Machine Language Lab: Data Analysis

CSC 242 Lab 1
Handed Out: See calendar
Due Date: See calendar

Introduction: At the machine level, programs are sequences of bits that are interpreted by the computer to perform some computation. In this Machine Problem (MP) you will construct a LC-3 program at the machine level to determine some characteristics of a value stored in memory.

Specifics:

- Your assignment is to, first, determine if the value store in memory location x3030 is even or odd.
- You are to store x0001 in memory location x3031 if it is odd, x0000 if it is even.
- Next, your program will count the number of 1s in the value at memory location x3030 and store that count in memory location x3032.
- Your program can use the LC-3 register file and memory address space. You cannot overwrite the original value in memory location x3030.
- Your code must be well-commented. Follow the commenting style of the code examples provided in class and in the textbook.
- Your program must be written in LC-3 Machine Language and originate at x3000.

Example: The following is a snapshot of memory locations x3030 through x3032 after the calculations described above have been performed. The value at x3030 in an input and the values in x3031 and x3032 are outputs.

Testing: You should test your program thoroughly before handing in your final version. Developing a good testing methodology is essential for being a good programmer. For this assignment, you should run your program several times for different values in memory location x3030 (you can do this using the simulator) and checking the output by hand.

Tools: You will need to use the LC - 3 simulator, which can be downloaded from the student resources on the textbook website. Download the Windows version along with the manual and tools. You will use the LC-3 Editor to create your text files required for this and future Machine Language Labs.

How to turn in your program: Print out your source code solution with your name affixed. Bring it to class for in class check/grading.

Grading: 80% for correct values; 15% for commenting; 5% for technique