

CS270 Recitation 7

“LC-3 Assembler and Simulator”

Goals

To understand how to use the LC-3 assembler and simulator. You will assemble, run, debug, and modify your first LC-3 assembly code program for this recitation.

The Assignment

Bring up a terminal. Make a subdirectory called R7 for the recitation assignment; all files should reside in this subdirectory. Copy the sample file into your R7 directory and bring it up in your editor. The program is a simple example of assembly code and prints “HELLO WORLD”. Inspect the program to see what it does.

```
$ mkdir R7
$ cd R7
$ cp ~cs270/public_html/CurrentSemester/Recitations/R7/hello.asm .
$ <yourFavoriteEditor> 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
```

Run the LC-3 assembler to build your assembly file into object (.obj) and symbol (.sym) files, using the following command. (Your current directory is R7):

```
$ ~cs270/lc3tools/lc3as hello.asm
$ ls hello.*
hello.asm hello.obj hello.sym
```

LC3 tool setup – the following link has the instructions to setup path for lc3 tools used in the class:
<http://www.cs.colostate.edu/~fsieker/misc/cs270.html>

Part 1: Debugging Assembly Code

Run the LC-3 simulator to debug and run the assembly program (Your current directory is R7):

```
$ ~cs270/lc3tools/lc3sim-tk &
```

Load the assembly program by selecting the browse button and loading hello.obj.

DEBUGGING

STEP the program to watch it load the memory values, going through the loop. When does it print the character H? Try to go through the debugger and understand the function of each button.

Part 2: Modify Assembly Code

Modify the given hello.asm file to print the following in place of “HELLO WORLD”:

```
“HELLO <YOUR_NAME>”
```

Show the output to the TA. Step through the code and see what is happening.

Part 3: PA3

Lets discuss requirements of PA3. You are given the hello.asm code as discussed above.