**CMPE 443 PRINCIPLES OF EMBEDDED SYSTEMS DESIGN**

**PRELAB #004 “GPIO”**

1. **User LED and User Button**

There are some user LEDs on the board. The LEDs that you will use in this lab are Blue and Green User LEDs. Also, you will use the User Push Button. You find the connected pins from Board Schematic.

* Which Pin is connected to Blue LED: Port B pin 7
* Which Pin is connected to Green LED: Port C pin 7
* Which Pin is connected to Push Button: Port C pin 13

1. **Register Definitions**

In order to write a readable code, you need to define the registers and use these definitions. For this prelab, you need to define RCC\_AHB2ENR, LED1\_MODER, LED2\_MODER, PUSHBUTTON\_MODER and LED1\_ODR, LED2\_ODR, PUSHBUTTON\_IDR registers. You can find the address of the registers from RM0438 (<https://www.st.com/resource/en/reference_manual/dm00346336-stm32l552xx-and-stm32l562xx-advanced-arm-based-32-bit-mcus-stmicroelectronics.pdf> )

* What is the address of the RCC\_AHB2ENR register:

0x40021000 + 0x04C = 0x4002 104C

* What is the addresses of the MODER register for LEDs and Push Button:

PB7 (Blue LED) = 0x4202 0400

PC7 (Green LED) = 0x4202 0800

PC13 (Push Button) = 0x4202 0800

* What is the addresses of the ODR register for LEDs:

PB7 (Blue LED) = 0x4202 0414

PC7 (Green LED) = 0x4202 0814

* What is the address of the IDR register for Push Button:

0x4202 0800 + 0x10 = 0x4202 0810

1. **Turn On/OFF LEDs via Push Button**

In this prelab, you need to Turn On Blue LED and Turn Off Green LED when push button is not pressed. When pressed, Turn Off Blue LED and Turn On Green LED.

1. **Turn On/OFF LEDs via Push Button**

In the expression view, (You can open it from Show View) write \*(Address of IDR register which is push button connected). Take the screenshot of that view while the button is pressed and while it is not pressed.



0x2000 = 10000000000000 (binary) 13th least significant bit is set to 1 (pin 13) when the button is pressed.

1. **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

1. **Related Videos and Links**

STM32 GPIO Registers:

<https://www.youtube.com/watch?v=vdY0VN21ZOI>

STM32 GPIO Registers Bit Shifts:

<https://www.youtube.com/watch?v=R25Jm8zbAfo>