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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.

2) 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)
```

3) 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)

4) 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

5) 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