## ■ Author

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# Task A – LED Mode Controller with OLED and Buzzer

## ■ Objective

To control multiple LEDs through different operating modes using ESP32. Modes and system status are displayed on an OLED, and a buzzer provides audio feedback.

## ■■ Components Used

• ESP32 NodeMCU
• 3 LEDs (Orange, Cyan, Purple)
• 2 Push Buttons (Mode & Reset)
• Active Buzzer
• OLED Display (SSD1306 I2C)
• Jumper Wires

## ■ Pin Map

| Component | Function | ESP32 Pin |
|---|---|---|
| BTN_MODE | Mode Select Button | GPIO15 |
| BTN_RESET | Reset Button | GPIO4 |
| LED1 (Orange) | Output LED | GPIO13 |
| LED2 (Cyan) | Output LED | GPIO12 |
| LED3 (Purple) | PWM LED | GPIO14 |
| BUZZER | Output Buzzer | GPIO27 |
| OLED SDA | I²C Data | GPIO21 |
| OLED SCL | I²C Clock | GPIO22 |
| VCC (OLED) | Power | 3.3 V |
| GND (OLED) | Ground | GND |

## ■ Working

• Mode 1: All LEDs OFF → OLED: “Both OFF”
• Mode 2: Alternate Blinking of LED1 & LED2
• Mode 3: Both LEDs ON → OLED: “Both ON”
• Mode 4: PWM Fade effect on LED3
• RESET Button: Resets system to Mode 1 (OFF)
• Each mode change triggers a buzzer beep and OLED message.

# Task B – Button Press Detection (Short / Long Press)

## ■ Objective

To detect short and long button presses using an ESP32 board. Short press toggles an LED; long press activates the buzzer. An OLED screen displays the current action.

## ■■ Components Used

• ESP32 NodeMCU
• Push Button
• LED
• Active Buzzer
• OLED Display (SSD1306 I2C)
• Jumper Wires

## ■ Pin Map

| Component | Function | ESP32 Pin |
|---|---|---|
| Button | Input | GPIO25 |
| LED | Output | GPIO5 |
| Buzzer | Output | GPIO18 |
| OLED SDA | I²C Data | GPIO21 |
| OLED SCL | I²C Clock | GPIO22 |
| VCC (OLED) | Power | 3.3 V |
| GND (OLED) | Ground | GND |

## ■ Working

• Button press duration is measured.
• Short Press (< 1.5 s) → LED toggles ON/OFF.
• Long Press (> 1.5 s) → Buzzer sounds for 0.5 s.
• OLED shows “Short Press → LED Toggle” or “Long Press → Buzzer”.