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Department of Computer Science

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Course Name:	Embedded IoT and Systems
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Project Title:

Button Press Detection using LED, Buzzer and OLED Display

Description:

This project contains one LED, one pushbutton, one buzzer and OLED display.

OLED setup:

#define SCREEN_WIDTH 128 // Define the width of the OLED screen

#define SCREEN_HEIGHT 64 // Define the height of the OLED screen

Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);

Pin Configuration:

const int buttonPin = 25;

const int ledPin = 5; // red led

const int buzzerPin = 33;

The OLED display shows which event is occuring like when button is pressed for long time it shows "Long press: buzzer played" and when pressed for short time it shows "Short press: LED".

It has two states:

- Short press (<1.5 s) LED toggle.
- Long press (>1.5 s) Buzzer played.

It helps us to understand OLED displays, conditional logic and Hangling button inputs etc.

The main purpose of the project is to differenciate between long and short pross and performing actions according to that as it continuoulsy reads the button state.

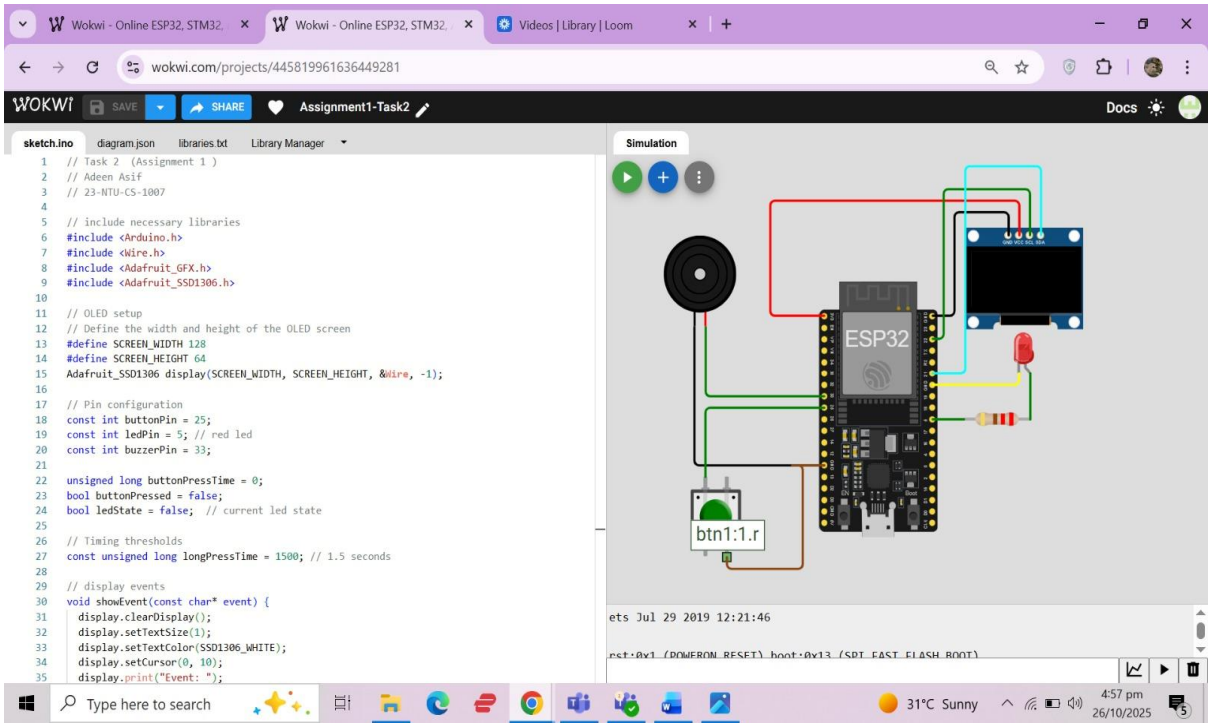
Code:

```
// Task 2  (Assignment 1 )
// Adeen Asif
// 23-NTU-CS-1007

// include necessary libraries
#include <Arduino.h>
#include <Wire.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>

// OLED setup
// Define the width and height of the OLED screen
#define SCREEN_WIDTH 128
#define SCREEN_HEIGHT 64
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);

// Pin configuration
const int buttonPin = 25;
const int ledPin = 5; // red led
const int buzzerPin = 33;

unsigned long buttonPressTime = 0;
bool buttonPressed = false;
bool ledState = false;  // current led state

// Timing thresholds
const unsigned long longPressTime = 1500; // 1.5 seconds

// display events
```

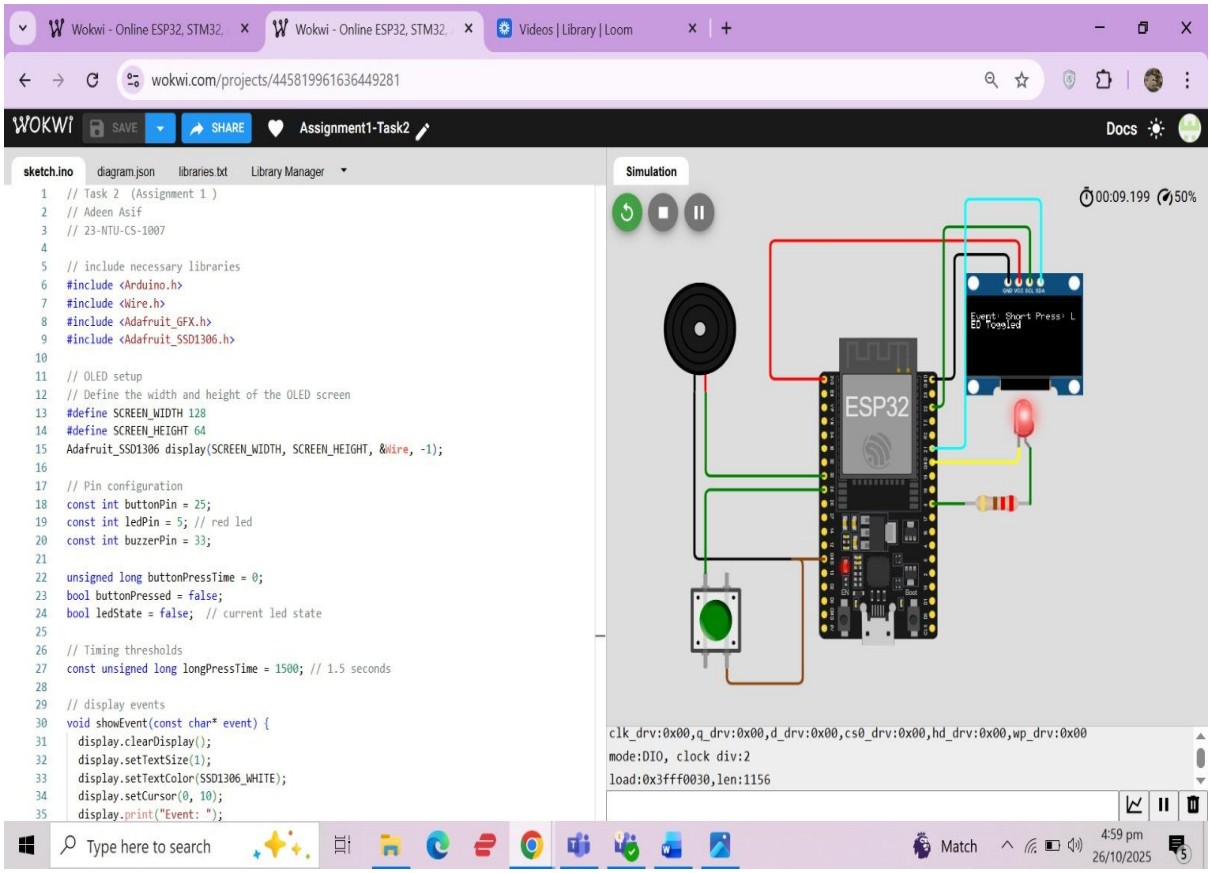
```
void showEvent(const char* event) {
  display.clearDisplay();
  display.setTextSize(1);
  display.setTextColor(SSD1306_WHITE);
  display.setCursor(0, 10);
  display.print("Event: ");
  display.println(event);
  display.display();
}

void setup() {
  pinMode(buttonPin, INPUT_PULLUP);
  pinMode(ledPin, OUTPUT); // led OUTPUT
  pinMode(buzzerPin, OUTPUT); // buzzer INPUT

  // OLED initialization
  if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println(F("SSD1306 allocation failed"));
    for (;;);
  }

  // first message
  display.clearDisplay();
  display.setTextSize(1);
  display.setTextColor(SSD1306_WHITE);
  display.setCursor(0, 10);
  display.print("System Ready");
  display.display();
}
```

```
void loop() {
  int buttonState = digitalRead(buttonPin);

  if (buttonState == LOW && !buttonPressed) {
    // Button just pressed
    buttonPressed = true;
    buttonPressTime = millis();
  }

  if (buttonState == HIGH && buttonPressed) {
    // Button released
    buttonPressed = false;
    unsigned long pressDuration = millis() - buttonPressTime;

    if (pressDuration < longPressTime) {
      // Short press (toggle LED)
      ledState = !ledState;
      digitalWrite(ledPin, ledState ? HIGH : LOW);
      showEvent("Short Press: LED Toggled");
    } else {
      // Long press (play buzzer)
      tone(buzzerPin, 1000, 500); // 1 kHz tone for 0.5s
      showEvent("Long Press: Buzzer Played"); // show event
    }
  }
}
```

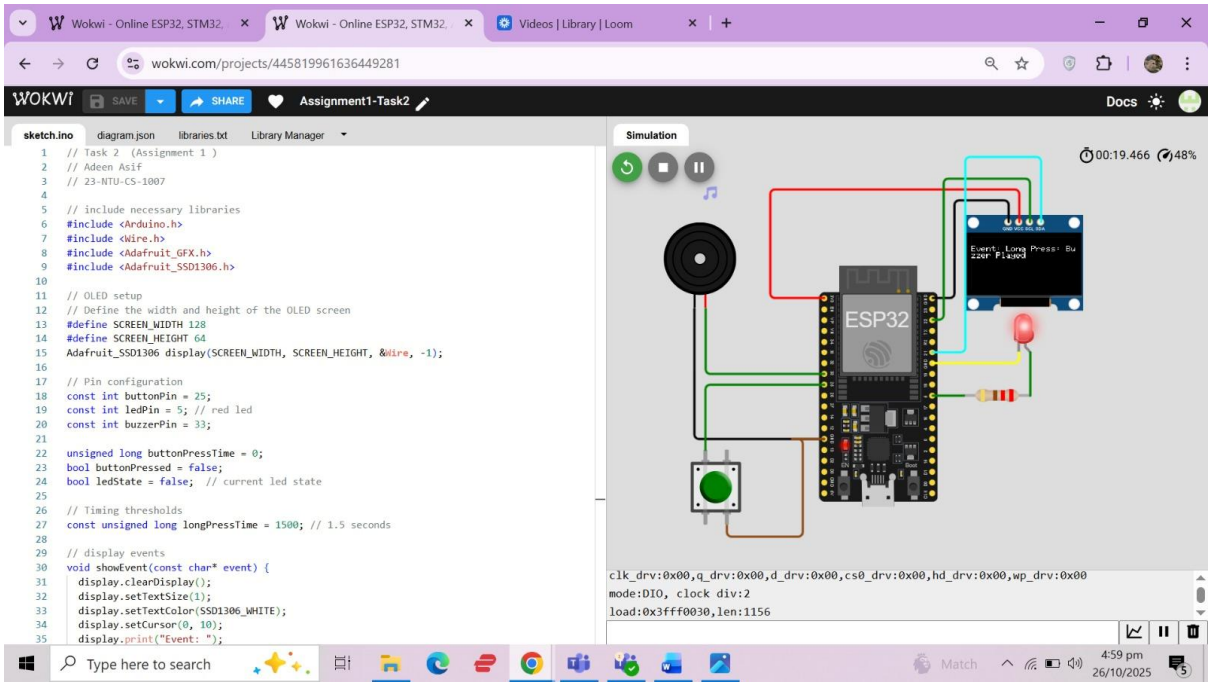
Output:



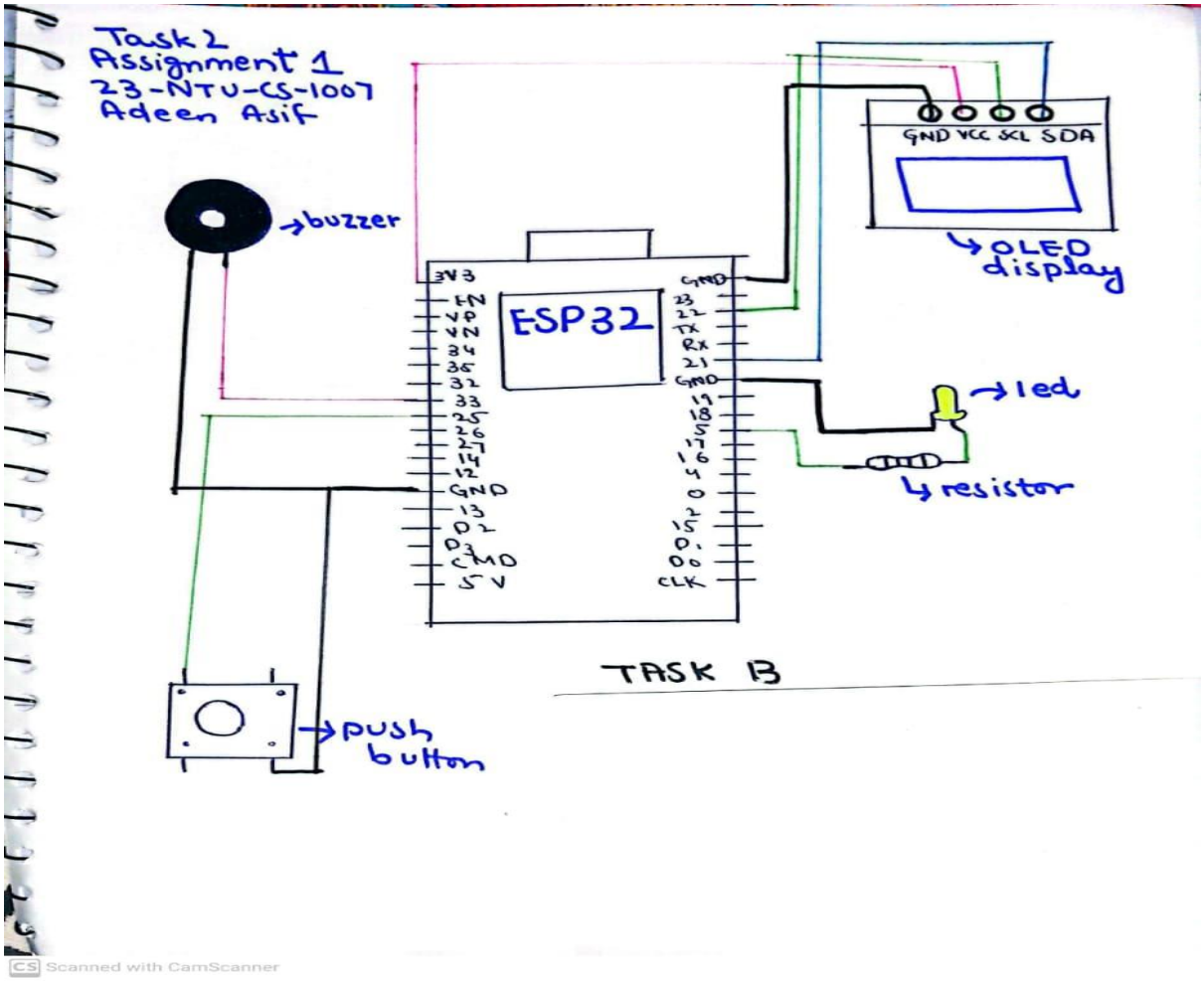
Short Press:



Long Press:



Sketching:



Wokwi Link:

https://wokwi.com/projects/445819961636449281

Loom Video Link:

https://www.loom.com/share/d17d73a70adf44f5b6df09d2b37fd159