

CS270 Programming Assignment 3

“LC3 Assembly Programming”

Program due Monday, March 26, 2011 (via Checkin by 4:59pm)
Revised 03/19/2011

Goals

In this assignment, you will write three LC-3 assembly programs. The goals are:

- Learn how to write a non-trivial LC-3 program, and
- Expand your understanding of the LC-3 architecture and tools.

You will need to use the LC3 tool-chain to complete the assignment. Details can be found at <http://www.cs.colostate.edu/~fsieker/misc/cs270.html> as discussed in Recitation 7.

The Assignment

You are given the sample assembly code in file hello.asm. The assembly program prints “HELLO WORLD”.

Contents of hello.asm

```
;
;
; Example assembly program, prints hello world
;
;         .ORIG      x3000
;
; Branch to the start
;
;         BR START
;
; Define all labels and variables here
;
MESSAGE .STRINGZ "HELLO WORLD"
;
; main program
;
START   LEA R0,MESSAGE
        PUTS
        HALT
        .END
```

There are three parts of this programming assignment. You are required to submit separate file for each part.

PART 1: Modify the given program. (25 points)

Modify given hello.asm program to print “HELLO CS270” in place of “HELLO WORLD”. Save your source file as ‘part1.asm’.

PART 2: Conditional print using the value of Register R4. (35 points)

Modify the above program to test the value of register R4. If the value of register R4 is non-zero, print “GOODBYE CS270”, otherwise print “HELLO CS270”. Save your source file as ‘part2.asm’.

PART 3: Read character using the TRAP GETC instruction. (35 points)

Modify the above program to read a character from user. If user enters an “A” the program should print the string “TRAP CS270”, otherwise print “HELLO CS270”. Save your source file as ‘part3.asm’.

Submission Instructions (5 points)

Create a directory called PA3 to store the assembly files. Submit a tar.gz file generated from the following command (assuming you are running this command from inside PA3 directory):

```
$ cd ../; tar -czvf PA3.tar.gz PA3
```

Do not submit the assignment with lc3tools inside PA3. There should be only three files in your PA3, namely, part1.asm, part2.asm and part3.asm. All the prints must be exactly as stated above. They are all uppercase print with exactly 2 words.

Grading Criteria

Points will be awarded as follows:

- Part 1: 25 points
- Part 2: 35 points
- Part 3: 35 points
- Following submission instructions: 5 points
- Extra credit Use as little memory as possible for your program (this includes code as well as data): 5 points.

Late Policy

This assignment will be accepted up to 48 hours past the due date with a 10% deduction for every 24 hour delay. This assignment will not be accepted past this period. If you were unable to submit via Checkin for any reason, contact us via email and we may be able to help. **DO NOT SUBMIT YOUR ASSIGNMENT VIA EMAIL.**