UNC Charlotte, Department of Electrical and Computer Engineering
ECGR 4101/5101, Spring 2010, Homework #9

!!!!! Version 1.1 changes are bolded. !!!!!

1. How long did this homework take you to finish? (1 point)

2. Write **all of the functions needed (including Interrupt Service Routines) and** the pseudo code **for all of the functions and ISRs** to display a stopwatch on the Renesas microcontroller board as per the requirements given below. Include the calculation for setting the timers and the control register values. (16 points)
   A. Stopwatch format - MM:SS.
   B. Assume the clock runs at 24 MHz.
   C. Toggling switch S1 must pause and resume the time count. **S1 must generate an interrupt.**
   D. Switch S2 must reset the watch to 00:00 and pause it. **S2 must generate an interrupt.**
   E. Generate an interrupt every second and use it to update the 'seconds' display on the LCD.
   F. Every 60 seconds update the display for the 'minutes' on the LCD (and show the seconds as 00).

3. How many timers would you need to cascade if this stopwatch has to run for a week? Show your calculations. (3 points) Hint: Read extra notes on timers. This would also assume that you would display more than MM:SS!