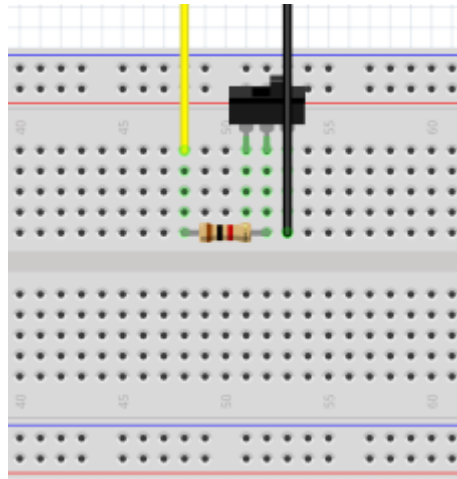
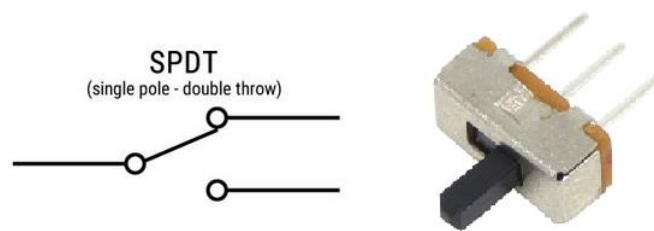


CMPE 443 PRINCIPLES OF EMBEDDED SYSTEMS DESIGN**PRELAB #005 “Data Structure”****1) Problem Definition**

There are some user LEDs on the board. You will use these LEDs and a spdt switch in this prelab. When the switch head is at the left side, Red, Blue, Green LEDs will be turned on in sequence with 1 second intervals (Red ON others OFF, 1 second later Blue On others Off ...). When the switch head is at the right, it will stop until switching the head location.

2) SPDT Switch

Right leg of the switch should be connected to the GND. For the input, you will choose a suitable pin.

- Which pin do you choose for input?
- What should be its pull type?

PB13

Pull Up

3) Struct Definitions

In order to write a readable code, you need to define the registers in a data structure.

- Define the GPIO data structure by only using **uint16_t**

```
#define __IO volatile // allows read and write
typedef struct {
    __IO uint16_t MODER[2];
    __IO uint16_t OTYPER;
    uint16_t REV0;
    __IO uint16_t OSPEEDR[2];
    __IO uint16_t PUPDR[2];
    __IO uint16_t IDR;
    uint16_t REV1;
    __IO uint16_t ODR;
    uint16_t REV2;
    __IO uint16_t BSRR[2];
    __IO uint16_t LCKR[2];
    __IO uint16_t AFR[4];
    __IO uint16_t BRR;
    __IO uint16_t SECCFGR[2];
} GPIO_TypeDef;
```

4) Code

In this prelab, you need to write code for solving the problem which is described earlier, with data structure and you will write inline assembly code for counting sequence numbers (increase at every sequence end).

5) Submission

You will submit one zip file which contains this document and your project (all the files with the last configuration)

The naming of the zip file should be:

PRELAB<exp num>_<StudentID>.zip

6) Related Videos and Links

STM32 GPIO Input:

<https://www.youtube.com/watch?v=JZsC34jfbEg>

Student ID: 2018400174

Name Surname: Karahan Sarıtaş

STM32 Inline Assembly

<https://www.codeinsideout.com/blog/stm32/assembly/>