

Introduction to Computing: Program 0

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Due date: Monday 10/13/2025 at 11:59PM

Objective

The purpose of this assignment is to write a program in LC-3 assembly language to exercise these five basic operations: LD, ST, NOT, AND and ADD, and these pseudo-ops: .ORIG, .END, .FILL, and .BLKW.

Details

You are given three inputs A, B and C stored respectively at addresses, x30F0, x30F1 and x30F2. Your job is to perform the following operations and store the results at address specified:

1. $X = A \text{ OR } B$ (store X at x30F4)
2. $Y = A \text{ XOR } B$ (store Y at x30F5)
3. $Z = \text{NOT}(A \text{ OR } B \text{ OR } C)$ (store Z at x30F6)
4. $W = \text{NOT}(A) \text{ AND } \text{NOT}(B) \text{ AND } \text{NOT}(C)$ (store W at x30F7)
5. $\text{Sum} = A + B + C$ (store Sum at x30F8)
6. $\text{Diff} = A - B - C$ (store Diff at x30F9)

Notes:

Test your solution to make sure it works for different values of A, B and C.

Examples: These are just examples and not exhaustive.

- A: M[x30F0]=x0001; B: M[x30F1]=x0001; C: M[x30F2]=x0001
 - o X: M[x30F4] = x0001
 - o Y: M[x30F5] = x0000
 - o Z: M[x30F6] = xFFFE
 - o W: M[x30F7] = xFFFE
 - o Sum: M[x30F8] = x0003
 - o Diff: M[x30F9] = xFFFF (-1)
- A: M[x30F0]=x00AA; B: M[x30F1]=x0055; C: M[x30F2]=x0022
 - o X: M[x30F4] = x00FF
 - o Y: M[x30F5] = x00FF
 - o Z: M[x30F6] = xFF00
 - o W: M[x30F7] = xFF00
 - o Sum: M[x30F8] = x0121
 - o Diff: M[x30F9] = x0033
- A: M[x30F0]=x0ABC; B: M[x30F1]=xDEF0; C: M[x30F2]=x1234
 - o X: M[x30F4] = xDEFC
 - o Y: M[x30F5] = xD44C
 - o Z: M[x30F6] = x2103
 - o W: M[x30F7] = x2103

- o Sum: $M[x30F8] = xFBE0$
- o Diff: $M[x30F9] = x1998$

Specifics:

- A starter program (Program0.asm) is given to you with the two .ORIG statements and two example test cases.
- Do not change the the .ORIG statement
- Keep the Barrier and do not change the .BLKW statements

Submission Instructions

- You must do the programming assignment by yourself. You are permitted to get help from ONLY the TAs and the instructor.
- The file you submit should be a LC-3 assembly language file named **Program0.asm**. This is the **only** file you need to submit. Programs named incorrectly or otherwise improperly submitted will receive point penalties.