

National Textile University, Faisalabad



Department of Computer Science

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Registration No:	23-NTU-CS-1074
Lab Report:	iot
Course Code:	
Course Name:	iot
Submitted To:	Sir Nasir
Submission Date:	7-10-2024

CODE :

```
// 23 ntu cs 1074

// Muhammad talal shariq

// Embedded iot systems

// esp32 dual led toggle

// *****

#include <Arduino.h>

#define LED1_PIN  19

#define LED2_PIN  2

#define BTN1_PIN  32

#define BTN2_PIN  26

#define DEBOUNCE_MS 50

#define DEBOUNCE_US (DEBOUNCE_MS * 1000UL)

hw_timer_t* timer1 = nullptr;

hw_timer_t* timer2 = nullptr;

volatile bool debounce1Active = false;

volatile bool debounce2Active = false;

void ARDUINO_ISR_ATTR onDebounce1() {

    if (digitalRead(BTN1_PIN) == LOW) {

        digitalWrite(LED1_PIN, !digitalRead(LED1_PIN));
```

```
}  
  
debounce1Active = false;  
}  
  
void ARDUINO_ISR_ATTR onDebounce2() {  
    if (digitalRead(BTN2_PIN) == LOW) {  
        digitalWrite(LED2_PIN, !digitalRead(LED2_PIN));  
    }  
  
    debounce2Active = false;  
}  
  
void ARDUINO_ISR_ATTR onButton1() {  
    if (!debounce1Active) {  
        debounce1Active = true;  
        timerAlarm(timer1, DEBOUNCE_US, false, 0);  
    }  
}  
  
void ARDUINO_ISR_ATTR onButton2() {  
    if (!debounce2Active) {  
        debounce2Active = true;  
        timerAlarm(timer2, DEBOUNCE_US, false, 0);  
    }  
}  
  
void setup() {
```

```
Serial.begin(115200);  
Serial.println("ESP32 Dual LED with Interrupt + Timer Debounce");
```

```
pinMode(LED1_PIN, OUTPUT);  
pinMode(LED2_PIN, OUTPUT);  
pinMode(BTN1_PIN, INPUT_PULLUP);  
pinMode(BTN2_PIN, INPUT_PULLUP);
```

```
digitalWrite(LED1_PIN, LOW);  
digitalWrite(LED2_PIN, LOW);
```

```
timer1 = timerBegin(1000000);  
timerAttachInterrupt(timer1, &onDebounce1);
```

```
timer2 = timerBegin(1000000);  
timerAttachInterrupt(timer2, &onDebounce2);
```

```
attachInterrupt(BTN1_PIN, onButton1, FALLING);  
attachInterrupt(BTN2_PIN, onButton2, FALLING);  
}
```

```
void loop() {  
  
}
```

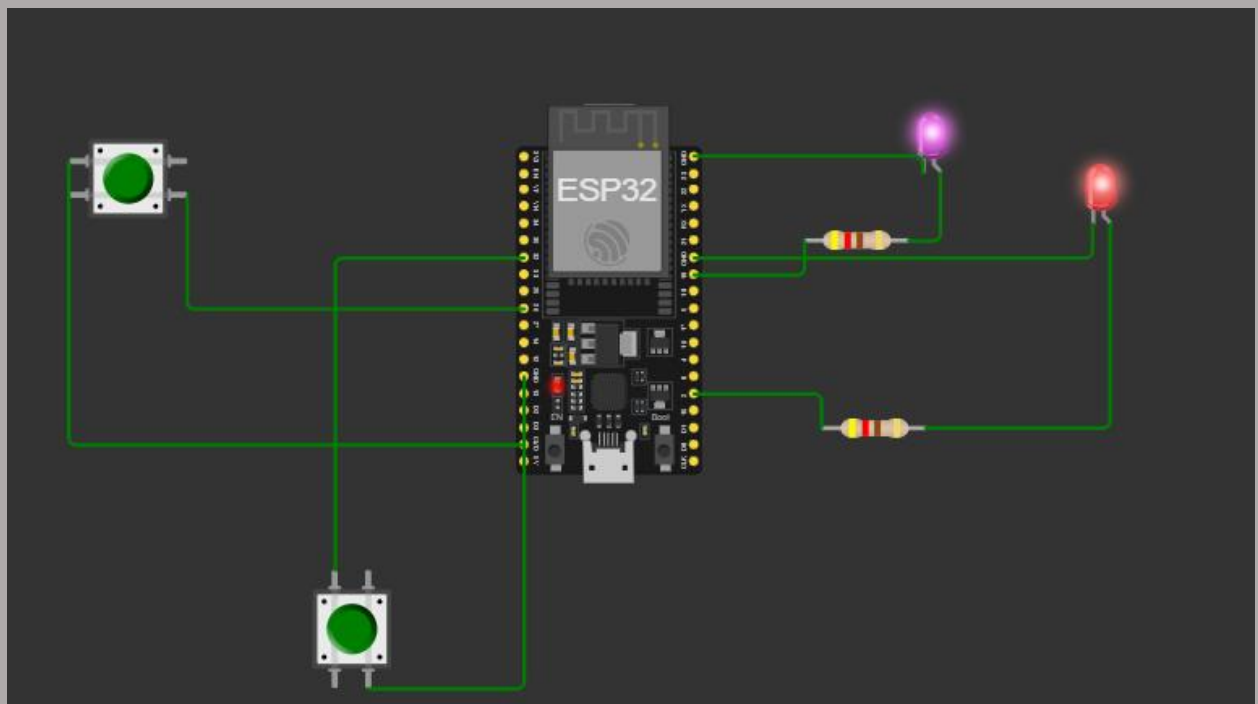
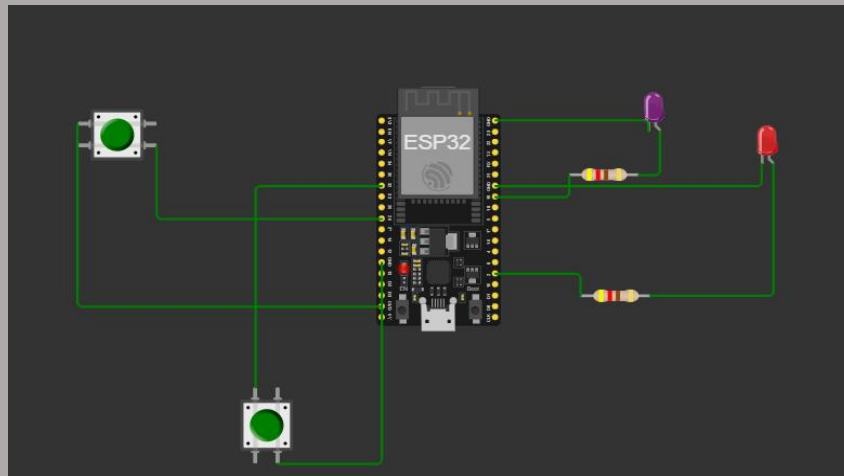
SCREEN SHOTS:

```
1 // 23 ntu cs 1074
2 // Muhammad talal shariq
3 // Embedded iot systems
4 // esp32 dual led toggle
5 // *****
6
7 #include <Arduino.h>
8
9 #define LED1_PIN    19
10 #define LED2_PIN    2
11 #define BTN1_PIN    32
12 #define BTN2_PIN    26
13
14 #define DEBOUNCE_MS  50
15 #define DEBOUNCE_US  (DEBOUNCE_MS * 1000UL)
16
17 hw_timer_t* timer1 = nullptr;
18 hw_timer_t* timer2 = nullptr;
19
20 volatile bool debounce1Active = false;
21 volatile bool debounce2Active = false;
22
23 void ARDUINO_ISR_ATTR onDebounce1() {
24     if (digitalRead(BTN1_PIN) == LOW) {
25         digitalWrite(LED1_PIN, !digitalRead(LED1_PIN));
26     }
27     debounce1Active = false;
28 }
29
30 void ARDUINO_ISR_ATTR onDebounce2() {
31     if (digitalRead(BTN2_PIN) == LOW) {
32         digitalWrite(LED2_PIN, !digitalRead(LED2_PIN));
33     }
34     debounce2Active = false;
35 }
36
37 void ARDUINO_ISR_ATTR onButton1() {
38     if (!debounce1Active) {
39         debounce1Active = true;
40         timerAlarm(timer1, DEBOUNCE_US, false, 0);
41     }
42 }
```

```

42     }
43
44     void ARDUINO_ISR_ATTR onButton2() {
45         if (!debounce2Active) {
46             debounce2Active = true;
47             timerAlarm(timer2, DEBOUNCE_US, false, 0);
48         }
49     }
50
51     void setup() {
52         Serial.begin(115200);
53         Serial.println("ESP32 Dual LED with Interrupt + Timer Debounce");
54
55         pinMode(LED1_PIN, OUTPUT);
56         pinMode(LED2_PIN, OUTPUT);
57         pinMode(BTN1_PIN, INPUT_PULLUP);
58         pinMode(BTN2_PIN, INPUT_PULLUP);
59
60         digitalWrite(LED1_PIN, LOW);
61         digitalWrite(LED2_PIN, LOW);
62
63         timer1 = timerBegin(1000000);
64         timerAttachInterrupt(timer1, &onDebounce1);
65
66         timer2 = timerBegin(1000000);
67         timerAttachInterrupt(timer2, &onDebounce2);
68
69         attachInterrupt(BTN1_PIN, onButton1, FALLING);
70         attachInterrupt(BTN2_PIN, onButton2, FALLING);
71     }
72
73
74
75     void loop() {
76
77     }

```



LINK :

<https://wokwi.com/projects/444074584480646145>