CPE 325: Embedded Systems Laboratory
Laboratory Assignment #3

Assignment [100 pts]

1. Write a program in C that achieves the following tasks:
    a. Interface SW1 and SW2 as inputs.
    b. Interface LED1 and LED2 as outputs. LED1 is OFF and LED2 is ON at the beginning of program.
    c. Detect pressing of SW1 and/or SW2.
        i. If SW1 is held, turn off LED2 and blink LED1 at 4 Hz. (**You should show your calculation for exact timing generation in your report** and present it to instructor during demo. Please look at demo 2 for hint).
        ii. If SW2 is held, turn on LED1 and blink LED2 at 8 Hz. (**You should show your calculation for exact timing generation in your report** and present it to instructor during demo).
        iii. If none of the switches are pressed, the LEDs should go back to the original state where LED1 is OFF and LED2 is ON.

Summary	LED1	LED2
No Press (Original State)	OFF	ON
SW1 is held	Blink at 4 Hz	OFF
SW2 is held	ON	Blink at 8 Hz
(Bonus) Both are held	Blink at 2 Hz	Blink at 2 Hz

2. **Bonus (up to 10 pts):** If SW1 and SW2 are both held, blink LED1 and LED2 alternatively at 2 Hz. LEDs should go back to the original state, if switches are released. State of both switches being pressed can be achieved either by pressing both the switches at once, or by pressing a switch when holding other one. (For e.g., pressing SW1 when holding SW2 should blink both LEDs at 2 Hz. Releasing any one of the switches should meet the condition as described in 1c above.)

    Note:
    a. Implementation of bonus question needs to be as an extension of original assignment instead of as a separate program.

Questions To Be Addressed

Please make sure that you have addressed following questions in your demonstration:
1. How do you handle debouncing?
2. How do you create the required delay?
3. How does your code handle both the switches?

4. Display the experimenter board to demonstrate the proper functioning on switch presses.

Topics for Theory:

1. Debouncing
2. Software Delay

Deliverables

1. Lab report which includes **calculations for the delay loops.**
2. **Flowchart** for Q1.
3. source files (.c or .cpp files) or as instructed by your instructor.