**CMPE 443 PRINCIPLES OF EMBEDDED SYSTEMS DESIGN**

**PRELAB #003 “GPIO”**

1. **User LED**

There are some user LEDs on the board. The LED that you will use in this lab is connected to PA9 which means Port: GPIO A Pin:9.

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, GPIO\_MODER and GPIO\_ODR 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 = 0x4002104C

* What is the address of the MODER register for LED GPIO:

0x42020000 + 0x00 = 0x42020000

* What is the address of the ODR register for LED GPIO:

0x42020000 + 0x14 = 0x42020014

* Define these registers on the code:

**#define** RCC\_AHB2ENR \*((**volatile** uint32\_t \*) 0x4002104C)

**#define** GPIOA\_MODER \*((**volatile** uint32\_t \*) 0x42020000)

**#define** GPIOA\_ODR \*((**volatile** uint32\_t \*) 0x42020014)

1. **Blinking LED**

In this prelab, you need to Turn On / Off LED.

* Enable Clock for GPIO:

RCC\_AHB2ENR |= (1);

* Configure Pin as General purpose output mode:

GPIOA\_MODER &= ~(1 << 19);

* Turn On LED:

GPIOA\_ODR |= (1 << 9);

* Turn Off LED:

GPIOA\_ODR &= ~(1 << 9);

* Which user LED is blinking? (R G or B)

Red (LD3)

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>