Lab 1 **Practices with LMC**

(Report **Due BY: 2/26/2010, Friday**)

Your name:	Grade:

Important notice about this lab:

- After you have completed each of the lab projects, you must **show** the results to the instructor and ask him to **sign on** the completed project in the lab (**lab attendance is required**; lab hours/room will be announced in class/on course web).
- Print out source code for the projects and staple them together with this lab text (in the same order of the projects) and submit by the due time.
- Check the following link for LMC simulator: http://www.atkinson.yorku.ca/~sychen/research/LMC/LMCHome.html
- The following is the LMC Instruction Set (the Mnemonics are little different than those in the handouts given in the class). To use that LMC Simulator, you need to use the following mnemonics.

Instruction	Mnemonic	MachineCode
Load	LDA	5xx
Store	STA	3xx
Add	ADD	1xx
Subtract	SUB	2xx
Input	INP	901
Output	OUT	902
End	HLT	000
Branch if zero	BRZ	7xx
Branch if zero or positive	BRP	8xx
Branch always	BRA	6xx
Data storage	DAT	

1. (**25 points**)Test the following LMC code segment on LMC simulator and show the result to the instructor.

```
INP
STA FIRST
INP
STA SECOND
SUB FIRST
BRP SECONDBIG
LDA FIRST
OUT
BRA PROGRAMEND
SECONDBIG LDA SECOND
OUT
PROGRAMEND HLT
FIRST DAT
SECOND DAT
```

2. (**35 points**)The following LMC program (in a different version from the LMC simulator, the program is stored on LMC memory with the starting address of 00) is supposed to add two inputs numbers, subtract a third input number from the sum, and output the result, i.e., ***Output = n1 + n2 – n3***

```
IN
STO 99
IN
ADD 99
STO 99
IN
SUB 99
OUT
COB
```

   a. Test this program on LMC simulator (you may have to do necessary changes on some instruction code).
   b. What is wrong with this program?
   c. Modify the program so that it produces the correct result.
   d. Show the result to the instructor.

3. (**40 points**) Write a LMC program that adds a column of input values and produces the sum as output. The first input value will contain the number of values that follow as input to be added.

4. (**Bonus 30 points**) Write a LMC program that accepts 3 values as input and outputs them in order of size, largest to smallest.