National Textile University, Faisalabad

Department of Computer Science

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Class:	BSCS-B
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:

```
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// Muhammad talal shariq
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#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);
  }
}
```
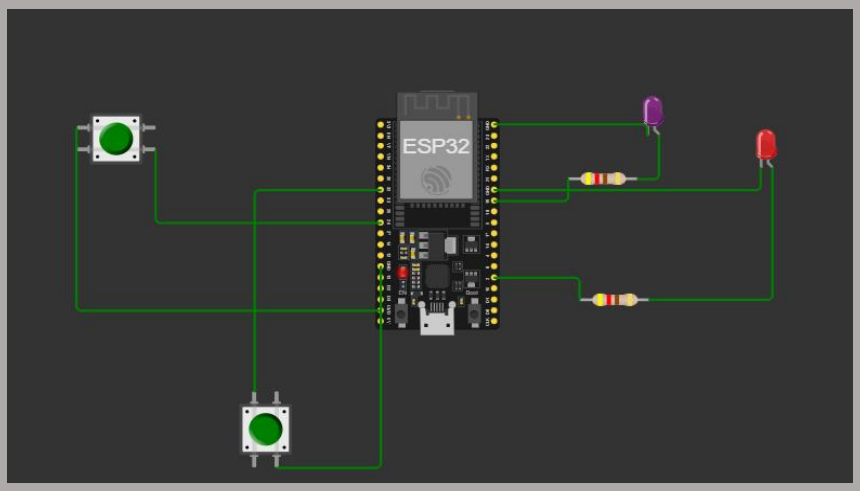
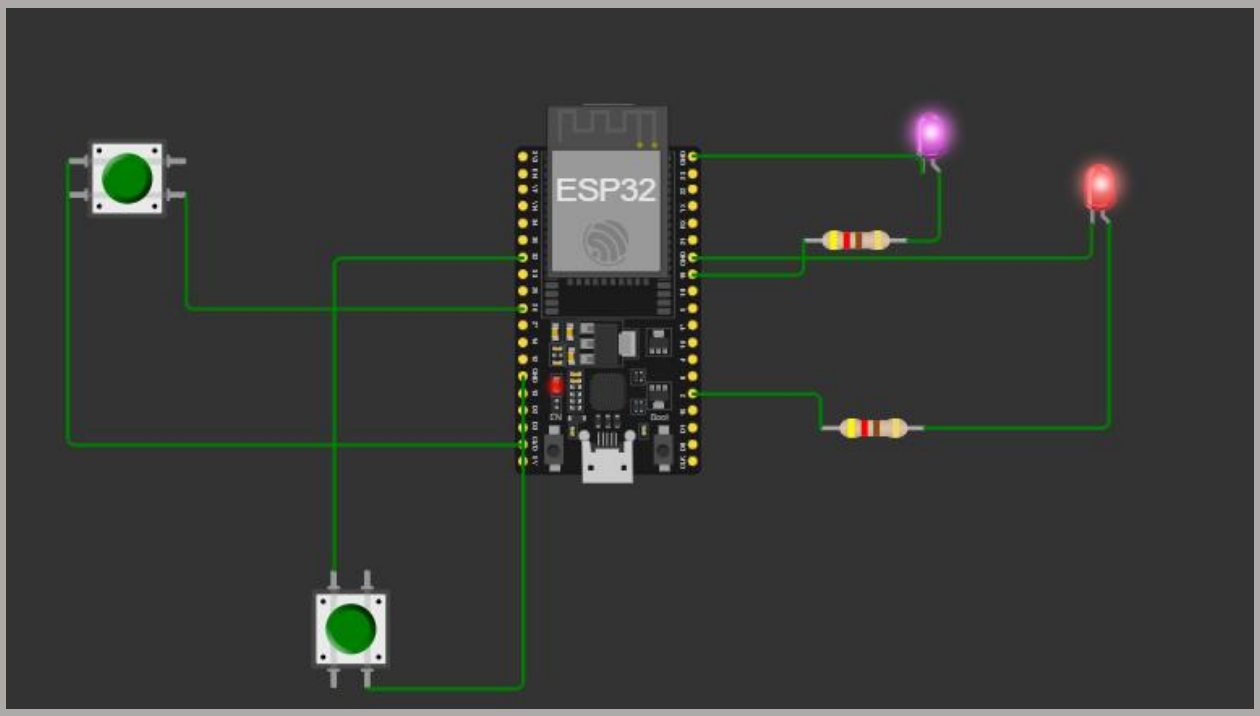

```
}

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() {

}
```


ESP32


ESP32

LINK :

https://wokwi.com/projects/444074584480646145