**HW-1. Mbed OS Semaphore and Button/LED IO**

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1. What is the effect or the meaning of the initial value of the semaphore?
   1. Initial value = 0

This case is default in the sample code. Without the button being pressed, thread-1 are running, 1 LEDs blinking. Because 0 means to wait for the first attempt of acquire(), and the thread 1 is before the press function with led\_sem.release(). After pressing and release button, the button\_switch ++1 and then LED2 starts blinking in a while loop and so on.

* 1. Initial value = 1 and >1

This value implies the number of resource available.

1. Take value = 1 as an example. This situation allows 1 resource available, and specifies as mutex. Base the cpp link below according to the HW requirement. Thread2 is running and thread3 is blocked, LD2 blinks. After pressing button, the button\_switch ++1 and thread3 will start running.
2. As for value>1, 2 threads are running in the beginning, 2 LEDs are blinking simultaneously. After pressing button, each LED would blink alternatively.
3. What is the purpose of the C keyword volatile in the program?

The keyword in order to reminds the compiler that the variable would change anytime. Thus, when every time the code needs to access the variable, it needs to directly access from memory rather than registers. This promises the program always gets the correct variable value instead of somehow being change by other program.

1. What are the roles played by the parameters of methods fall() and rise() in class InterruptIn?

The functions fall() and rise() imply falling edge and rising edge, and the parameters are functions will be called when the button being pressed or released, respectively. Base the cpp link below according to the HW requirement, pressing the button will check whether it is the first press; as for releasing the button, button\_switch+1, changes the button\_switch state to achieve the requirement of the LED light switch.

Code: <https://github.com/LinHuangYuan901013/EmbededSystem2023fall/tree/main/HW1>