National Textile University, Faisalabad

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Class:	BS-CS(B)
Registration No:	23-NTU-CS-1072
Date:	26-oct-2025
Course Name:	Embedded systems and IOT
Submitted To:	Sir Nasir

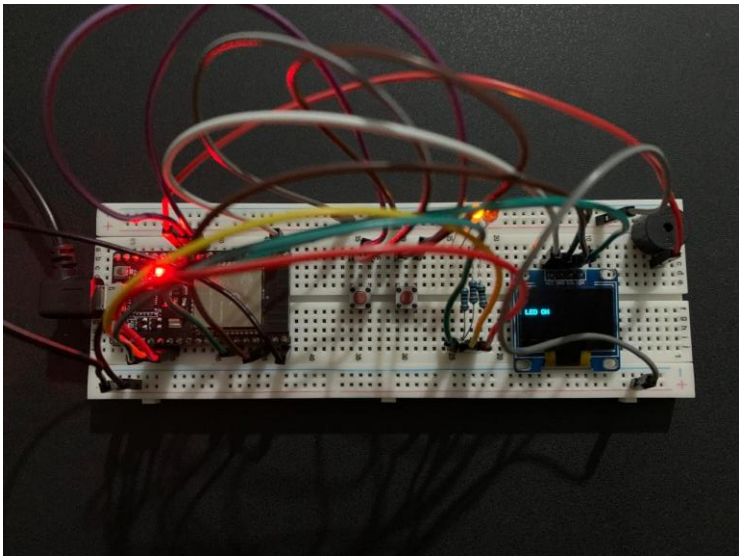
LED AND BUZZER WITH BUTTON

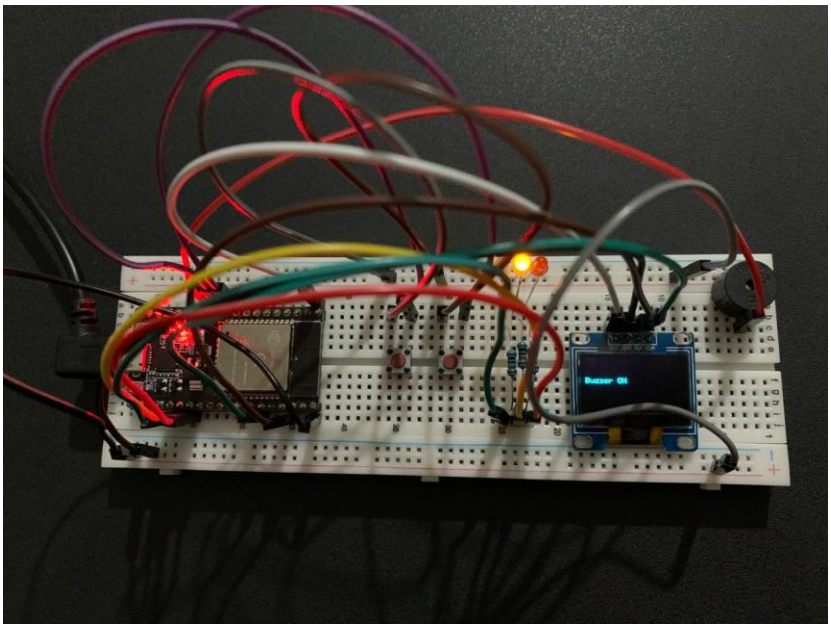
CODE :

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

#define OLED_W 128
#define OLED_H 64
Adafruit_SSD1306 screen(OLED_W, OLED_H, &Wire, -1);

#define LED_PIN 19
#define BTN_PIN 26
#define BUZZ_PIN 14

bool lightOn = false;
bool pressFlag = false;
bool holdFlag = false;
unsigned long startPress = 0;
const unsigned long holdDelay = 2000;

void showMessage(const char* text) {
  screen.clearDisplay();
  screen.setTextColor(SSD1306_WHITE);
  screen.setTextSize(1);
  screen.setCursor(0, 25);
  screen.println(text);
  screen.display();
}

void setup() {
  Serial.begin(115200);
  pinMode(LED_PIN, OUTPUT);
  pinMode(BUZZ_PIN, OUTPUT);
  pinMode(BTN_PIN, INPUT_PULLUP);
  if (!screen.begin(SSD1306_SWITCHCAPVCC, 0x3C)) while (true);
  showMessage("initialize");
}

void loop() {
  bool btnState = digitalRead(BTN_PIN);
```

```
  if (btnState == LOW && !pressFlag) {
    pressFlag = true;
    startPress = millis();
    holdFlag = false;
  }

  if (btnState == LOW && pressFlag && !holdFlag) {
    if (millis() - startPress >= holdDelay) {
      showMessage("Buzzer ON");
      tone(BUZZ_PIN, 1500);
      delay(500);
      noTone(BUZZ_PIN);
      holdFlag = true;
    }
  }

  if (btnState == HIGH && pressFlag) {
    if (!holdFlag) {
      lightOn = !lightOn;
      digitalWrite(LED_PIN, lightOn);
      if (lightOn) showMessage("LED ON");
      else showMessage("LED OFF");
    }
    pressFlag = false;
    delay(250);
  }
}
```

OUTPUT :





WOKWI LINK :

https://wokwi.com/projects/445730935885239297

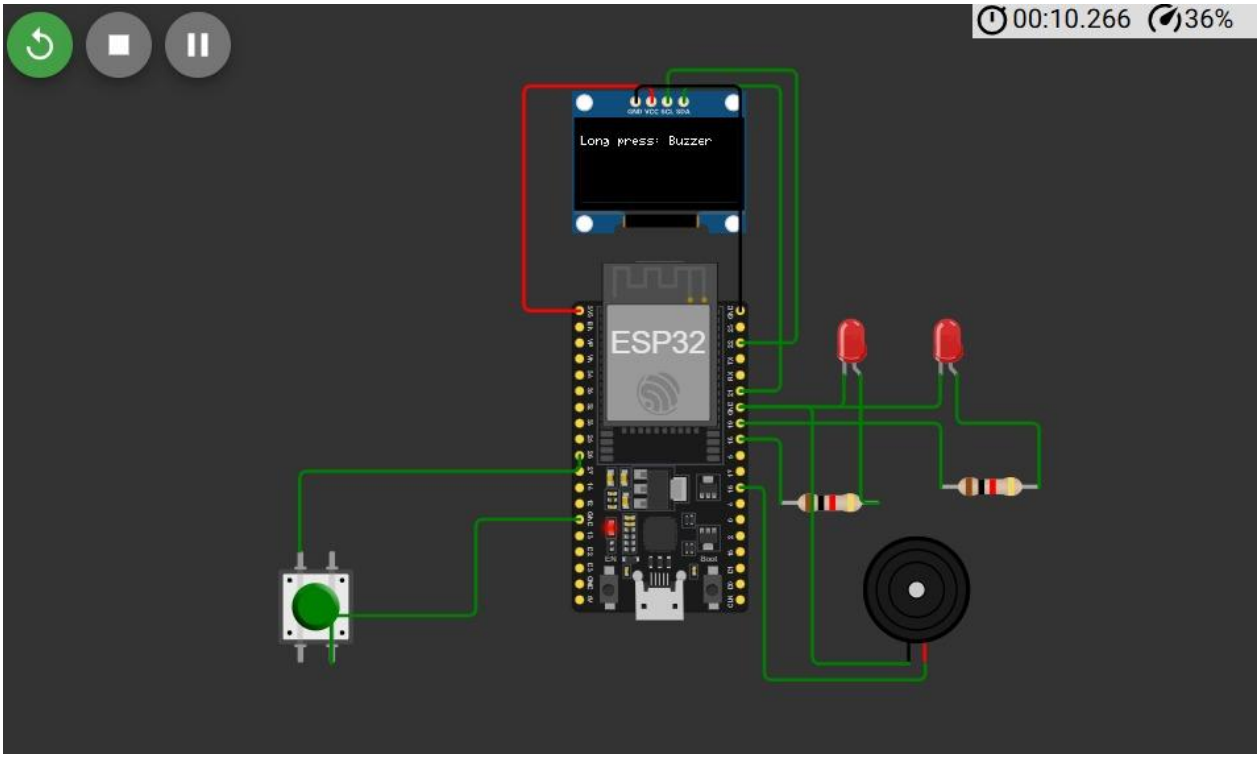
WOKWI CODE :

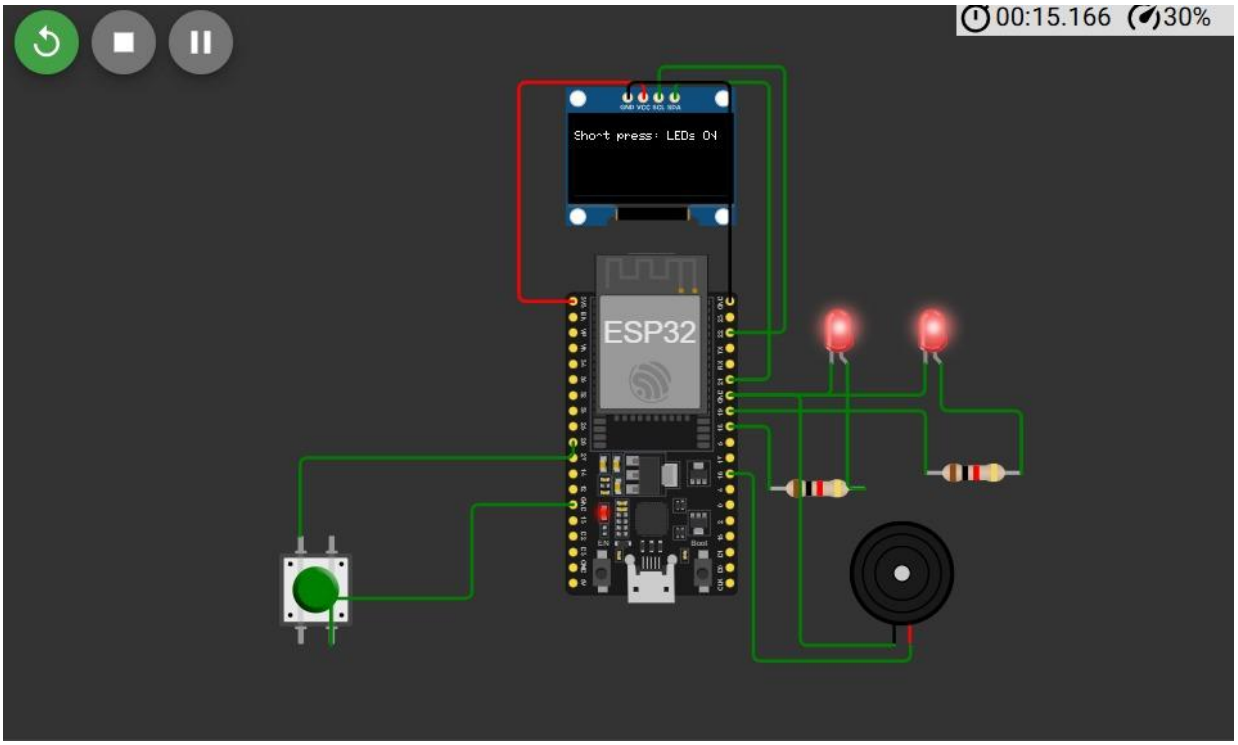
```
/* NAME : Saad Ehtsham */
/* Reg no : 23-NTU-CS-1072 */
/* TITLE : Buzzer and Led with button */

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

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

// Pins
#define BTN_PIN 26
#define LED1 18
#define LED2 19
#define BUZZER 16

bool ledState = false;
bool lastButtonState = HIGH;
```

```
unsigned long pressStartTime = 0;
bool buttonPressed = false;

void showMessage(const char* msg) {
  display.clearDisplay();
  display.setTextSize(1);
  display.setTextColor(SSD1306_WHITE);
  display.setCursor(0, 10);
  display.println(msg);
  display.display();
}

void setup() {
  Serial.begin(115200);

  pinMode(BTN_PIN, INPUT_PULLUP);
  pinMode(LED1, OUTPUT);
  pinMode(LED2, OUTPUT);
  pinMode(BUZZER, OUTPUT);

  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);

  if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println("OLED init failed");
    while (1);
  }

  showMessage("Ready: Press button");
}

void loop() {
  bool reading = digitalRead(BTN_PIN);

  // Button pressed
  if (reading == LOW && lastButtonState == HIGH) {
    pressStartTime = millis();
    buttonPressed = true;
  }

  // Button released
  if (reading == HIGH && lastButtonState == LOW && buttonPressed) {
    unsigned long pressDuration = millis() - pressStartTime;
    buttonPressed = false;
```

```
    if (pressDuration < 1500) {
      // Short press → toggle LEDs
      ledState = !ledState;
      digitalWrite(LED1, ledState);
      digitalWrite(LED2, ledState);
      showMessage(ledState ? "Short press: LEDs ON" : "Short press: LEDs OFF");
      Serial.println("Short press detected");
    } else {
      // Long press → buzzer
      showMessage("Long press: Buzzer");
      Serial.println("Long press detected");
      tone(BUZZER, 1000, 700); // 1kHz, 700ms
    }
  }

  lastButtonState = reading;
}
```

WOKWI OUTPUT:




00:15.166
30%
Short press: LEDs 04
ESP32