

# Week 7 Lab

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7.1.1.

| 0x00000065 This value is displayed because we are changing the value to hexadecimal (from decimal)

7.1.2.

0x00000101 This value is displayed because we are changing the value to hexadecimal

7.1.3.

0x00000005 This value is displayed because we are changing the value to hexadecimal (from binary)

7.1.4.

No, it will not change. But the data inside the memory box will change.

7.2.1.

Because 4 bytes are used to represent each word.

7.3.1.

The screenshot displays the ARMLite Simulator V1.2 interface, which is divided into three main sections: Program, Processor, and Memory.

- Program:** This panel shows a list of assembly instructions. The first instruction is `MOV R1, #.PixelScreen`. The program is currently at instruction 19, which is `BLT randLoop`. The program counter (PC) is 0x00000000.
- Processor:** This panel shows the current state of the processor. The PC is 0x00000000. The status bits are 117 CV 0000. The current instruction is `BLT randLoop`. The processor is currently executing instruction 19.
- Memory:** This panel shows the memory contents. The memory is currently at address 0x00000000. The memory contains a large number of zero values (0x00000000).

The interface also includes a Count display showing 221813961, a Current Instruction display, and an Input/Output display. The ARMLite Simulator V1.2 logo and copyright information (© Peter Higginson 2020) are visible in the bottom right corner.

7.3.2.

The thing that shows up is the place that store the memory/value

7.3.3:

- The blank lines and additional spaces will not be stored in the memory

- The comments will be coloured after the code is submitted.
- The line number, if the comment is added, will increase. Otherwise, will stay the same.
- If we replace the comma in the first line of code, an error will be displayed.

7.4.1.

Red: Next step

Black: Slow

7.4.2.

Increase the line being executed.

7.4.3.

The code before the break line will be executed.

7.5.1.

The MOV command is moving 1 into R0, then, ADD command is used to plus 8 with R0(1) and pass the value 9 (8+1) to R1

When the SUB command is executed, R2(109) minus 25 and pass the value to R3

The value 84, which we are looking for is R3

7.5.2.

| Program |                |     |         |
|---------|----------------|-----|---------|
| 1       | MOV R0,#1      | PC  | 36      |
| 2       | ADD R1,R0,#8   | LR  | 32      |
| 3       | ADD R2,R1,#100 | SP  | 1048576 |
| 4       | SUB R3,R2,#25  | R12 | 0       |
| 5       | HALT           | R11 | 0       |
|         |                | R10 | 0       |
|         |                | R9  | 0       |
|         |                | R8  | 0       |
|         |                | R7  | 0       |
|         |                | R6  | 0       |
|         |                | R5  | 0       |
|         |                | R4  | 0       |
|         |                | R3  | 84      |
|         |                | R2  | 109     |
|         |                | R1  | 9       |
|         |                | R0  | 1       |

7.5.3.

1

MOV R0,#300

2

SUB R1,R0,#21

3

ADD R2,R1,#5

4

SUB R3,R2,#64

5

SUB R4,R3,#18

6

ADD R5,R4,#92

7

MOV R7, R5

8

HALT

Processor

PC

32

LR

0

SP

1048576

R12

0

R11

0

R10

0

R9

0

R8

0

R7

294

R6

0

R5

294

R4

202

R3

220

R2

284

R1

279

R0

300

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Count

8

Current Instruction

Status bits

NZCV  
0000

Memory

|        | 0x0        | 0x4        | 0x8        | 0xc        |
|--------|------------|------------|------------|------------|
| 000    |            |            |            |            |
| 0x0000 | 3818917707 | 3795849237 | 3800113157 | 3795988544 |
| 0x0001 | 3796058130 | 3800322140 | 3785388037 | 3774873712 |
| 0x0002 | 0          | 0          | 0          | 0          |
| 0x0003 | 0          | 0          | 0          | 0          |
| 0x0004 | 0          | 0          | 0          | 0          |
| 0x0005 | 0          | 0          | 0          | 0          |
| 0x0006 | 0          | 0          | 0          | 0          |
| 0x0007 | 0          | 0          | 0          | 0          |
| 0x0008 | 0          | 0          | 0          | 0          |
| 0x0009 | 0          | 0          | 0          | 0          |
| 0x000a | 0          | 0          | 0          | 0          |
| 0x000b | 0          | 0          | 0          | 0          |
| 0x000c | 0          | 0          | 0          | 0          |
| 0x000d | 0          | 0          | 0          | 0          |
| 0x000e | 0          | 0          | 0          | 0          |
| 0x000f | 0          | 0          | 0          | 0          |
| 0x0010 | 0          | 0          | 0          | 0          |
| 0x0011 | 0          | 0          | 0          | 0          |
| 0x0012 | 0          | 0          | 0          | 0          |
| 0x0013 | 0          | 0          | 0          | 0          |
| 0x0014 | 0          | 0          | 0          | 0          |
| 0x0015 | 0          | 0          | 0          | 0          |
| 0x0016 | 0          | 0          | 0          | 0          |
| 0x0017 | 0          | 0          | 0          | 0          |
| 0x0018 | 0          | 0          | 0          | 0          |
| 0x0019 | 0          | 0          | 0          | 0          |
| 0x001a | 0          | 0          | 0          | 0          |
| 0x001b | 0          | 0          | 0          | 0          |
| 0x001c | 0          | 0          | 0          | 0          |
| 0x001d | 0          | 0          | 0          | 0          |
| 0x001e | 0          | 0          | 0          | 0          |
| 0x001f | 0          | 0          | 0          | 0          |

Decimal (unsigned) ▼

Clear

Input/Output

Program HALTED. STOP, LOAD or EDIT

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[Documentation](#)

7.5.4.

Assembly Code:

```

1 | MOV R0, #60
2 | SUB R1, R0, #2
3 | ADD R2, R1, #5
4 | SUB R3, R2, #6
5 | SUB R4, R3, #1
6 | ADD R5, R4, #9
7 | MOV R7, R5
8 | HALT

```

Processor State:

- PC: 1048576
- LR: 0
- SP: 0
- R12: 0
- R11: 0
- R10: 0
- R9: 0
- R8: 0
- R7: 65
- R6: 0
- R5: 65
- R4: 56
- R3: 57
- R2: 63
- R1: 58
- R0: 60
- Count: 6
- Current Instruction:
- Status bits: NZCV 0000

Memory Dump (0x0000 to 0x001f):

| Address | Value      |
|---------|------------|
| 0x0000  | 3818913852 |
| 0x0001  | 3795849218 |
| 0x0002  | 3795988486 |
| 0x0003  | 3796058113 |
| 0x0004  | 3800322057 |
| 0x0005  | 3785388037 |
| 0x0006  | 3774873712 |
| 0x0007  | 0          |
| 0x0008  | 0          |
| 0x0009  | 0          |
| 0x000a  | 0          |
| 0x000b  | 0          |
| 0x000c  | 0          |
| 0x000d  | 0          |
| 0x000e  | 0          |
| 0x000f  | 0          |
| 0x0010  | 0          |
| 0x0011  | 0          |
| 0x0012  | 0          |
| 0x0013  | 0          |
| 0x0014  | 0          |
| 0x0015  | 0          |
| 0x0016  | 0          |
| 0x0017  | 0          |
| 0x0018  | 0          |
| 0x0019  | 0          |
| 0x001a  | 0          |
| 0x001b  | 0          |
| 0x001c  | 0          |
| 0x001d  | 0          |
| 0x001e  | 0          |
| 0x001f  | 0          |

Program HALTED. STOP, LOAD or EDIT

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7.5.5.

Program:

```

1 | MOV R0, #12
2 | ADD R1, R0, #11
3 | ADD R2, R1, R0
4 | ADD R3, R2, R1
5 | MOV R4, #3
6 | AND R5, R4, #2
7 | MOV R6, #7
8 | SUB R7, R6, R5
9 | ADD R8, R7, R1
10 | ADD R9, R8, R1
11 | ADD R10, R3, R9
12 | SUB R11, R4, #2
13 | ADD R12, R10, R11
14 | HALT

```

Processor State:

- PC: 1048576
- LR: 0
- SP: 0
- R12: 0
- R11: 0
- R10: 0
- R9: 0
- R8: 0
- R7: 0
- R6: 0
- R5: 0
- R4: 0
- R3: 0
- R2: 0
- R1: 0
- R0: 0
- Count: 0
- Current Instruction:
- Status bits: NZCV 0000

7.6.3.

The pattern is that negative number (in binary ) is flipped , then add 1.

7.6.4.

### Program

|   |            |
|---|------------|
| 1 | MOV R0, #1 |
| 2 | MVN R1, R0 |
| 3 | HALT       |

### Processor

|     |         |
|-----|---------|
| PC  | 12      |
| LR  | 0       |
| SP  | 1048576 |
| R12 | 0       |
| R11 | 0       |
| R10 | 0       |
| R9  | 0       |
| R8  | 0       |
| R7  | 0       |
| R6  | 0       |
| R5  | 0       |
| R4  | 0       |
| R3  | 0       |
| R2  | 0       |
| R1  | -2      |
| R0  | 1       |

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Count

3

Current

Instruction

Status bits

NZCV  
0000

### Input/Output

Program HALTED. STOP, LOAD or EDIT

Load

Save

Edit