C, 305 *K, 25 *R, 71 H
```

The right sidebar shows the 'TERMINAL' tab with a list of tasks:

- Build Task
- Upload Task
- Clean Task
- Monitor Task

Assignment 2:

Make a simulation of a temperature and humidity reader in the middle of the city by using an LED light as an indicator accompanied by a description of the temperature and humidity data displayed on the serial monitor!



```
src > C++ main.cpp > TemperatureHumidity()
25 }
26
27 Serial.print((int)temperature);
28 Serial.print(" *C, ");
29 Serial.print((int)humidity);
30 Serial.println(" H");
31
32 if ((int)temperature >= 30)
33 {
34     digitalWrite(RED_LED, LOW);
35     digitalWrite(GREEN_LED, HIGH);
36     digitalWrite(BLUE_LED, HIGH);
37     Serial.println(":Hot Temperature");
38 }
39 else if ((int)temperature >= 20)
40 {
41     digitalWrite(RED_LED, HIGH);
42     digitalWrite(GREEN_LED, LOW);
43     digitalWrite(BLUE_LED, HIGH);
44     Serial.println(":Normal Temperature");
45 }
46 else
47 {
48     digitalWrite(RED_LED, HIGH);
49     digitalWrite(GREEN_LED, HIGH);
50     digitalWrite(BLUE_LED, LOW);
51     Serial.println(":Cold Temperature");
52 }
53
54 delay(5000);
55 }
56
57 void setup()
58 {
59     Serial.begin(115200);
60     Serial.println("Simple DHT");
61     pinMode(RED_LED, OUTPUT);
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

--- Available filters and text transformations: colorize, debug, default, direct, esp
8266_exception_decoder, hexlify, log2file, nocontrol, printable, send_on_enter, time
--- More details at <https://bit.ly/pio-monitor-filters>
--- Miniterm on COM4 115200,8,N,1 ---
--- Quit: Ctrl+C | Menu: Ctrl+T | Help: Ctrl+T followed by Ctrl+H ---

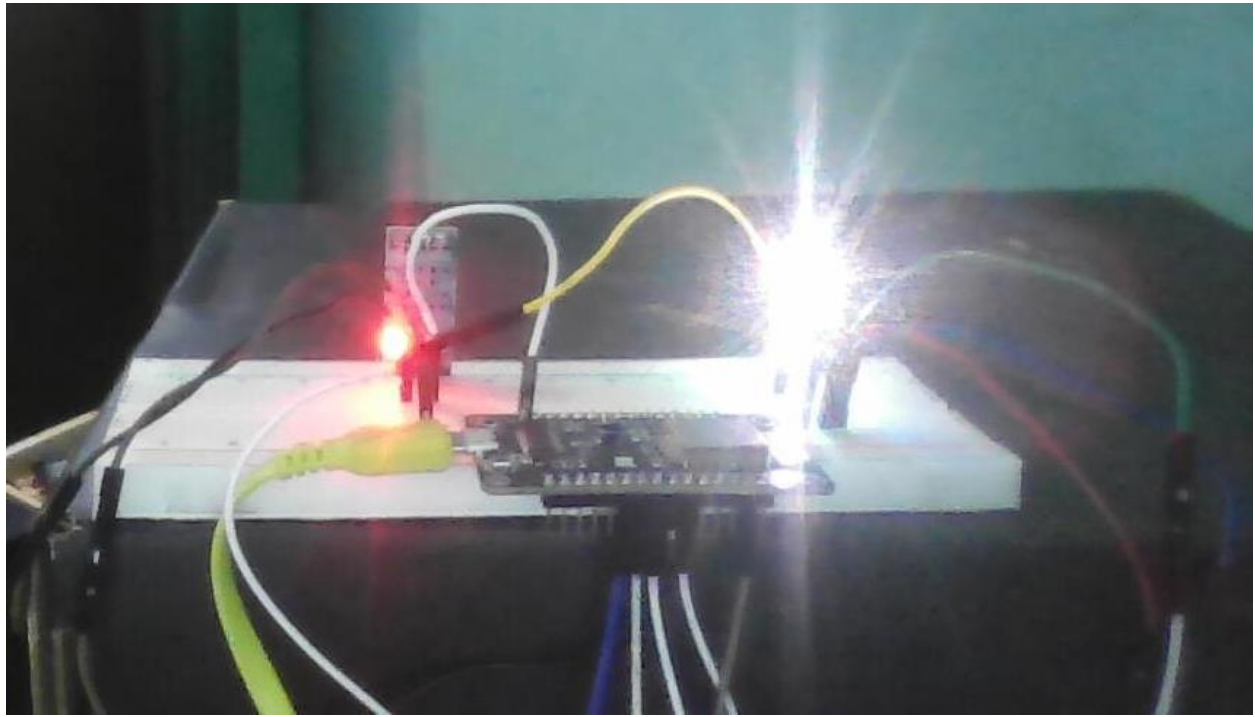
31 *C, 71 H
:Hot Temperature
31 *C, 71 H
:Hot Temperature

Build Task ✓
Upload Task ✓
Monitor Task

0 0 0 1 ✓ → Default (vs-program3) Omar Live Share 2 hrs 35 mins PlatformIO Prettier

Results:

Initial setup



Hot temperature of 31 c

