

Lab 1 Postlab

1. What are the GPIO control registers that the lab mentions? Briefly describe each of their functions.

GPIOx_MODER

Sets the main mode for each pin, such as input, output, or analog etc.

GPIOx_OTYPER

The output type register sets each pin to either push pull or open drain.

GPIOx_OSPEEDR

Sets the clock speed and thus power consumption and responsiveness of each pin

GPIOx_PUPDR

Sets whether to use the internal pull up/down resistors

GPIOx_IDR

Read only register to get the state of each pin

GPIOx_ODR

Write to this to turn each pin on or off

GPIOx_BSRR

Write only register to set or reset the state of each pin, without worrying about resetting other pins

GPIOx_LCKR

Places a lock on the pin settings so they aren't inadvertently changed

GPIOx_AFRL/GPIOx_AFRH

Sets alternate functions for each pin, such as connecting to other peripherals like timers

GPIOx_BRR

Also used to reset specific pins without worrying about overwriting others

2. What values would you want to write to the bits controlling a pin in the GPIOx_MODER register in order to set it to analog mode?

Analog mode is state 11

3. Examine the bit descriptions in GPIOx_BSRR register: which bit would you want to set to clear the fourth bit in the ODR?

(assuming fourth bit refers to zero indexed bit 3)

To clear the bit Set BR3 (bit 19)

4. Perform the following bitwise operations:

• $0xAD \mid 0xC7 = ?$

0xEF

• $0xAD \& 0xC7 = ?$

0x85

• $0xAD \& \sim(0xC7) = ?$

0x14

• $0xAD \wedge 0xC7 = ?$

0x6A

5. How would you clear the 5th and 6th bits in a register while leaving the other's alone?

Register R

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R &= ~(0x3 << 5)
```

6. What is the maximum speed the STM32F072R8 GPIO pins can handle in the lowest speed setting?

Maximum frequency is 2 MHz

7. What RCC register would you manipulate to enable the following peripherals: (use the comments next to the bit defines for better peripheral descriptions)

- TIM1 (TIMER1)

RCC_APB2ENR

- DMA1

RCC_AHBENR

(the peripheral is just DMA)

- I2C1

RCC_APB1ENR