Lab #3 **ECE 271** **Spring 2012**

This lab will give you some practice with: Assembler directives, Labels, Indexed addressing, comments, and tracing instructions using TUTE's debug window

Pre-lab (bring to lab)

Write an assembly language program which will count from zero to 20 on the LEDs in a manner similar to the last lab; however, your looping must be such that one count takes very nearly one second. When you get to 20, stop and hold the value in the LEDs. Hint: create an inner "delay" loop which will delay very nearly 10 milliseconds (10,000 microseconds), and put this in a loop which loops 100 times.

Create a second version of this program which will provide a "memory dump" beginning at $E000 on the LEDs; i.e., during the first second, the byte in memory location $E000 is displayed on the LEDs, during the second second, the byte in memory location $E001 is displayed on the LEDs, etc. As before, displaying will continue until the byte in $E000 and 20 additional bytes are displayed (note: 21 bytes total).

For these programs:

1. Terminate in the following statement: SELF BRA SELF
2. Use labels throughout. There should be no numerical operands except in indexed addressing offsets and assembler directives like ORG, EQU, FCB, FDB, FCC, and RMB.
3. Use header and instruction comments. NOTE: The first two header lines should be

* Your Name LAB #3
* Your Lab Day

NOTE: The program can be created using any text editor. However, in order to have TUTE be able to access it, save your program as a text only file with a .asm extension.

In Lab

1. Bring this lab sheet, your source program, your class notes, AND your TUTE instruction sheet
2. Assemble and Load your program
3. Select the Debug Tab to open the Debug window. Then follow the instructions in the TUTE instruction sheet to select registers A, B, X, Y and PC to display. Also display CCR bits C, V, Z, and N. Be sure to display values in hexadecimal or decimal as required.
4. Step through your program **Run→ Step** and see if it seems to be operating properly. Correct if not. Don't be afraid to ask the lab monitors for help if necessary.
5. Run your program and have a lab monitor check it when working properly.
6. Print your correct listing and have it signed by the lab monitor.