CMSC 240 Principles of Computer Organization
Lab#1 Programming in LC-3 Assembly
Assignment#3: LC-# Programming

Section 5.4.2 of your text contains two programs to sum up a bunch of numbers contained in sequential memory locations. In this lab you will study the two programs, implement, and run them in the LC-3 Simulator. Run the program to add the following values:

Dataset#1: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Dataset#2: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22

Program#1 (Counter-driven Loop): The first program sums up 12 numbers contained in memory locations x3100 through x310B. The algorithm for it is described in Figure 5.12. The program itself is provided in Figure 5.13. Note that the program is not complete (what is missing?). First, study the program carefully. Better yet, given the algorithm, try to write your own.

Once you have the program on paper, implement it in the LC-3 Simulator. Run the program using the two data sets. Provide the final snapshots showing the results of addition.

Program#2 (Sentinel Controlled Loop): The first program used a counter to count the number of integers to be added. In the second version, you will use a sentinel value to indicate the end of input. This is discussed in Section 5.4.2. Both the algorithm and a base program is presented in Figures 5.14 and 5.15. First, study the program carefully. Better yet, given the algorithm, try to write your own.

Once you have the program on paper, implement it in the LC-3 Simulator. Run the program using the two data sets. Use -1 as the sentinel value. Provide the final snapshots showing the results of addition.

What to hand-in:

1. A pdf containing the snapshots of four programs after each of them have completed execution.

Assignment#3: Write a LC-3 machine language program to compute the minimum value stored in 10 memory locations.

Notes:

1. You will need to store 10 random values in consecutive memory locations. Store them starting from location x3030.
2. Leave the minimum value found in register R1.
3. Store your program starting from memory location x3000
4. Start by writing the program in pseudocode, choose registers for variables used in psuedocode. Encode the pseudocode in LC-3 instructions.

When completed, show a snapshot of the data in memory. And a snapshot of the program upon completion showing the minimum values in register R1. Submit via e-mail.

This assignment is due before start of class on Tuesday, April 13.