

Assignment 2

divide.bin photo

```
1 0011000000000000 ; Start at x3000
2 1010 011 000001110 ; Loading R3 with the address that holds x4000 (Current Address x3000)
3 1010 100 000001110 ; Loading R4 with the address that holds x4001 (Current Address x3001)
4 0101 110 110 1 00000 ; Assigning 0 to R6 (Current Address x3002)
5 1001 100 100 111111 ; Not R4 to be used in the subtraction (Current Address x3003)
6 0001 100 100 1 00001; R4 2's Complement needed for the subtraction (Current Address x3004)
7 0001 011 011 0 00 100 ; R3 <- R3-R4 (now R3 + (-R4)) (Current Address x3005)
8 0000 100 000000010; Break to address x3009 if R3 < 0 (negative) (Current Address x3006)
9 0001 110 110 1 00001 ; R6 <- R6+1 (Current Address x3007)
10 0000 001 111111100 ; Break to Address x3004 where we get the 2's complement for R4 (Current Address x3008)
11 0001 100 100 1 11111 ; Add -1 to R4 (will get R4 back to the way it was before doing the step in x3005) (Current Address x3009)
12 1001 100 100 111111 ; Not R4 to return it to the way it was before doing changing it for the step at x3005 (Current Address x300A)
13 0001 011 011 0 00 100; R3 <- R3+R4 (Current Address x300B)
14 1011 110 000000100; Store R6 indirectly in x5000 (Current Address x300C)
15 1011 110 000000100; Store R3 indirectly in x5001 (Current Address x300D)
16 1111 0000 00011001; HALT
17 0100000000000000 ; x4000
18 0100000000000001 ; x4001
19 0101000000000000 ; x5000
20 0101000000000001 ; x5001
21 |
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divide.bin text

0011000000000000 ; Start at x3000

1010 011 000001110 ; Loading R3 with the address that holds x4000 (Current Address x3000)

1010 100 000001110 ; Loading R4 with the address that holds x4001 (Current Address x3001)

0101 110 110 1 00000 ; Assigning 0 to R6 (Current Address x3002)

1001 100 100 111111; Not R4 to be used in the subtraction (Current Address x3003)

0001 100 100 1 00001; R4 2's Complement needed for the subtraction (Current Address x3004)

0001 011 011 0 00 100 ; R3 <- R3-R4 (now R3 + (-R4)) (Current Address x3005)

0000 100 000000010; Break to address x3009 if R3 < 0 (negative) (Current Address x3006)

0001 110 110 1 00001 ; R6 <- R6+1 (Current Address x3007)

0000 001 111111100 ; Break to Address x3004 where we get the 2's complement for R4 (Current Address x3008)

0001 100 100 1 11111 ; Add -1 to R4 (will get R4 back to the way it was before doing the step in x3005) (Current Address x3009)

1001 100 100 111111 ; Not R4 to return it to the way it was before doing changing it for the step at x3005 (Current Address x300A)

0001 011 011 0 00 100; R3 <- R3+R4 (Current Address x300B)

1011 110 000000100; Store R6 indirectly in x5000 (Current Address x300C)

1011 110 000000100; Store R3 indirectly in x5001 (Current Address x300D)

1111 0000 00011001; HALT

0100000000000000 ; x4000

0100000000000001 ; x4001

0101000000000000 ; x5000

0101000000000001 ; x5001

Registers when quotient is 0

▶	x4000	x0000	0
▶	x4001	x0190	400

LC3Tools v2.0.1

Application Edit View

LC3Tools

Registers

R0	x0000	0
R1	x0000	0
R2	x0000	0
R3	x0000	0
R4	x0190	400
R5	x0000	0
R6	x0000	0
R7	x0000	0
PSR	x8002	32770 CC: Z
PC	x300E	12302
MCR	x0000	0

Console (click to focus)

Memory

▶	x3000	xA60E	42510	1010011000001110
▶	x3001	xA80E	43022	1010100000001110
▶	x3002	x5DA0	23968	0101110110100000
▶	x3003	x993F	39231	1001100100111111
▶	x3004	x1921	6433	0001100100100001
▶	x3005	x16C4	5828	0001011011000100
▶	x3006	x0802	2050	0000100000000010
▶	x3007	x1DA1	7585	0001101101000001
▶	x3008	x03FC	1020	0000001111111100
▶	x3009	x193F	6463	0001100100111111
▶	x300A	x993F	39231	1001100100111111
▶	x300B	x16C4	5828	0001011011000100
▶	x300C	xBC04	48132	1011110000000100
▶	x300D	xBC04	48132	1011110000000100
▶	x300E	xF019	61465	1111000000011001
▶	x300F	x4000	16384	0100000000000000
▶	x3010	x4001	16385	0100000000000001
▶	x3011	x5000	20480	0101000000000000
▶	x3012	x5001	20481	0101000000000001
▶	x3013	x0000	0	
▶	x3014	x0000	0	
▶	x3015	x0000	0	
▶	x3016	x0000	0	
▶	x3017	x0000	0	

PC ← ← → →

x4000

12:01 AM

Registers when remainder is 0

!	▶	x4000	x0032	50
!	▶	x4001	x0005	5

The screenshot shows the LC3Tools v2.0.1 application interface. It features a sidebar with navigation icons, a main window with three panels: Registers, Memory, and Console.

Registers Panel:

Register	Address	Value
R0	x0000	0
R1	x0000	0
R2	x0000	0
R3	x0000	0
R4	x0005	5
R5	x0000	0
R6	x000A	10
R7	x0000	0
PSR	x8002	32770 CC: Z
PC	x300E	12302
MCR	x0000	0

Memory Panel:

Address	Hex Value	Decimal Value	Binary Value
x3000	xA60E	42510	1010011000001110
x3001	xA80E	43022	1010100000001110
x3002	x5DA0	23968	0101110110100000
x3003	x993F	39231	1001100100111111
x3004	x1921	6433	0001100100100001
x3005	x16C4	5828	0001011011000100
x3006	x0802	2050	0000100000000010
x3007	x1DA1	7585	0001101101000001
x3008	x03FC	1020	0000001111111100
x3009	x193F	6463	0001100100111111
x300A	x993F	39231	1001100100111111
x300B	x16C4	5828	0001011011000100
x300C	xB0C4	48132	1011110000000100
x300D	xB0C4	48132	1011110000000100
x300E	xF019	61465	1111000000011001
x300F	x4000	16384	0100000000000000
x3010	x4001	16385	0100000000000001
x3011	x5000	20480	0101000000000000
x3012	x5001	20481	0101000000000001
x3013	x0000	0	
x3014	x0000	0	
x3015	x0000	0	
x3016	x0000	0	
x3017	x0000	0	

Console Panel:

```
warning: 257: Skipping 'Updating Keyboard' scheduled for 250
warning: 257: Skipping 'Updating Display' scheduled for 250
warning: 257: Skipping 'No interrupt of higher priority
pending' scheduled for 251
□
```

The bottom status bar shows the PC register value as x4000 and navigation arrows.

Registers when the remainder is positive

!	▶	x4000	x0190	400
!	▶	x4001	x015E	350

LC3Tools v2.0.1

Application Edit View

LC3Tools

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Registers

R0	x0000	0
R1	x0000	0
R2	x0000	0
R3	x0032	50
R4	x015E	350
R5	x0000	0
R6	x0001	1
R7	x0000	0
PSR	x8001	32769 CC: P
PC	x300E	12302
MCR	x0000	0

Console (click to focus)

warning: 257: Skipping 'Updating Keyboard' scheduled for 250

warning: 257: Skipping 'Updating Display' scheduled for 250

warning: 257: Skipping 'No interrupt of higher priority pending' scheduled for 251

warning: 1297: Skipping 'Updating Keyboard' scheduled for 1290

warning: 1297: Skipping 'Updating Display' scheduled for 1290

warning: 1297: Skipping 'No interrupt of higher priority pending' scheduled for 1291

Memory

▶ x3000	xA60E	42510	1010011000001110
▶ x3001	xA80E	43022	1010100000001110
▶ x3002	x5DA0	23968	0101101101000000
▶ x3003	x993F	39231	1001100100111111
▶ x3004	x1921	6433	0001100100100001
▶ x3005	x16C4	5828	0001011011000100
▶ x3006	x0802	2050	0000100000000010
▶ x3007	x1DA1	7585	0001110110100001
▶ x3008	x03FC	1020	0000001111111100
▶ x3009	x193F	6463	0001100100111111
▶ x300A	x993F	39231	1001100100111111
▶ x300B	x16C4	5828	0001011011000100
▶ x300C	xB0C4	48132	1011110000000100
▶ x300D	xB0C4	48132	1011110000000100
▶ x300E	xF019	61465	1111000000011001
▶ x300F	x4000	16384	0100000000000000
▶ x3010	x4001	16385	0100000000000001
▶ x3011	x5000	20480	0101000000000000
▶ x3012	x5001	20481	0101000000000001
▶ x3013	x0000	0	
▶ x3014	x0000	0	
▶ x3015	x0000	0	
▶ x3016	x0000	0	
▶ x3017	x0000	0	

x4000

PC ← ← → →

12:05 AM