

Microprocessor and Computer Architecture

UE21CS251B

4th Semester, Academic Year 2022-23

Date: 13-02-2023

Name: NAGAVENI L G	SRN: PES2UG21CS315	Section: F
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Week# 4 Program Number: 1

Title of the Program

Write an ALP to add two 64 bit numbers loaded from memory and store the result in memory.

I.ARM Assembly Code

.data

a: .word 10,20

b: .word 30,40

c: .word 0,0

.text

ldr r0, =a

ldr r1, =b

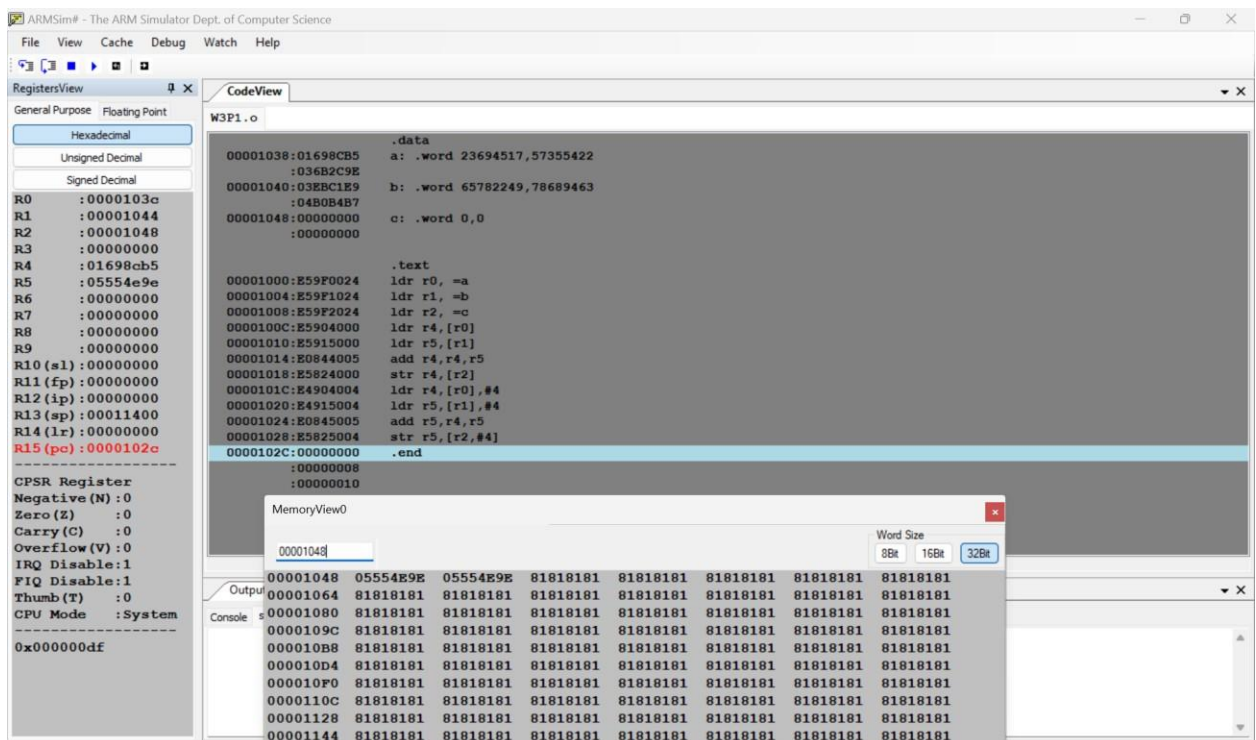
ldr r2, =c

```

ldr r4,[r0]
ldr r5,[r1]
add r4,r4,r5
str r4,[r2]
ldr r4,[r0,#4]
ldr r5,[r1,#4]
add r5,r4,r5
str r5,[r2,#4]
.end

```

II. Output Screen Shot (One)



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Week# ____4____ Program Number: ____2____

Title of the Program

Write an ALP to find 1's and 2's complement of a 32 bit number

I.ARM Assembly Code

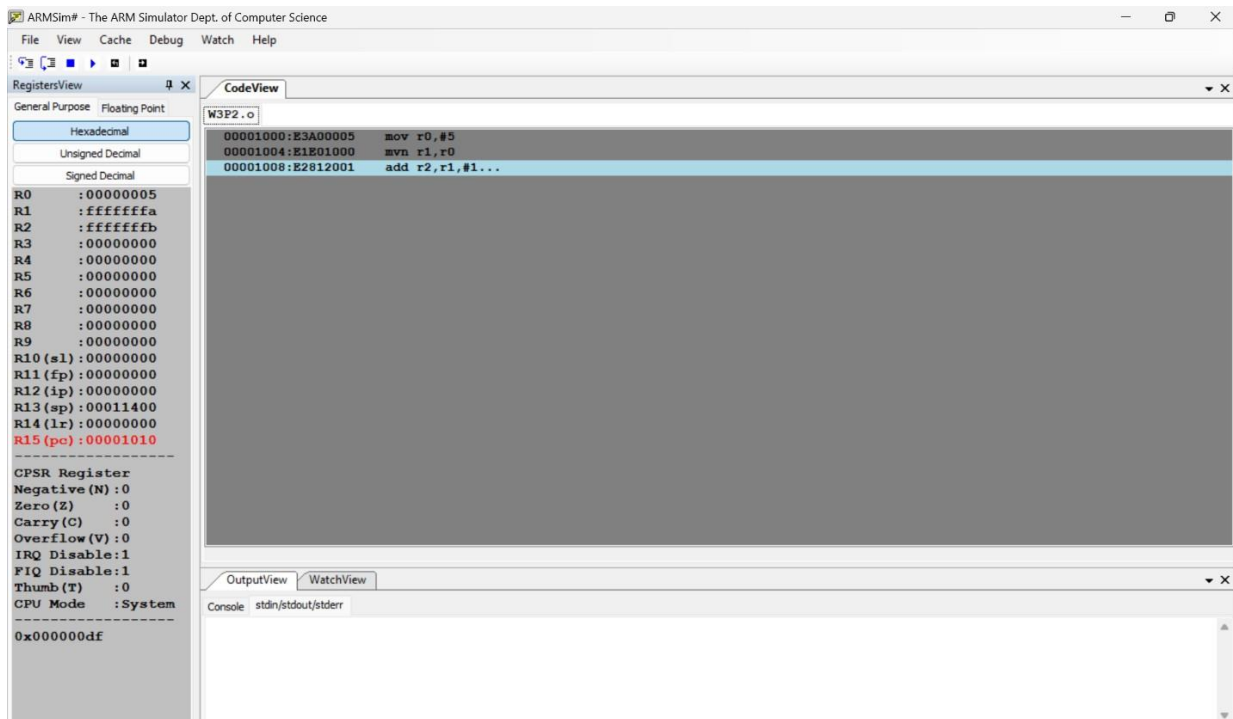
.text

mov r0,#5

mvn r1,r0

add r2,r1,#1

II. Output Screen Shot (One)



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Week# ____4____ Program Number: ____3__

Title of the Program

Write an ALP to scan a 32 bit number if it is negative or positive

I.ARM Assembly Code

.text

mov r0, #0

cmp r0, #0

beq zero

bgt great

blt less

zero:

LDR R0, =ZEROMEG

SWI 0X02

swi 0x11

great:

LDR R0, = POSMSG

SWI 0X02

swi 0x11

less:

LDR R0, =NEGMSG

SWI 0X02

swi 0x011

.data

ZEROMEG: .ASCIZ "The given num is Zero and Positive"

POSMSG: .ASCIZ "The given num is Positive"

NEGMSG: .ASCIZ "The given num is Negative"

II. Output Screen Shot (One)

The screenshot displays the ARMSim# - The ARM Simulator interface. The top menu bar includes File, View, Cache, Debug, Watch, and Help. The main window is divided into three panes:

- RegistersView:** Shows the state of 16 registers (R0-R15) and the CPSR register. R0 is highlighted with a value of 00001044. The CPSR register shows Negative (N):0, Zero (Z):1, Carry (C):1, and Overflow (V):0.
- CodeView:** Displays the assembly code for the file W4P6.o. The code includes instructions like mov, cmp, beq, bgt, blt, LDR, SWI, and .data. The instruction at address 0000101C (SWI 0x11) is highlighted.
- OutputView:** Shows the execution output in the console. The output indicates that the assembly language file was loaded, execution started, and the given number is Zero and Positive. The execution ended with an instruction count of 6 and an elapsed time of 00:00:00.0207901.

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Week# 4 Program Number: 4

Title of the Program

Write an ALP to find the number of zeroes, positive and negative numbers in a given array

I.ARM Assembly Code

.data

a: .word 4,3,-2,0,7,0,-9

.text

ldr r0,=a

mov r1,#7

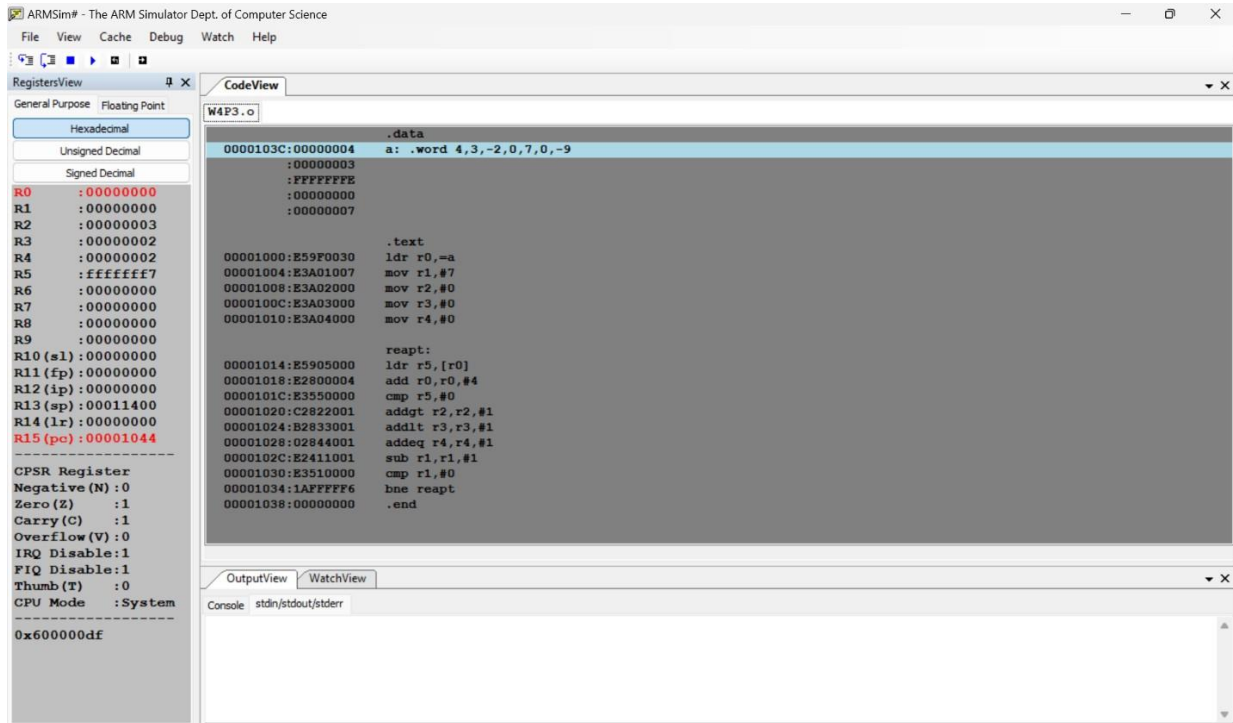
mov r2,#0

mov r3,#0

mov r4,#0


```
reapt:
ldr r5,[r0]
add r0,r0,#4
cmp r5,#0
addgt r2,r2,#1
addlt r3,r3,#1
addeq r4,r4,#1
sub r1,r1,#1
cmp r1,#0
bne reapt
.end
```

II. Output Screen Shot (One)



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--------------------	-----------------------	--------------

Week# ____4____ Program Number: ____5__

Title of the Program

Write an ALP to count the number of 1's and 0's in a given 32 bit number.

I.ARM Assembly Code

.data

a: .word 46

.text

ldr r0,=a

ldr r0,[r0]

mov r1,#32

mov r2,#0

mov r3,#0

repeat:

movs r0,r0,lsr#1

addcs r2,r2,#1

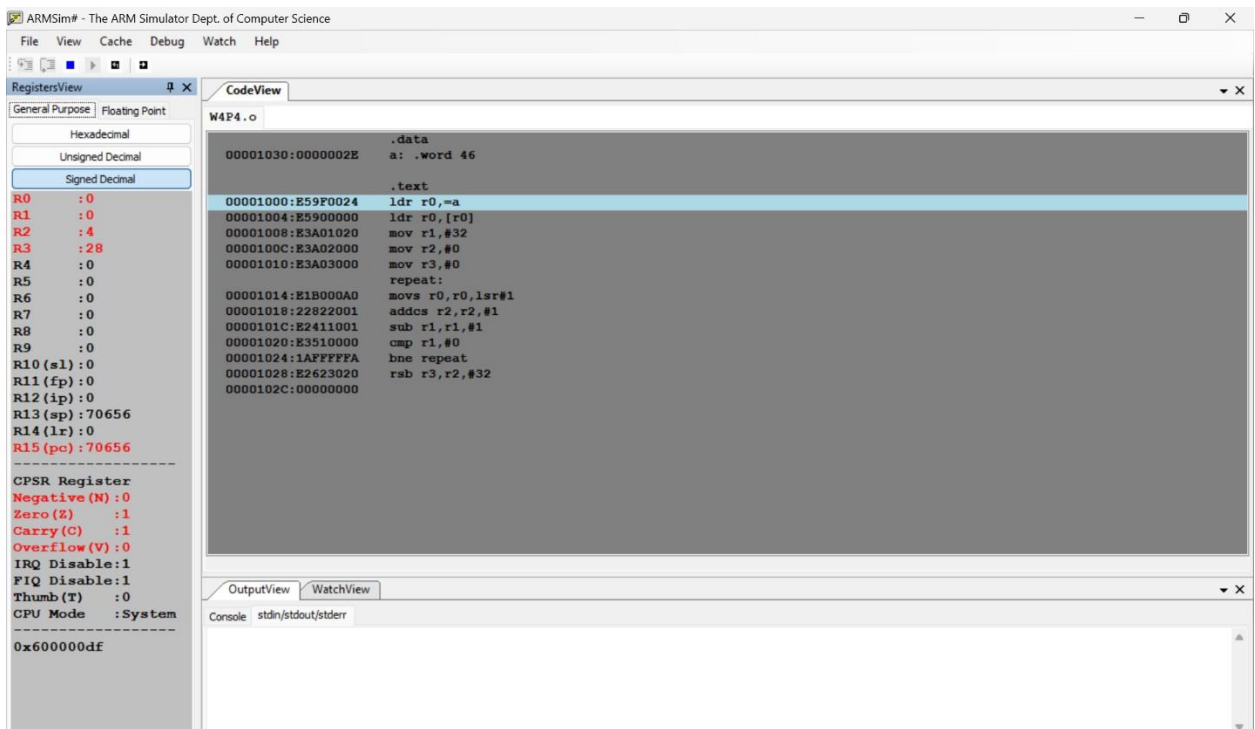
sub r1,r1,#1

cmp r1,#0

bne repeat

rsb r3,r2,#32

II. Output Screen Shot (One)



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Week# 4

Program Number: 6

Title of the Program

Write an ALP to check the given number has odd or even number of 1's and display the result. (Even Parity and Odd Parity)

I.ARM Assembly Code

.data

a: .word 47

b: .asciz "Odd Parity"

c: .asciz "Even Parity"

.text

```
ldr r0,=a
ldr r0,[r0]
mov r1,#32
mov r2,#0
repeat:
movs r0,r0,lsr#1
addcs r2,r2,#1
sub r1,r1,#1
cmp r1,#0
bne repeat
and r3,r2,#1
cmp r3,#0
bne loop1
b loop2
```

```
loop1:
ldr r0,=b
swi 0x02
b exit
```

loop2:

ldr r0,=c

swi 0x02

exit:swi 0x11

.end

II. Output Screen Shot (One)

The screenshot displays the ARMSim# ARM Simulator interface. The main window is titled 'ARMSim# - The ARM Simulator Dept. of Computer Science'. It features a menu bar (File, View, Cache, Debug, Watch, Help) and a toolbar. The interface is divided into several panes:

- RegistersView:** Shows the state of 16 registers (R0-R15) and the CPSR register. R0 is highlighted in red and contains the value 0000105c. The CPSR register shows flags: Negative (N): 0, Zero (Z): 0, Carry (C): 1, Overflow (V): 0, IRQ Disable: 1, FIQ Disable: 1, Thumb (T): 0, and CPU Mode: System.
- CodeView:** Displays the assembly code for 'W4P5.o'. It includes data sections for 'a' (word 47) and 'b' (ASCII 'Odd Parity'), and 'c' (ASCII 'Even Parity'). The text section contains instructions for loading, moving, and comparing registers, with labels 'loop1' and 'loop2'.
- OutputView:** Shows the execution output, including the path to the assembly file, the start of execution, and the end of execution with statistics: 'Execution ending, Instruction Count:171 Elapsed Time:00:00:00.3721556' and 'Instructions per second:459'.

Disclaimer:

- The programs and output submitted is duly written, verified and executed by me.

- I have not copied from any of my peers nor from the external resource such as internet.
- If found plagiarized, I will abide with the disciplinary action of the University.

Signature:

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