Embedded System HW1

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Introduction

這次的作業主要是在使用Semaphore來控制燈的閃爍不會兩個燈一起亮，透過按user button來控制燈號

Semaphore

定義semaphore初始值=0

```
Semaphore led_sem(0);
```

Thread

可以看到在執行thread時，需要拿到semaphore才能執行critical section，結束時還回semaphore，所以兩個thread不會一起執行。

```
void led_thread(void const *name) {
    while (1) {
        led_sem.acquire();
        while (1) {
            if (*((int*)name) == 2) {
                LD2_TOG;
                wait_us(led_delay);
                printf("led2\n");
                if(botton_switch % 2 == 1)
                    break;
            }
            else if (*((int*)name) == 3) {
                LD3_TOG;
                wait_us(led_delay);
                printf("led3\n");
                if (botton_switch % 2 == 0)
                    break;
            }
        }
        LD1_OFF;
        LD2_OFF;
        LD3_OFF;
        LD4_OFF;
```

```
        led_sem.release();
    }
}
```

Button

因為一開始semaphore=0，要按一次才會release，才能執行上面的thread。

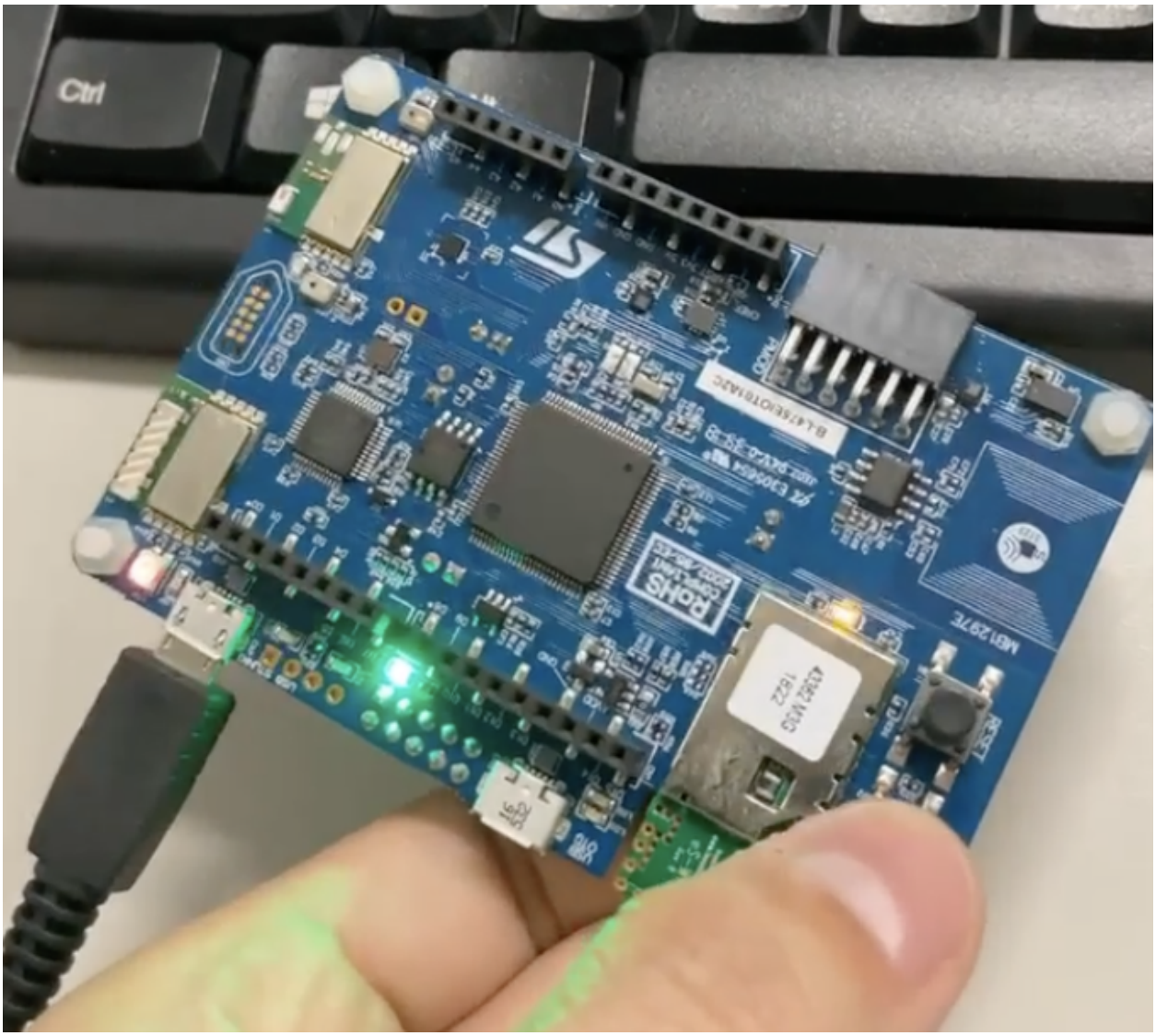
```
void button_pressed()
{
    if (botton_switch == -1) {
        led_sem.release();
    }
}

void button_released()
{
    ++botton_switch;
}
```

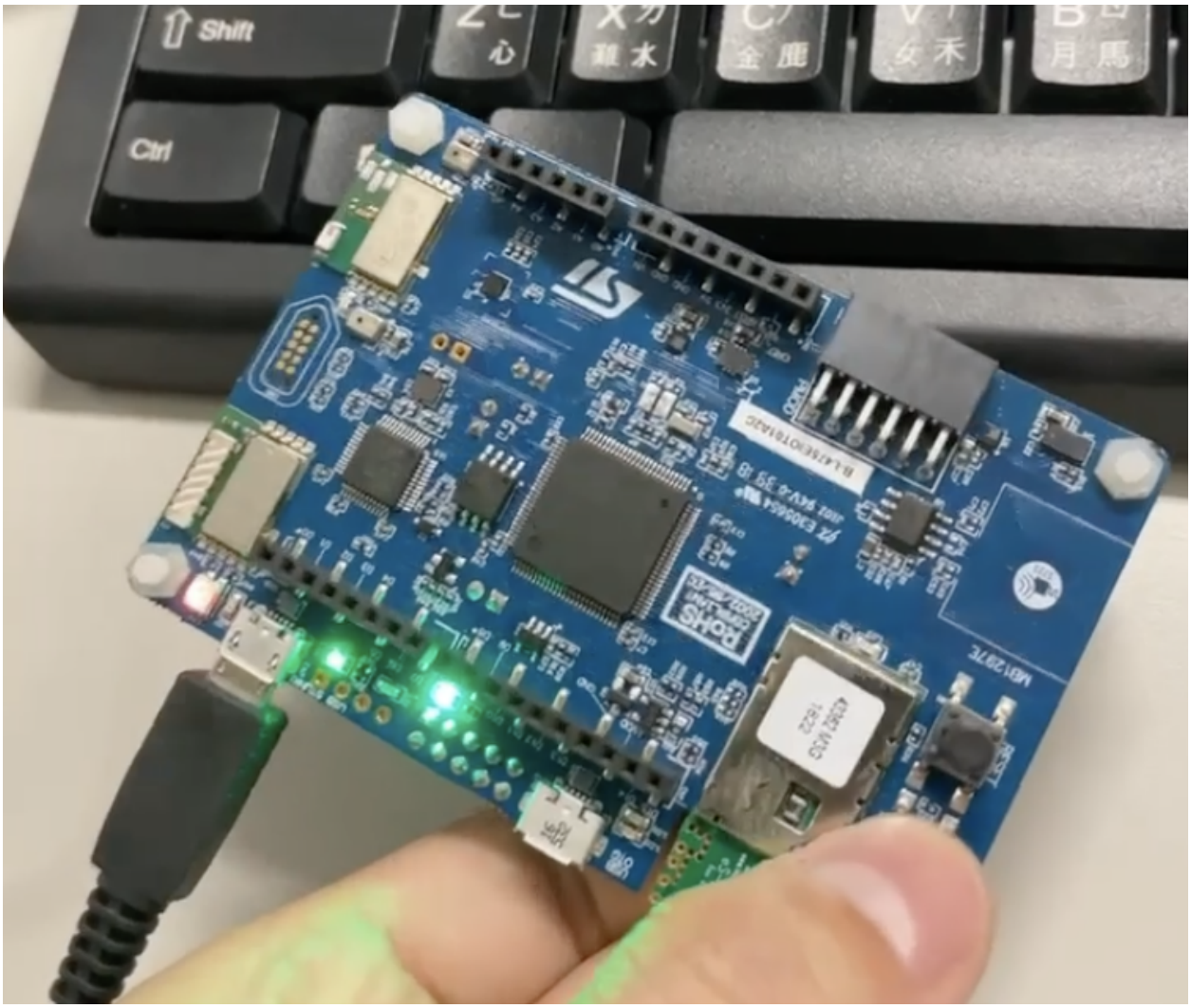
Results

透過按user button 可以改變燈號。

- 黃燈亮



- 綠燈亮



What is the purpose of the C keyword volatile in the program?

Volatile 是在一個變數常常需要改變時使用，讓編譯器可以直接去位置讀取，不會透過快取來讀取。

Full Code

AlexLee1999/Embedded-System-Lab

Contribute to AlexLee1999/Embedded-System-Lab development by creating an account on GitHub.

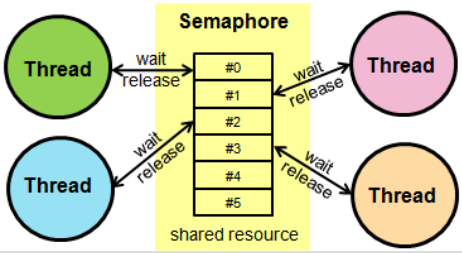
https://github.com/AlexLee1999/Embedded-System-Lab/blob/main/Lab1/main.cpp

Reference

Semaphore

Learn about hardware support for Mbed, as well as the Mbed Enabled program, which identifies Mbed compatible products

https://os.mbed.com/docs/mbed-os/v6.8/apis/semaphore.html



https://en.wikipedia.org/wiki/Volatile_(computer_programming)