# Lab 1

(Report **Due date: 10/6/2009, Tuesday, in class**)

(*******Lab attendance is REQUIRED* on Thursday, 10/1/2009******)

| Your name: | Grade: |
|---|---|
|  |  |

**Important notice** about this lab:
- The lab consists of two different portions:
  - On-line searches/researches for the preparation for your "Writing and Presentation Assignment" (see the course syllabus)
  - Practices with LMC.
- This lab will constitute 7% of your final grade, thus fulfilling 70% of your "Writing and Presentation Assignment" workload.
- There is a bonus which will be added to your final grade.
- Lab report and lab attendances are required for full credits.

**Part one: On-line searches/researches (50 points):**
- Find 3 articles/papers in the area of Computer Science/Engineering through one of the following links:
  - http://www.salemstate.edu/library/3826.php
  - http://cs.salemstate.edu/~b_yi/ (Under "Pointers", on the last line, there are a few links)
  - (You *are required to find papers/articles through these links*! And you will need to use Internet connections from the Campus!!—from the lab.)
  - (You may use the following key words/phrases to narrow your searching for journals, magazines, paper titles: Interactions, HCI (or CHI), Programming, Programming Languages, Graphics, Computer Graphics, Games, Interacting, Multimedia, Communications, Internet, Network, Robotics, Visual, Embedded, Computer Vision, Software,….)
- Submission: for each of the paper, you need to provide:
  - Its journal/magazine title, volume/issue number, publication date,
  - The author(s)'s names, and
  - Brief description of the paper *in your own words* in one paragraph (3 lines to half a page).

**Part two: Practices with LMC (50 points):**

- 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 | |

- (**20 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
```

- (**30 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**

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

**Part three: Practices with LMC (BONUS):**

- (**35 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.

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

- (Show the results to the instructor and submit your LMC code in your lab report).