CEG 3310/5310 – Computer Organization

Lab 1 – Representations

Learning Objectives
- Understand how different data types are represented in binary
- Learn the interface of the LC3 simulator and editor

Overview
You will be given an assembly language program that loads and prints certain values from memory. Your task is to change the binary values in memory to represent different values and types, as described below.

The program you will be given (Lab1.asm) will behave as follows:

1. It will load the value found in memory at address x3500, and print it as a signed, 2's complement integer.
2. It will load the value found in memory at address x3501, and print it as an unsigned integer.
3. It will assume that there is a null-terminated string found in memory at address x3502. This string will be printed.
4. It will assume that there is a linked list starting at address x4000. The list nodes consist of two words. The first word is a signed 2's complement integer to be printed. The second word is a 16-bit pointer to the next list node. The list will be read, and each integer will be printed, until a null pointer is encountered.

As distributed, the program output will appear as follows:

```
Signed integer:  0
Unsigned integer: 0
String:
Linked list:
```

The Program
Load the binary program into the simulator as demonstrated in the lab. Change the values in memory so that the program output matches the target output, below. <u>For the unsigned integer, output the last 4 digits of your UID. Do not print "1234".</u> Do not change the program, only the data. In other words, *you may only change the values in memory at address x3500 and higher*. Demonstrate your modified program to the TA for credit or upload a screenshot to Pilot. Your program output should appear as follows:

```
Signed integer:  -23
Unsigned integer: 1234
String: Do not talk about fight club.
Linked list: -2, -4, -6, -8, -10
```

Grading
This lab is worth 5.00 points, distributed as follows:

Task	Points
Successfully modify the signed integer value	1.25
Successfully modify the unsigned integer value	1.25
Successfully modify the null-terminated string	1.25
Successfully modify the linked list	1.25
Total	5.00