**CSCI240 – Computer Organization and Assembly Language Programming**

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**Assignment:** Homework 7: Assembly Language

**3.** AND is one of the opcodes specified by the ISA, so using it as a label would cause the assembler to recognize it as an opcode, causing an error.

**5.** This program multiplies two numbers together. Specifically, it takes the number at label M1 and adds it to itself the amount of times in label M0. Therefore, the number in RESULT will be x200C (x0803 \* x0004)

**7.**

**8.** R0: xA400 >> xA400 THIS1 LEA R0 THIS1 loads R0 with the address of THIS1, which is xA400

R1: x23FF >> xA401 THIS2 LD R1 THIS2 loads R1 with the contents of THIS2, 0010001111111111 or x23FF

R2: xE1FF >> xA402 THIS3 LDI R2 THIS5 loads R2 with THIS5, which is xA400. The value in xA4000 is 1110000111111111 or xE1FF

R3: xA402 >> xA403 THIS4 LDR R3 R0 2 loads R3 with the value of R0 + 2

R4: x0000 >> Registers R4 – R7 are unused in this program

R5: x0000

R6: x0000

R7: x0000

**9.** The .END pseudo-op is used to tell the LC-3 assembler where the end of the program is. It differs from the HALT instruction in that it does not actually stop the program when it’s running, and it is not an actual LC-3 instruction.

**10.** Question 10 in the book has the instruction ADD R3, R3, #30, but the PDF on Canvas has the instruction ADD R3, R3, #10.

The error in this code is in the instruction ADD R3, R3, #30, which uses an immediate value too large for the 5-bit limit of that instruction. This error is detected by the LC-3 assembler.