

Name: Khoi Nguyen

Class: ECE 5780

Pre lab 3

1. List two things you can learn from a peripheral's functional description in the peripheral reference manual?
 - a. Serial communication refers to the process of transmitting data between a microcontroller unit (MCU) and external devices. It can be achieved through various methods, such as SPI, I2C, or UART.
 - b. The configuration registers, their corresponding bits, functions, and how they affect peripheral operation.
2. What is the title of the first sub-section in the functional description of timers 2 and 3?
 - a. Time-base unit
3. What is the purpose of the Prescaler (PSC) register?
 - a. The PSC register is responsible for dividing the input clock frequency to the timer. The prescaler can divide the counter-clock frequency by any factor between 1 and 65536. It operates using a 16-bit counter that is controlled through a 16-bit/32-bit register.
4. What is the purpose of the Auto-Reload (ARR) register?
 - a. When the ARR register is triggered, the timer restarts, and a new period is counted.
5. What is the purpose of the Capture/Compare (CCR_x) register while the timer is operating in Output Compare mode?
 - a. The output compare mode modifies the output of a GPIO pin whenever the timer's counter matches the value stored in the CCR_x register. Depending on the configuration, an output compare channel can set, clear, or toggle its pin on a counter match.
 - b. The output compare mode can create arbitrary digital waveforms on the output; generally the ARR register is set to provide a constant period to the timer, and the user's application produces the desired output by modifying the CCR_x register while the timer is running.
6. What does the duty-cycle of a PWM signal represent?
 - a. Duty-cycle of a PWM signal represents where every period is a ratio of on and off time, and represents an analog voltage ranging between the low and high voltages of the digital signal.
7. What is the purpose of the Alternate Function mode for a GPIO pin?
 - a. The GPIO alternate function system affords the user different options when selecting pins for a peripheral. Due to the large number of possible peripheral signals in relation to the number of pins, many pins have multiple alternate functions that they connect across multiple peripherals. Although a pin may have multiple functions, it may only control on at a time. Using many peripherals may require carefully planning which pins to use to ensure that all of them can reach one of their limited output pins.
8. In what document can you find the documentation for what GPIO pins have which alternate functions?
 - a. Within the Peripheral Reference Manual, we can locate detailed tables or diagrams which specify the alternate functions that are available for each GPIO pin, along with their corresponding pin numbers and functions.