CIS 350 – INFRASTRUCTURE TECHNOLOGIES

SMALL GROUP ACTIVITY #3

Names of group members: Brooklynn Taylor, Dylan Lasley, Jonathan McCarrick, Zoe Druen

Topic: Operation of the Computer, Assembler Language – The Little Man Computer (LMC)

Logistics

1. Get in touch with your group. (See Groups folder on Blackboard.)
2. Discuss and work **all** of the 2 assignments collectively with your group via E-mail, Discussion Forum, Blackboard Collaborate Ultra, and/or MS Teams. (Do not divide the work among group members.)
3. Choose a recorder to prepare the final copy (one per group) and submit it via the Blackboard Assignments/Small Group Activities folder.
4. Be sure all group members' names are on final copy. Do **not** add names of your group members who did not participate in the assignment or whose contribution was minimal.

Assignment One

Write the LMC program that reads in four numbers (one at a time) and places them in memory locations 25, 26, 27, 28 symbolically denoted by variables *a*, *b*, *c,* and *d*, respectively, in the C# like program segment below. The LMC program should subtract the second number from the first number and add the third number and the fourth number to the difference (*e:=a-b-c+d*). Next, the program should store the result in memory location 29, symbolically denoted by variable *e*, and print it out. Write the LMC instructions in the mnemonic form. Note that your LMC program will actually implement the following statements written in the C# pseudocode below. The LMC instructions start at address 00.

```
int a, b, c, d, e;
read a, b, c, d;
e:=a-b-c+d;
print e;
```

address	instruction
00	IN
01	STO 25
02	IN
03	STO 26
04	IN
05	STO 27
06	IN
07	STO 28
08	LDA 25
09	SUB 26
10	SUB 27
11	ADD 28
12	STO 29
13	OUT
14	HLT
….	
….	
….	
25	DAT
26	DAT
27	DAT
28	DAT
29	DAT

What addresses represent the program area and the data area, respectively?
Program area: __00-14_____ Data area: __25-29_____

Assignment Two

Write an LMC program (one program) that reads in two numbers, stores them in memory locations 40 and 41, finds the **larger** of the two numbers, stores the larger number in memory location 42, and outputs the larger number. (Note that the program will be similar, not the same, to the one that finds the positive difference of two numbers that we discussed in the lecture notes for Chapter 6 recorded on Panopto. Note that the LMC instructions start at address 00. You may trace in your memory or on paper the program execution for the two scenarios below:

scenario 1: you enter 5 and 7; and
scenario 2: you enter 7 and 5.

In both cases, your program should output 7.

Address	Instruction		Memory locations 40	41	42	Does your program returns 7? Circle Yes or No!
00	IN	Scenario 1	5	7	**7**	Yes/No
01	STO 40	Scenario 2	7	5	**7**	Yes/No
02	IN					
03	STO 41					
04	SUB 40					
05	BRP 08					
06	LDA 40					
07	BR 09					
08	LDA 41					
09	STO 42					
10	OUT					
11	HLT					
…						
…						

Address	
40	DAT
41	DAT
42	DAT

What range of addresses represents the program area? ___00-11_____

What range of the addresses represents the data area? ___40-42_____