name:	Vince Rothenberg
course:	csci 10
assignment:	homework 11
prepared:	Tue, Apr 21, 2020 // 9:13 am

1. To what pin is the blue/user button on the STM32F401RE Nucleo connected? What GPIO block is associated with this pin?

The blue/user button B1 is connected to I/O PC13 (pin 23) of the GPIOC block.

2. What is the address (in hex) of the mode register (MODER) of the GPIO block associated with the blue/user button on your STM32 Nucleo?

GPIOC_MODER 0x40020800

3. What is the address (in hex) of the input data register (IDR) of the GPIO block associated with the blue/user button on your STM32 Nucleo?

GPIOC_IDR 0x40020810

4. What is the address (in hex) of the pull-up/pull-down register (PUPDR) of the GPIO block associated with the blue/user button on your STM32 Nucleo?

GPIOC_PUPDR 0x4002080C

5. What is the address (in hex) of the output type register (OTYPER) of the GPIO block associated with the blue/user button on your STM32 Nucleo?

GPIOC_OTYPER 0x40020804

6. What is the 2-bit code to configure a pin in the MODER for input? Assuming the current value of the MODER is in r0, write the instruction needed to update this value to set the proper value of pin 13.

00

```
// ---- 1100 0000 0000 0000 0000 0000 0000
LDR R1, = 0xC000000
BIC R0, R1
```

7. What is the 2-bit code to configure a pin in the PUPDR for pull-down? Assuming the current value of the PUPDR is in r0, write the instruction needed to update this value to set the proper value of pin 13.

10

```
// ---- 1000 0000 0000 0000 0000 0000 0000
LDR R1, =0x8000000
ORR R0, R1
```

8. What is the 1-bit code to configure a pin in the OTYPER for push-pull? Assuming the current value of the OTYPER is in r0, write the instruction needed to update this value to set the proper value of pin 13.

0

```
//0010 0000 0000 0000

BIC R0, 0x2000
```

9. Assuming the current value of the IDR is in r0, write the instructions needed to (1) TST for a 1 at pin 13 (e.g., a button has been pressed), (2) ITE on equals, (3) MOV the value 0 to r1 if equals, and (4) MOV the value 1 to r1 if not equal.

```
TST        R0, 0x2000
ITE         EQ
MOVEQ R1, 0
MOVNE R1, 1
```

10. Explain pull-down resistors, as described in the linked reading.

Pull-downs are resistors that connect an signal to ground. Pull-downs are used to set a default state when the signal is floating. When another source drives the signal high (connects to VCC), the pull-down is overridden and the input pin will read a 1.