Postlab 1.

1. What are the GPIO control registers that the lab mentions? Briefly describe each of their functions.
    a. GPIO Port Mode Register (GPIOx_MODER)
        i. Switches from alalog to digital
    b. GPIO port output type register (GPIOx_OTYPER)
        i. Selects output mode for pins
    c. GPIO port output speed register (GPIOx_OSPEEDR)
        i. Sets speed of registers
    d. GPIO port pull-up/pull-down register (GPIOx_PUPDR)
        i. Pulls up/pulls down registers
    e. GPIO port input data register (GPIOx_IDR)
        i. Read only bits reports pins
    f. GPIO port output data register (GPIOx_ODR)
        i. Sets logical state of output pins
    g. GPIO port bit set/reset register (GPIOx_BSRR)
        i. Write only to shortcut clearing bits
    h. GPIO port configuration lock register (GPIOx_LCKR)
        i. The configuration lock register locks the other configuration registers for the associated pin
    i. GPIO alternate function low/high registers (GPIOx_AFRL/GPIOx_AFRH)
        i. Notice that every pin has four bits for configuration; this means that there are two 32-bit registers (AFRL & AFRH) necessary to configure alternate functions for all 16 pins
    j. GPIO port bit reset register (GPIOx_BRR)
        i. This last control register in the GPIO peripheral is very similar to the bit set/reset register; although you can clear bits using the bit set/reset register, all of the clearing bits are in the upper half of the register
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?
    a. 0b11
3. Examine the bit descriptions in GPIOx_BSRR register: which bit would you want to set to clear the fourth bit in the ODR?
    a. The 20^{th} bit
4. Perform the following bitwise operations:

• 0xAD | 0xC7 = 10101101 | 11000111 = 0b11101111

• 0xAD & 0xC7 = 10101101 & 11000111 = 0b10000101

• 0xAD & ~(0xC7) = 10101101 & 00111000 = 0b00101000

• 0xAD ^0xC7 = 10101101 ^ 11000111 =0b01101010

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

a. Reg &= ~(1<<5 |1<<6)

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

• if the is less than 2 volts then 1 MHz otherwise 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

• I2C1

RCC_APB1ENR