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CMSC 311 Computer Organization
LAB 3: Machine Language programming Using LC-3 Simulator
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SOURCE CODE:

```
0011 000000000000; Start the program at location x3000
0101 001 001 1 00000; Clear register 1
0010 101 000011100; Assign R5 to memory location x301E
0010 110 000011100; Assign R6 to memory location x301F
1001  110  110 111111; reverse the sign of value in R6
0001  110 110 1 00 001; get the value in R6, add 1 and put it back into R3 for comparison
0001 100 101 000 110; Add R5 and R6 and put the value into R4
0000 101000000001;  If the above step (R4) is zero then continue, otherwise skip the next step and
leave R1 as 0
0001 001001100001; Add 1 into R1 (show the result as equal .i.e. 1)
1111 000000100101; HALT
```

LC3 Simulator - tes2.obj

File   Execute   Simulate   Help

Jump to: x3000

R0	x0000	0	R4	x0000	0	PC	x3008	12296
R1	x0001	1	R5	x1234	4660	IR	x1261	4705
R2	x0000	0	R6	xEDCC	-4660	PSR	x8001	-32767
R3	x0000	0	R7	x0000	0	CC	P	

x3000	0101001001100000	x5260		AND	R1, R1, #0
x3001	0010101000011100	x2A1C		LD	R5, x301E
x3002	0010110000011100	x2C1C		LD	R6, x301F
x3003	1001110110111111	x9DBF		NOT	R6, R6
x3004	0001110110100001	x1DA1		ADD	R6, R6, #1
x3005	0001100101000110	x1946		ADD	R4, R5, R6
x3006	0000101000000001	x0A01		BRNP	x3008
x3007	0001001001100001	x1261		ADD	R1, R1, #1
x3008	1111000000100101	xF025		TRAP	HALT
x3009	0000000000000000	x0000		NOP	
x300A	0000000000000000	x0000		NOP	
x300B	0000000000000000	x0000		NOP	
x300C	0000000000000000	x0000		NOP	
x300D	0000000000000000	x0000		NOP	
x300E	0000000000000000	x0000		NOP	
x300F	0000000000000000	x0000		NOP	
x3010	0000000000000000	x0000		NOP	
x3011	0000000000000000	x0000		NOP	
x3012	0000000000000000	x0000		NOP	
x3013	0000000000000000	x0000		NOP	
x3014	0000000000000000	x0000		NOP	
x3015	0000000000000000	x0000		NOP	
x3016	0000000000000000	x0000		NOP	
x3017	0000000000000000	x0000		NOP	
x3018	0000000000000000	x0000		NOP	
x3019	0000000000000000	x0000		NOP	
x301A	0000000000000000	x0000		NOP	
x301B	0000000000000000	x0000		NOP	
x301C	0000000000000000	x0000		NOP	
x301D	0000000000000000	x0000		NOP	
x301E	0001001000110100	x1234		ADD	R1, R0, #-12
x301F	0001001000110100	x1234		ADD	R1, R0, #-12

tes2.obj   8 instructions executed   Idle

VALUE IN BOTH STORING LOCATION is x1234

File   Execute   Simulate   Help

Jump to: x3000

R0	x0000	0	R4	x0005	5	PC	x3008	12296
R1	x0000	0	R5	x1239	4665	IR	x0A01	2561
R2	x0000	0	R6	xEDCC	-4660	PSR	x8001	-32767
R3	x0000	0	R7	x0000	0	CC	P	

x3000	0101001001100000	x5260	AND	R1, R1, #0
x3001	0010101000011100	x2A1C	LD	R5, x301E
x3002	0010110000011100	x2C1C	LD	R6, x301F
x3003	1001110110111111	x9DBF	NOT	R6, R6
x3004	0001110110100001	x1DA1	ADD	R6, R6, #1
x3005	0001100101000110	x1946	ADD	R4, R5, R6
x3006	0000101000000001	x0A01	BRNP	x3008
x3007	0001001001100001	x1261	ADD	R1, R1, #1
x3008	1111000000100101	xF025	TRAP	HALT
x3009	0000000000000000	x0000	NOP	
x300A	0000000000000000	x0000	NOP	
x300B	0000000000000000	x0000	NOP	
x300C	0000000000000000	x0000	NOP	
x300D	0000000000000000	x0000	NOP	
x300E	0000000000000000	x0000	NOP	
x300F	0000000000000000	x0000	NOP	
x3010	0000000000000000	x0000	NOP	
x3011	0000000000000000	x0000	NOP	
x3012	0000000000000000	x0000	NOP	
x3013	0000000000000000	x0000	NOP	
x3014	0000000000000000	x0000	NOP	
x3015	0000000000000000	x0000	NOP	
x3016	0000000000000000	x0000	NOP	
x3017	0000000000000000	x0000	NOP	
x3018	0000000000000000	x0000	NOP	
x3019	0000000000000000	x0000	NOP	
x301A	0000000000000000	x0000	NOP	
x301B	0000000000000000	x0000	NOP	
x301C	0000000000000000	x0000	NOP	
x301D	0000000000000000	x0000	NOP	
x301E	0001001000111001	x1239	ADD	R1, R0, #-7
x301F	0001001000110100	x1234	ADD	R1, R0, #-12

tes2.obj   15 instructions executed   Idle

File   Execute   Simulate   Help

Jump to: x3000 ▼

```
R0    x0000   0        R4   x0000   0        PC   x3008   12296
R1    x0001   1        R5   x1239   4665     IR   x1261   4705
R2    x0000   0        R6   xEDC7   -4665    PSR  x8001   -32767
R3    x0000   0        R7   x0000   0        CC   P
```

	Address	Binary	Hex		Instruction
	x3000	0101001001100000	x5260	AND	R1, R1, #0
	x3001	0010101000011100	x2A1C	LD	R5, x301E
	x3002	0010110000011100	x2C1C	LD	R6, x301F
	x3003	1001110110111111	x9DBF	NOT	R6, R6
	x3004	0001110110100001	x1DA1	ADD	R6, R6, #1
	x3005	0001100101000110	x1946	ADD	R4, R5, R6
	x3006	0000101000000001	x0A01	BRNP	x3008
	x3007	0001001001100001	x1261	ADD	R1, R1, #1
●	x3008	1111000000100101	xF025	TRAP	HALT
	x3009	0000000000000000	x0000	NOP	
	x300A	0000000000000000	x0000	NOP	
	x300B	0000000000000000	x0000	NOP	
	x300C	0000000000000000	x0000	NOP	
	x300D	0000000000000000	x0000	NOP	
	x300E	0000000000000000	x0000	NOP	
	x300F	0000000000000000	x0000	NOP	
	x3010	0000000000000000	x0000	NOP	
	x3011	0000000000000000	x0000	NOP	
	x3012	0000000000000000	x0000	NOP	
	x3013	0000000000000000	x0000	NOP	
	x3014	0000000000000000	x0000	NOP	
	x3015	0000000000000000	x0000	NOP	
	x3016	0000000000000000	x0000	NOP	
	x3017	0000000000000000	x0000	NOP	
	x3018	0000000000000000	x0000	NOP	
	x3019	0000000000000000	x0000	NOP	
	x301A	0000000000000000	x0000	NOP	
	x301B	0000000000000000	x0000	NOP	
	x301C	0000000000000000	x0000	NOP	
	x301D	0000000000000000	x0000	NOP	
	x301E	0001001000111001	x1239	ADD	R1, R0, #-7
	x301F	0001001000111001	x1239	ADD	R1, R0, #-7

tes2.obj | 30 instructions executed | Idle