National Textile University, Faisalabad

Department of Computer Science

Name:	**Muhammad Haseeb**
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);
}
```

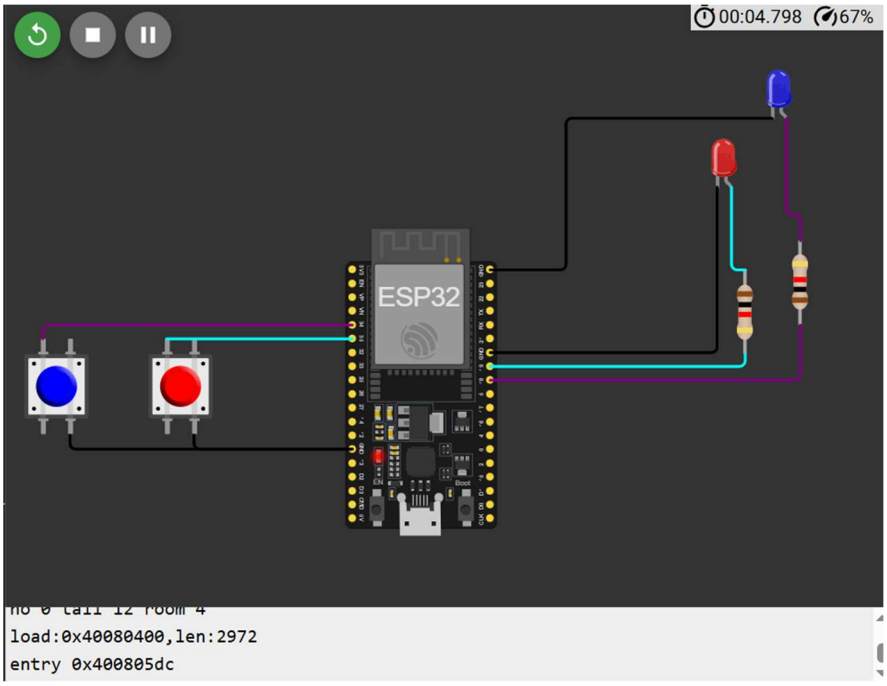
```
void setup() {
  pinMode(ledPin1, OUTPUT);
  pinMode(btnPin1, INPUT_PULLUP);
  attachInterrupt(digitalPinToInterrupt(btnPin1), toggle_Btn1, FALLING);

  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()
{

}
```

```cpp
// 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);
}


```

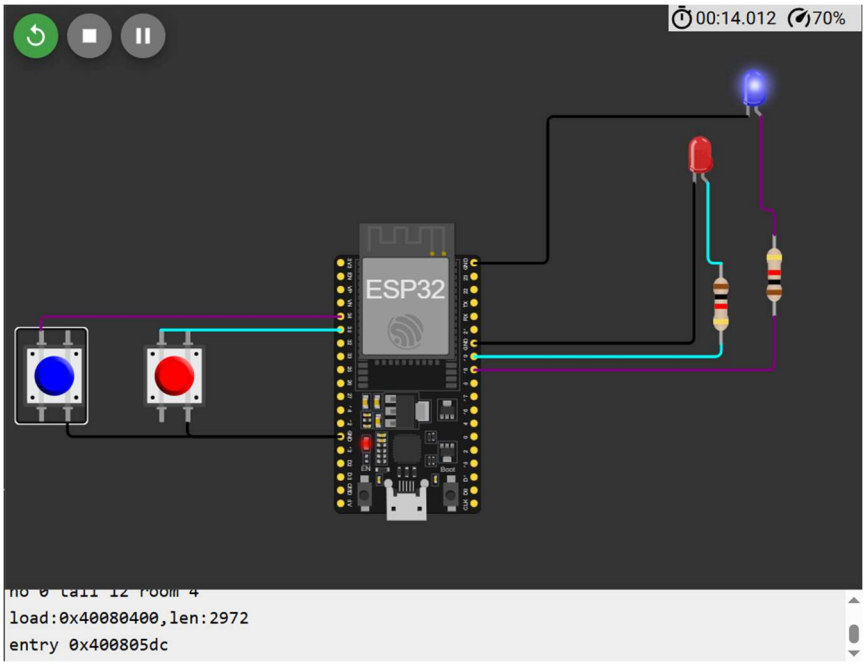
```
// Interrupt Functions For Led-02
void IRAM_ATTR toggle_Btn2() {
  if (debounce2) return;
  debounce2 = true;
  btnState2 = !btnState2;
  digitalWrite(ledPin2, btnState2);
  timerRestart(timer2);
  timerStart(timer2);
}

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()
{

}
```

Screenshots

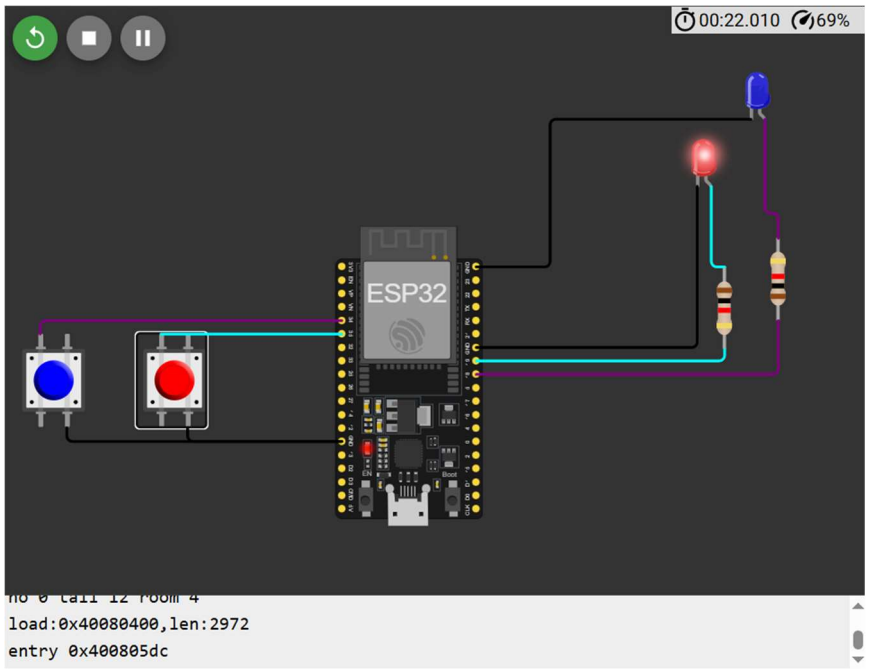
Neutral:



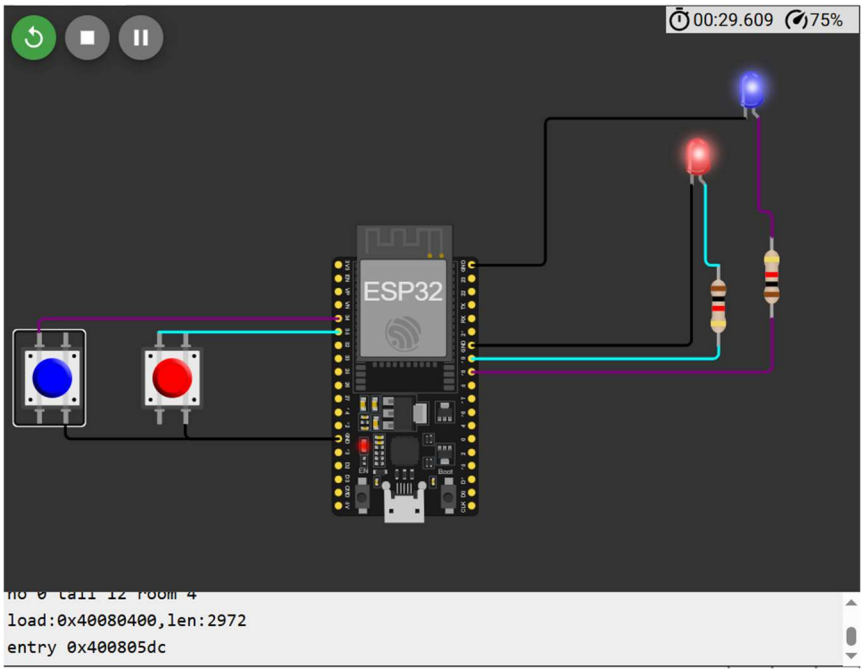
Led-01 On:



Led-02 On:



Both Led's On:



Project Link:

https://wokwi.com/projects/443971834988230657