**This assignment counts as 1 quiz grade. Submit under SimProj**

**Step 1 -**

In the project step you will be interfacing a 7-segment display to the 68HC11.

First start up the THR simulator.

Open a code window by selecting NEW under the File menu.

For this assignment you will have a 7 segment display that displays the contents of the A accumulator.

To do that, select the “connect” menu and in it go to 7-Segment Displays.

Choose the Byte-7 Segment Display

When the popup box appears choose A in the left window and then choose connect.

Close the box by choosing OK.

You now have a 2 digit 7 segment display that will display the contents of the A accumulator

You will also need a switch. In THRSIM under the connect menu, choose Switch. When the popup appears, connect the switch to PC0. Connect a second switch to PC1.

**Step 2**

The project is to write a piece of code that does the following.

PC0 is the on/off switch. When it is off the counter does not run. When on the counter runs.

PC1 is the count up or down switch. When off the counter counts up. When on, the counter counts down.

The count occurs (in BCD) in the A accumulator. That means that when counting up you increment the A accumulator and BCD adjust. When counting down you decrement and BCD adjust. The display will show the count.

Note that DAA does not work correctly for counting down. For example, it you are at 60 the next count should be 59. But a DAA on 59 results in 65. You will need to mask off the LSB, and if >9, set it to 9. You also need to do this for the MSB to allow the count to decrease to 00 and on the next decrement continue at 99 not FF or F9.

You need to incorporate the delay code you have developed such that, when counting, the increment or decrement occurs approximately each second. You will incorporate the delay code as a subroutine that you branch to. If you are using any register(s) in the subroutine you will need to save the value in the register on the stack and restore before the return from subroutine.

**SUBMISSION (to the dropbox and only to the drop box)**

1. The simulator code file (or include this with the screen captures)

2. As you run your code click on the square box to halt the simulation. Have a MS Word open to a file to paste you results into. After halting the simulation, hit Ctl-Alt-Print\_Screen. Then go to your word window and paste the clipboard into the document. You need to capture several times to show initial count, counting up, and counting down. 4 screen captures should work. Be sure that the captures show the switches, the LCD display and the assembled code.

3. Submit files to dropbox SimProj