

CSCI 240 - Computer Organization and Assembly Language Programming

Homework 7 - Assembly Language

Problem 3. What is the problem associated with using the symbol AND as a label?

Problem 5. What does the following program do? What value will be contained in RESULT after the program runs to completion?

```

.ORIG x3000
LD    R2, ZERO
LD    R0, M0
LD    R1, M1
LOOP  BRz DONE
ADD   R2, R2, R0
ADD   R1, R1, #-1
BR    LOOP
DONE  ST R2, RESULT
HALT

RESULT .FILL x0000
ZERO   .FILL x0000
M0     .FILL x0004
M1     .FILL x0803
.END

```

Problem 7. Write an LC-3 assembly language program that counts the number of 1s in the value stored in R0 and store the result into R1. For example, if R0 contains 0001 0011 0111 0000 then after the program executes, the result stored in R1 would be 0000 0000 0000 0110.

Problem 8. An engineer is in the process of debugging a program she has written. She is looking at the following segment of the program, and decides to place a breakpoint in memory at location 0xA404. Starting with the PC = 0xA400, she initializes all the registers to zero and runs the program until the breakpoint is encountered.

```

0xA400 THIS1 LEA    R0, THIS1
0xA401 THIS2 LD     R1, THIS2
0xA402 THIS3 LDI    R2, THIS5
0xA403 THIS4 LDR    R3, R0, #2
0xA404 THIS5 .FILL 0XA400

```

Show the contents of the register file (in hexadecimal) when the breakpoint is encountered.

Problem 9. What is the purpose of the .END pseudo-op? How does it differ from the HALT instruction?

Problem 10. The following program has an error in it. Identify the error and explain how to fix it

```

ADD   R3, R3, #10
ST    R3, A
HALT

A     .FILL #10

```

Will this error be detected when this code is assembled or when this code is run on the LC-3?