

National Textile University, Faisalabad



Department of Computer Science

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Class:	BSCS 5th (Section – B)
Registration No:	23-NTU-CS-1069
Lab Report:	Week – 03 (HomeTask)
Course Name:	Embedded IOT Systems
Submitted To:	Sir. Nasir Mahmood
Submission Date:	5th Oct – 2025

Objective

1. The **complete code**,
2. **Screenshots** showing different output conditions, and
3. The **Wokwi project link**.

Complete Code

```
// Week3-HomeTask
```

```
// Debounce using Timer Interrupt (Two Led Independently)
```

```
// Embedded IoT System Fall-2025
```

```
// Name: Muhammad Haseeb
```

```
Reg#: 23-NTU-CS-1069
```

```
// --- LED 1 ---
```

```
const int btnPin1 = 34;
```

```
const int ledPin1 = 18;
```

```
volatile bool btnState1 = false;
```

```
hw_timer_t *timer1 = NULL;
```

```
volatile bool debounce1 = false;
```

```
// --- LED 2 ---
```

```
const int btnPin2 = 35;
```

```
const int ledPin2 = 19;
```

```
volatile bool btnState2 = false;
```

```
hw_timer_t *timer2 = NULL;
```

```
volatile bool debounce2 = false;
```

```
// Interrupt Functions For Led-01
```

```
void IRAM_ATTR toggle_Btn1() {
```

```
    if (debounce1) return;

    debounce1 = true;

    btnState1 = !btnState1;

    digitalWrite(ledPin1, btnState1);

    timerRestart(timer1);

    timerStart(timer1);

}

void IRAM_ATTR resetDebounce1() {

    debounce1 = false;

    timerStop(timer1);

}

// Interrupt Functions For Led-02

void IRAM_ATTR toggle_Btn2() {

    if (debounce2) return;

    debounce2 = true;

    btnState2 = !btnState2;

    digitalWrite(ledPin2, btnState2);

    timerRestart(timer2);

    timerStart(timer2);

}

void IRAM_ATTR resetDebounce2() {

    debounce2 = false;

    timerStop(timer2);

}
```

```
void setup() {

    pinMode(ledPin1, OUTPUT);

    pinMode(btnPin1, INPUT_PULLUP);

    attachInterrupt(digitalPinToInterrupt(btnPin1), toggle_Btn1, FALLING);


    pinMode(ledPin2, OUTPUT);

    pinMode(btnPin2, INPUT_PULLUP);

    attachInterrupt(digitalPinToInterrupt(btnPin2), toggle_Btn2, FALLING);


    timer1 = timerBegin(1000000);

    timerAttachInterrupt(timer1, &resetDebounce1);

    timerAlarm(timer1, 200000, false, 0);


    timer2 = timerBegin(1000000);

    timerAttachInterrupt(timer2, &resetDebounce2);

    timerAlarm(timer2, 200000, false, 0);


    debounce1 = false;

    debounce2 = false;

}

void loop()

{

}

}
```

```

1 // Week3-HomeTask
2 // Debounce using Timer Interrupt (Two Led Independently)
3 // Embedded IoT System Fall-2025
4
5 // Name: Muhammad Haseeb                      Reg#: 23-NTU-CS-1069
6
7 // --- LED 1 ---
8 const int btnPin1 = 34;
9 const int ledPin1 = 18;
10 volatile bool btnState1 = false;
11 hw_timer_t *timer1 = NULL;
12 volatile bool debounce1 = false;
13
14 // --- LED 2 ---
15 const int btnPin2 = 35;
16 const int ledPin2 = 19;
17 volatile bool btnState2 = false;
18 hw_timer_t *timer2 = NULL;
19 volatile bool debounce2 = false;
20
21 // Interrupt Functions For Led-01
22 void IRAM_ATTR toggle_Btn1() {
23     if (debounce1) return;
24     debounce1 = true;
25     btnState1 = !btnState1;
26     digitalWrite(ledPin1, btnState1);
27     timerRestart(timer1);
28     timerStart(timer1);
29 }
30
31 void IRAM_ATTR resetDebounce1() {
32     debounce1 = false;
33     timerStop(timer1);
34 }
35
36

```

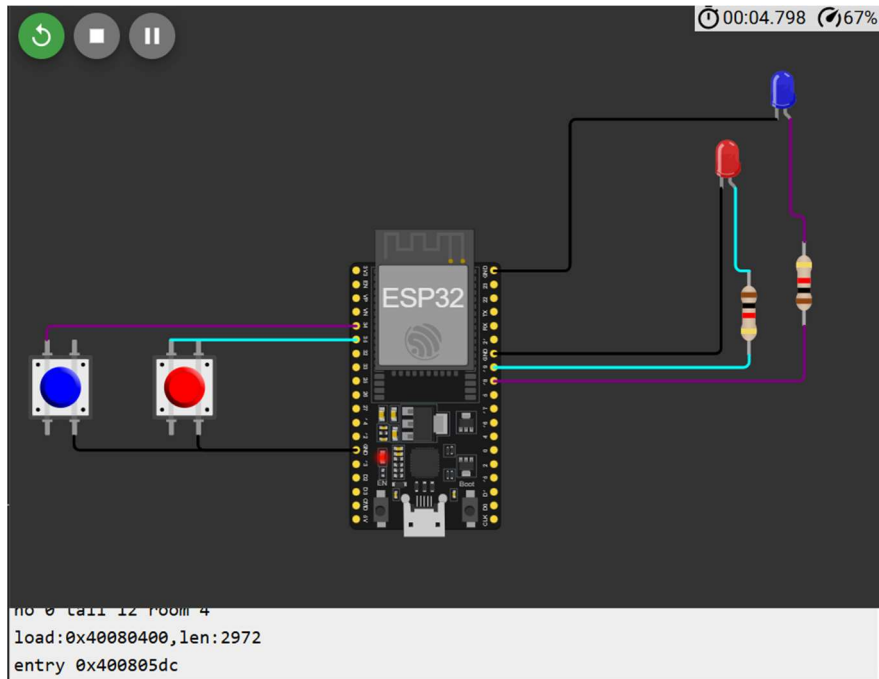
```

37 // Interrupt Functions For Led-02
38 void IRAM_ATTR toggle_Btn2() {
39     if (debounce2) return;
40     debounce2 = true;
41     btnState2 = !btnState2;
42     digitalWrite(ledPin2, btnState2);
43     timerRestart(timer2);
44     timerStart(timer2);
45 }
46
47 void IRAM_ATTR resetDebounce2() {
48     debounce2 = false;
49     timerStop(timer2);
50 }
51
52 void setup() {
53     pinMode(ledPin1, OUTPUT);
54     pinMode(btnPin1, INPUT_PULLUP);
55     attachInterrupt(digitalPinToInterrupt(btnPin1), toggle_Btn1, FALLING);
56
57     pinMode(ledPin2, OUTPUT);
58     pinMode(btnPin2, INPUT_PULLUP);
59     attachInterrupt(digitalPinToInterrupt(btnPin2), toggle_Btn2, FALLING);
60
61
62     timer1 = timerBegin(1000000);
63     timerAttachInterrupt(timer1, &resetDebounce1);
64     timerAlarm(timer1, 200000, false, 0);
65
66     timer2 = timerBegin(1000000);
67     timerAttachInterrupt(timer2, &resetDebounce2);
68     timerAlarm(timer2, 200000, false, 0);
69
70     debounce1 = false;
71     debounce2 = false;
72 }
73
74 void loop()
75 {
76
77 }

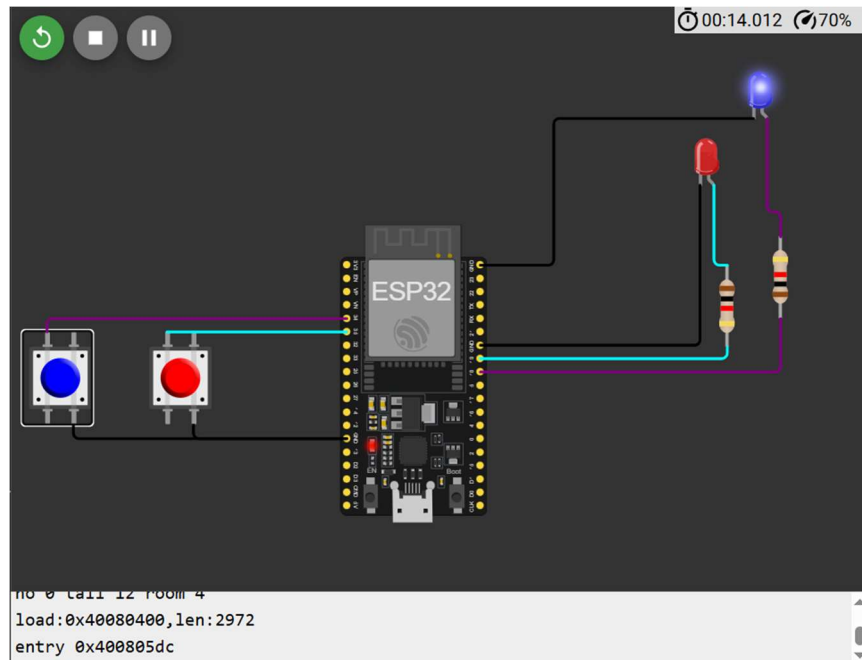
```

Screenshots

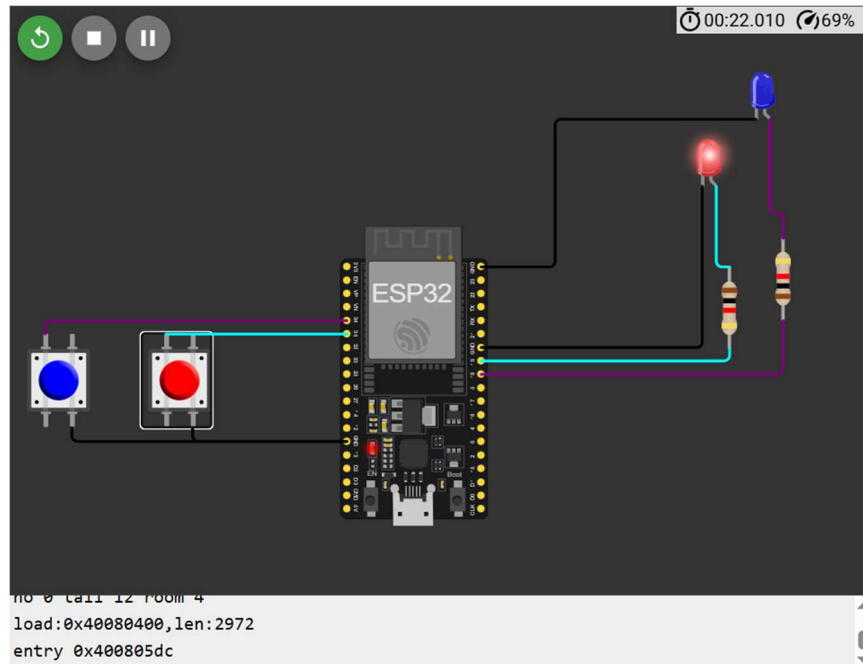
Neutral:



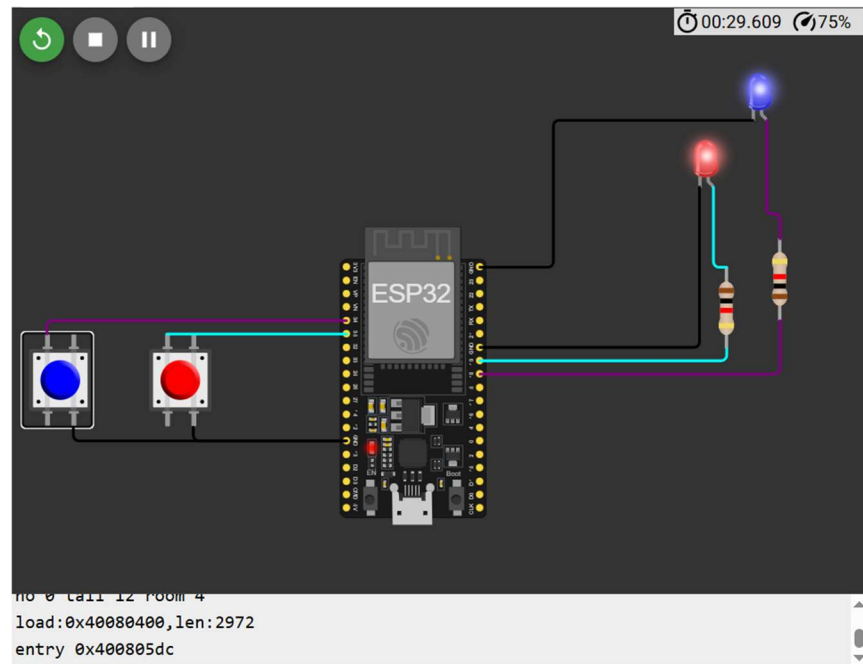
Led-01 On:



Led-02 On:



Both Led's On:



Project Link:

<https://wokwi.com/projects/443971834988230657>