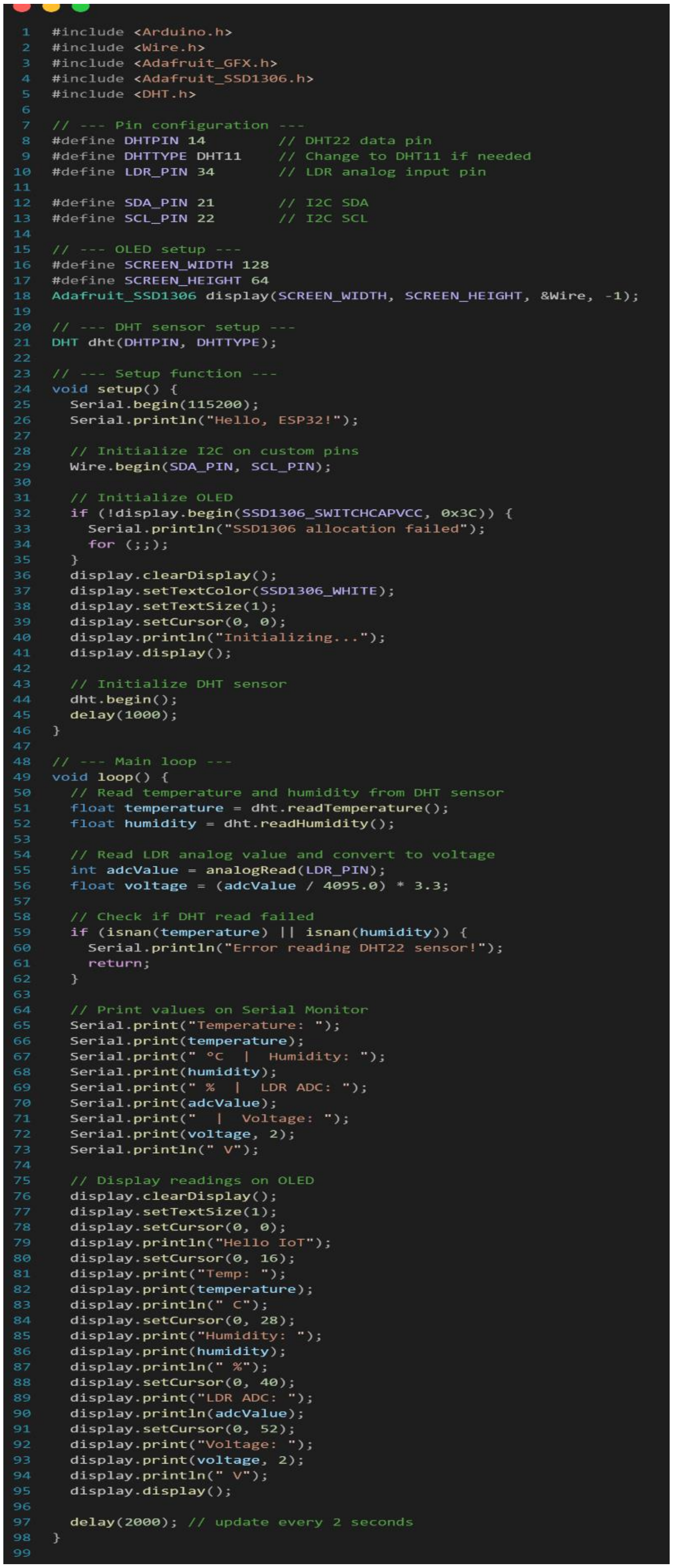
National Textile University, Faisalabad

Department of Computer Science

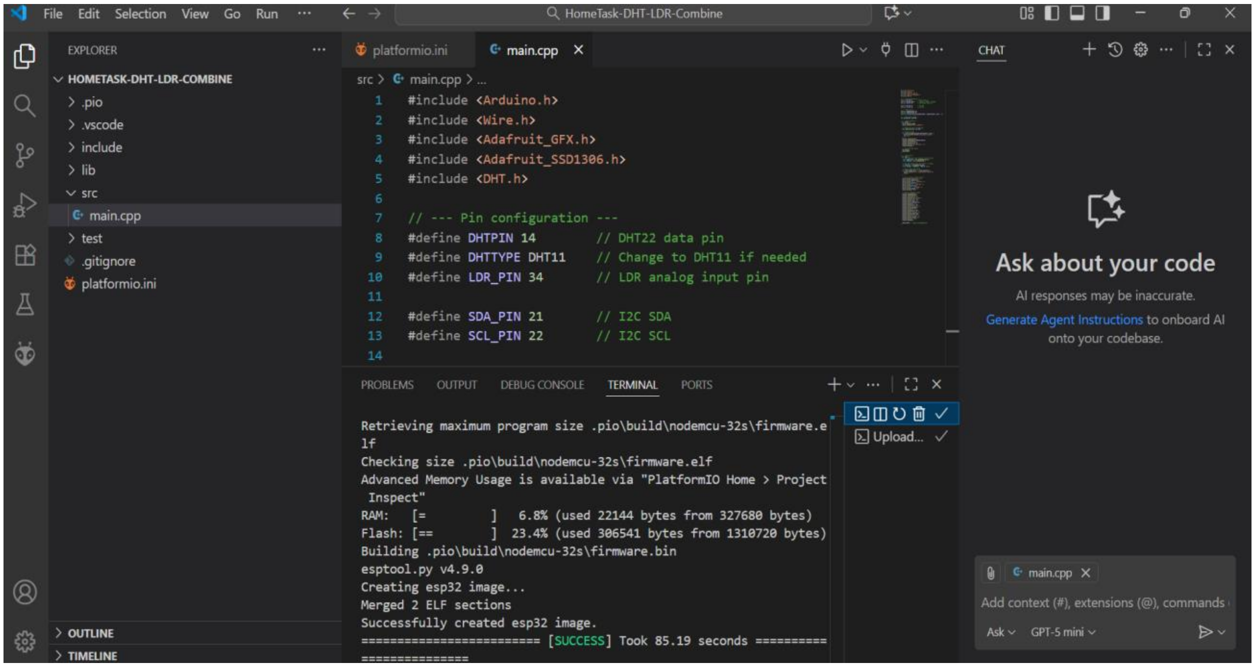
Name:	SAJAL NAEEM
Class:	BSCS 5TH B
Registration No:	23-NTU-CS-1089
Lab Report:	HOMETASK WEEK 6
Course Name:	IOT AND EMBEDDED SYSTEMS
Submitted To:	SIR NASIR MEHMOOD
Submission Date:	21ST OCTOBER 2025

Code screenshot:



```
#include <Arduino.h>
#include <Wire.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>
#include <DHT.h>

// --- Pin configuration ---
#define DHTPIN 14         // DHT22 data pin
#define DHTTYPE DHT11     // Change to DHT11 if needed
#define LDR_PIN 34        // LDR analog input pin

#define SDA_PIN 21        // I2C SDA
#define SCL_PIN 22        // I2C SCL

// --- OLED setup ---
#define SCREEN_WIDTH 128
#define SCREEN_HEIGHT 64
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);

// --- DHT sensor setup ---
DHT dht(DHTPIN, DHTTYPE);

// --- Setup function ---
void setup() {
  Serial.begin(115200);
  Serial.println("Hello, ESP32!");

  // Initialize I2C on custom pins
  Wire.begin(SDA_PIN, SCL_PIN);

  // Initialize OLED
  if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println("SSD1306 allocation failed");
    for (;;);
  }
  display.clearDisplay();
  display.setTextColor(SSD1306_WHITE);
  display.setTextSize(1);
  display.setCursor(0, 0);
  display.println("Initializing...");
  display.display();

  // Initialize DHT sensor
  dht.begin();
  delay(1000);
}

// --- Main loop ---
void loop() {
  // Read temperature and humidity from DHT sensor
  float temperature = dht.readTemperature();
  float humidity = dht.readHumidity();

  // Read LDR analog value and convert to voltage
  int adcValue = analogRead(LDR_PIN);
  float voltage = (adcValue / 4095.0) * 3.3;

  // Check if DHT read failed
  if (isnan(temperature) || isnan(humidity)) {
    Serial.println("Error reading DHT22 sensor!");
    return;
  }

  // Print values on Serial Monitor
  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.print(" °C  |  Humidity: ");
  Serial.print(humidity);
  Serial.print(" %  |  LDR ADC: ");
  Serial.print(adcValue);
  Serial.print("  |  Voltage: ");
  Serial.print(voltage, 2);
  Serial.println(" V");

  // Display readings on OLED
  display.clearDisplay();
  display.setTextSize(1);
  display.setCursor(0, 0);
  display.println("Hello IoT");
  display.setCursor(0, 16);
  display.print("Temp: ");
  display.print(temperature);
  display.println(" C");
  display.setCursor(0, 28);
  display.print("Humidity: ");
  display.print(humidity);
  display.println(" %");
  display.setCursor(0, 40);
  display.print("LDR ADC: ");
  display.println(adcValue);
  display.setCursor(0, 52);
  display.print("Voltage: ");
  display.print(voltage, 2);
  display.println(" V");
  display.display();

  delay(2000); // update every 2 seconds
}

```

Code build success:



```
#include <Arduino.h>
#include <Wire.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>
#include <DHT.h>

// --- Pin configuration ---
#define DHTPIN 14         // DHT22 data pin
#define DHTTYPE DHT11     // Change to DHT11 if needed
#define LDR_PIN 34        // LDR analog input pin

#define SDA_PIN 21        // I2C SDA
#define SCL_PIN 22        // I2C SCL

```

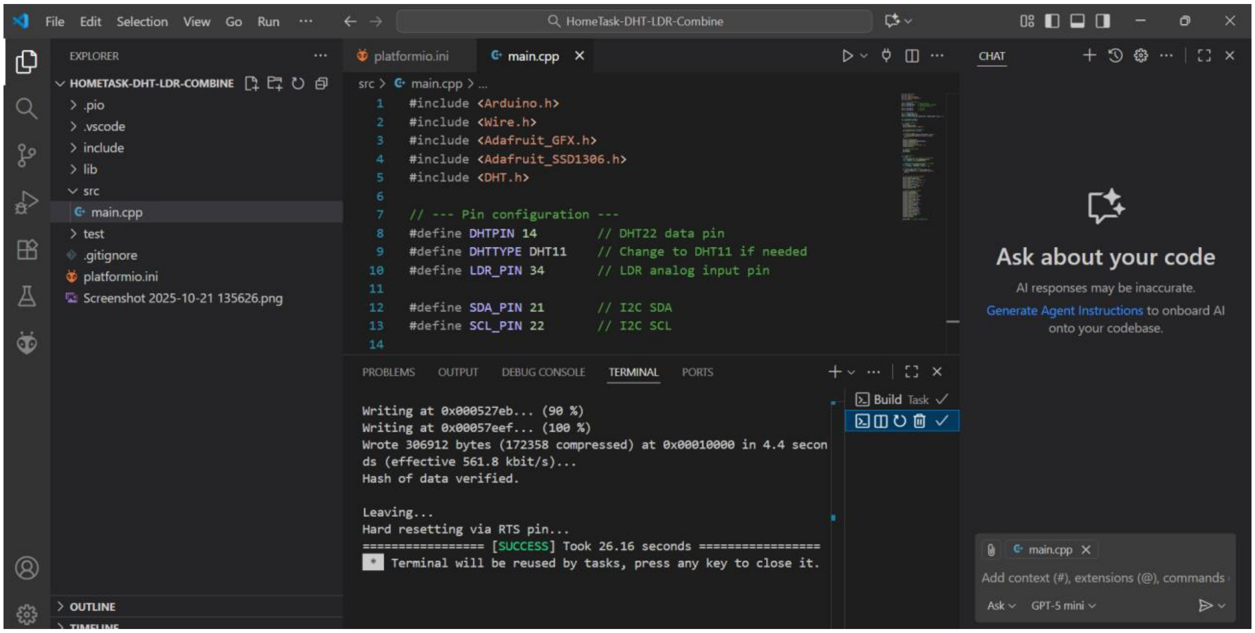
```
Retrieving maximum program size .pio\build\nodemcu-32s\firmware.e
lf
Checking size .pio\build\nodemcu-32s\firmware.elf
Advanced Memory Usage is available via "PlatformIO Home > Project
 Inspect"
RAM:   [=         ]   6.8% (used 22144 bytes from 327680 bytes)
Flash: [==        ]  23.4% (used 306541 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 85.19 seconds ==========
===============
```

Ask about your code

AI responses may be inaccurate.

Generate Agent Instructions to onboard AI onto your codebase.

Code upload Screenshot:



```
#include <Arduino.h>
#include <Wire.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>
#include <DHT.h>

// --- Pin configuration ---
#define DHTPIN 14         // DHT22 data pin
#define DHTTYPE DHT11     // Change to DHT11 if needed
#define LDR_PIN 34        // LDR analog input pin

#define SDA_PIN 21        // I2C SDA
#define SCL_PIN 22        // I2C SCL

```

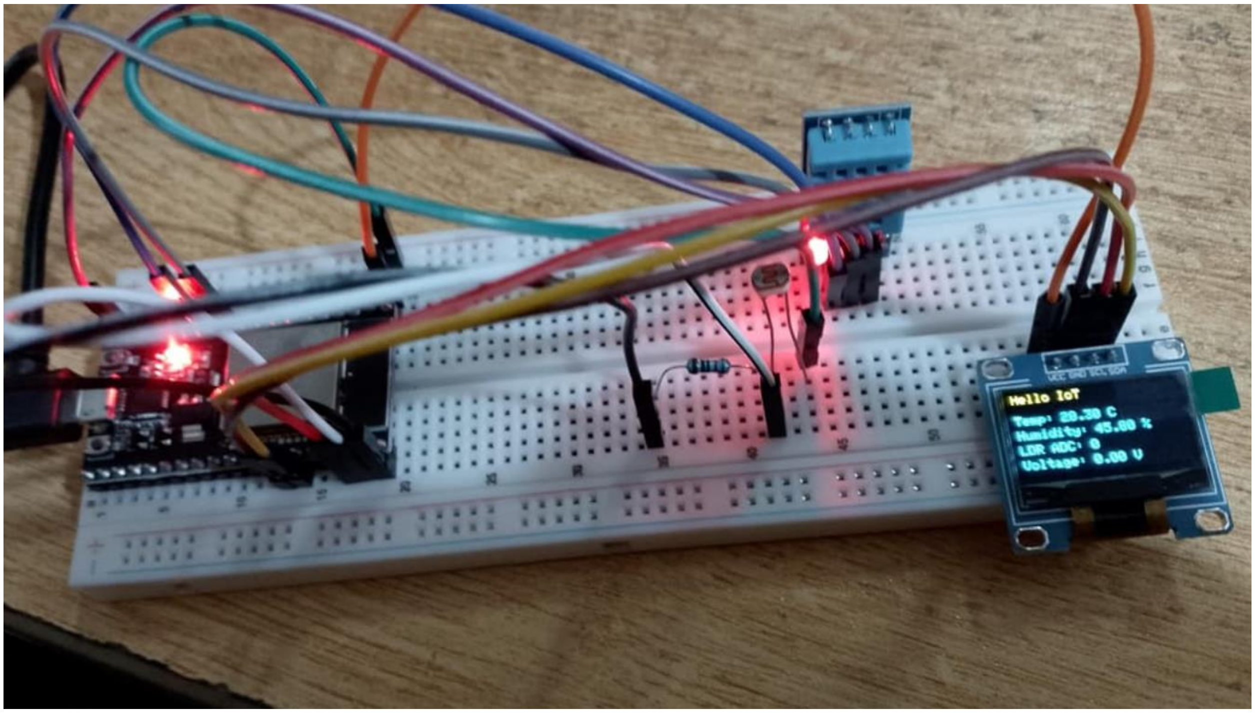
```
Writing at 0x000527eb... (90 %)
Writing at 0x00057eef... (100 %)
Wrote 306912 bytes (172358 compressed) at 0x00010000 in 4.4 secon
ds (effective 561.8 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
================= [SUCCESS] Took 26.16 seconds =================
 *  Terminal will be reused by tasks, press any key to close it.
```

Ask about your code

AI responses may be inaccurate.

Generate Agent Instructions to onboard AI onto your codebase.

Hardware Output picture:



```
Hello IoT
Temp: 28.30 C
Humidity: 45.00 %
LDR ADC: 0
Voltage: 0.00 V
```

Circuit pin map:

Device Name	Pin Name	Pin Number
OLED	GROUND	GND
OLED	VCC	3.3
OLED	SDA	21
OLED	SCL	22
DHT	GROUND	GND
DHT	VCC	5
DHT	DATA PIN	14
LDR	ONE PIN	3.3 VCC

LDR	SECOND PIN	10K RESISTOR
10K RESISTOR	ONE PIN	GND
10K RESISTOR	SECOND PIN	36