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CSE 313

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Homework #3

**Chapter (7):**

**7.4** Create the symbol table entries generated by the assembler when translating the following routine into machine code:

.ORIG x301C

ST R3, SAVE3

ST R2, SAVE2

AND R2, R2, #0

TEST IN

BRz TEST

ADD R1, R0, #-10

BRn FINISH

ADD R1, R0, #-15

NOT R1, R1

BRn FINISH

HALT

FINISH ADD R2, R2, #1

HALT

SAVE3 .FILL x0000

SAVE2 .FILL x0000

.END

**7.9** What is the purpose of the .END pseudo-op? How does it differ from the

HALT instruction?

**Chapter (8):**

**8.5** What is the purpose of bit [15] in the KBSR?

**8.10** What problem could occur if the display hardware does not check the DSR

before writing to the DDR?

**Chapter (9):**

**9.2 a.** How many trap service routines can be implemented in the LC-3? Why?

**9.2 b.** Why must a RET instruction be used to return from a TRAP routine?

Why won’t a BR (Unconditional Branch) instruction work instead?

**9.2 c.** How many accesses to memory are made during the processing of a TRAP

instruction? Assume the TRAP is already in the IR.

**9.16** The two code sequences *a* and *b* are assembled separately. There is one

error that will be caught at assemble time or at link time. Identify and

describe why the bug will cause an error, and whether it will be detected

at assemble time or link time.

.ORIG x3200

SQRT ADD R0, R0, #0

; code to perform square

*a.* ; root function and

; return the result in R0

RET

.END

.EXTERNAL SQRT

.ORIG x3000

LD R0, VALUE

JSR SQRT

*b.* ST R0, DEST

HALT

VALUE .FILL x30000

DEST .FILL x0025

.END

**Chapter (10):**

**10.1** What are the defining characteristics of a stack?

**10.8** The following operations are performed on a stack:

PUSH A, PUSH B, POP, PUSH C, PUSH D, POP, PUSH E, POP, POP,

PUSH F

1. What does the stack contain after the PUSH F?
2. At which point does the stack contain the most elements?

Without removing the elements left on the stack from the previous operations, we perform:

PUSH G, PUSH H, PUSH I, PUSH J, POP, PUSH K, POP, POP, POP, PUSH L, POP, POP, PUSH M

1. What does the stack contain now?