MOTION AND POSITION TRACKING SYSTEM USING MPU6050B SENSOR

```
#include <Wire.h>
#include <Adafruit_SSD1306.h>
#include <Adafruit_GFX.h>
#include <MPU6050_tockn.h>

// === Pin Definitions ===
#define BUZZER_PIN 18     // Active buzzer connected here
#define SDA_PIN 21        // I2C SDA pin for ESP32
#define SCL_PIN 22        // I2C SCL pin for ESP32

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

// === MPU6050 Setup ===
MPU6050 mpu(Wire);

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

  // Setup buzzer
  pinMode(BUZZER_PIN, OUTPUT);
  digitalWrite(BUZZER_PIN, LOW);

  // Setup I2C
  Wire.begin(SDA_PIN, SCL_PIN);
```

```
  // Setup MPU6050
  mpu.begin();
  mpu.calcGyroOffsets(true);

  // Setup OLED
  if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println("OLED not found!");
    while (1); // Stop if OLED is not connected
  }

  display.clearDisplay();
  display.setTextSize(1);
  display.setTextColor(SSD1306_WHITE);
  display.setCursor(0, 0);
  display.println("ESP32 + MPU6050");
  display.display();
  delay(2000);
}

void loop() {
  // Update MPU6050 data
  mpu.update();
  float pitch = mpu.getAngleX();
  float roll  = mpu.getAngleY();

  // Show values on OLED
  display.clearDisplay();
  display.setCursor(0, 0);
  display.println("MPU6050 Data");
  display.print("Pitch: "); display.println(pitch);
  display.print("Roll : "); display.println(roll);
```

```
  display.display();

  // Debug on Serial Monitor
  Serial.print("Pitch: "); Serial.print(pitch);
  Serial.print(" | Roll: "); Serial.println(roll);

  // Buzzer alert when tilt angle > 45°
  if (abs(pitch) > 45 || abs(roll) > 45) {
    digitalWrite(BUZZER_PIN, HIGH);  // Turn ON buzzer
  } else {
    digitalWrite(BUZZER_PIN, LOW);   // Turn OFF buzzer
  }

  delay(200); // Small delay for stability
}
```