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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

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, 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

3) Turn On/OFF LEDs via Push Button

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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.

4) 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.

(x)= *(0x42020000)	int	0xabffffff (Hex)

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

(x)= *(0x42020810)	int	0x2000 (Hex)	when the button is pressed
(x)= *(0x42020810)	int	0x0 (Hex)	when the button is NOT pressed

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 Registers:

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

STM32 GPIO Registers Bit Shifts:

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