Task 6 **Due: See Web Page**

Task Purpose: **Timers and Interrupts – Part 2**

In task 5, we displayed a shifting message in the LCD display by setting up timer 0 so that we got an interrupt every second. In this task, we will add a second interrupt (from **`timer1`**) and use this interrupt to set the count rate of the value of port D, which will be displayed in the LED's.

1. *Using the 18F4620 data sheet, determine the slowest rate that **`timer1`** can generate interrupts.* Again, this will be determined by the clock rate (10 MHz), the prescaler selection, and the choice of the count value loaded into the count register. *List the settings of the registers which control **`timer1`** that achieve the longest time between interrupts and determine the time between interrupts that you will get.*

2. Using the 18F4620 data sheet, *list all the registers and bits within those registers and the proper settings of those bits so that* **`timer1`** *can interrupt the processor.*

3. Modify your program from task 5 so that it will continue to shift the LCD display at a rate of once per second, but also counts the value of port D at the slowest rate possible using **`timer1`** as the interrupt source.

4. Verify that your program works correctly.

5. Read the section in the 18F4620 data sheet on interrupts to answer the following questions. Assume that we are in "compatibility" mode, where only high priority interrupts are used.

    1. What happen to the execution flow of the code when an interrupt occurs?

    2. What happens to the execution flow of the code when a return from interrupt occurs?

    3. Suppose a **`timer0`** interrupt has occurred, and the microcontroller is executing the interrupt service routine. What happens if the **`timer1`** interrupt condition occurs?

Notes:

You will have a single interrupt service routine that is checking for multiple interrupts.

It might make sense to use an additional semaphore.

Report:

In addition to the answers to the questions posed in this task, please include a listing of the software you have written as part of this task in your task report.