

Lab 6b: LC-3 Executor

Write a program to execute LC-3 binary code.

Implementation Details

- You are required to write in **C** or any other high level programming language.

Instructions

The instructions you need to implement is listed in the following table.

	..00	..01	..10	..11
00..	BR	ADD	LD	ST
01..	JSR	AND	LDR	STR
10..	RTI	NOT	LDI	STI
11..	JMP	1101	LEA	TRAP*

- You can refer to the state machine in Figure C.2 on page 702 and the data path in Figure C.3 on page 704.
- Trap routines, interrupts, exceptions are not required.
 - The instructions RTI, 1101 are not required.
 - Privilege mode is not required. ACV is not detected by your executor.
 - The only TRAP instruction you need to implement is HALT. When HALT is executed, your executor should stop and exit.

Executing

- The default values of all registers and memory locations are x7777.
- After the executor halts, print the value of all registers.
 - When HALT is executed by your program, the value of R0, R1, R6, R7 should remain unchanged.

Input

The LC-3 binary code is input from *stdin*. It only contains 0, 1, and newline characters.

Sample 1

```
0011000000000000
1111000000100101
```

Sample 2

```
0011000000000000
0010000000001000
0101010010100000
0001011000000000
0001100011000011
0101001011000100
0101001001000000
0000010000000001
0001010010100001
1111000000100101
0001001000110100
```

- The first line is the starting address of the program.

Output

Print the results to *stdout*.

Sample 1

```
R0 = x7777
R1 = x7777
R2 = x7777
R3 = x7777
R4 = x7777
R5 = x7777
R6 = x7777
R7 = x7777
```

Sample 2

```
R0 = x1234
R1 = x0000
R2 = x0000
R3 = x2468
R4 = x48D0
R5 = x7777
R6 = x7777
R7 = x7777
```

- Print the result by `R%d = x%04X\n`. That is:
 - There are space characters between `=`.
 - The hexadecimal number should use capital letters.