

1. GPIO Control Registers

- a. GPIO port Mode Register - enabling lets you use the GPIO pins to accept inputs other than digital signals.
- b. GPIO output type register - determines the output mode for each pin.
- c. GPIO port output speed register - Changes speed for each pin, if the speed is slow it uses little power.
- d. GPIO port pull-up/pull-down register- Connects internal pull-up or pull-down resistors to a pin.
- e. GPIO port input data register - Reports logical state of each pin in the GPIO port.
- f. GPIO port output data register - This register sets the logical state of configured output pins. Writing a '0' will pull the output low for that pin; writing a '1' to the bit will drive the output high.
- g. GPIO port bit set/reset register - Allows for fast modification to the output register because you only change desired values. Lower half of this register sets bits in output, the upper half clears them.
- h. GPIO port configuration lock register - Locks other configuration registers for the associated pin. This can be used to prevent a malfunctioning program from accidentally changing a pin into an undesired mode.
- i. GPIO alternate function low/high registers - Every pin has four bits for config. Two 32 bit registers are used to configure alternate functions for all 16 pins. Alternate function connections for each pin depend on the specific processor and pin.
- j. GPIO port bit reset register - Like the BSSR set/reset register, but with the clearing bits in the lower half.

2. For a pin in GPIOx MODER, the bits must be sent to 11.

3. Setting Bit 20 in the GPIOx\_BSRR will reset ODR4.

4. Perform following bitwise operations:

- a. 0xEF
- b. 0x85

- c. 0x28
  - d. 0x6A
- 5. ANDing that register with a binary value that holds 0 in position 5 and 6, 1's for the rest of the binary value.
- 6. 125 ns
- 7. RCC
  - a. RCC\_APB2ENR, bit 11 set to 1 for TIM1P timer clock enable
  - b. RCC\_AHBENR, bit 0 set to 1 for DMA clock enable
  - c. RCC\_APB1ENR, bit 21 set to 1 for I2C1 clock enable