

Microprocessor and Computer Architecture

UE21CS251B

4th Semester, Academic Year 2022-23

Date:04/02/2023

Name: NAGAVENI L G	SRN:PES2UG21CS315	Section:F
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Week# 3 Program Number: 1

Title of the Program

Generate Fibonacci Series and store them in an array.

I.ARM Assembly Code

.data

a: .word 0,0,0,0,0,0,0,0,0,0

.text

LDR r0,=a

MOV r1,#0

MOV r2,#1

MOV r4,#2

STMIA r0!,{r1,r2}

BL fib

B exit

fib:

loop:

LDMDB r0,{r1,r2}

ADD r3,r1,r2

STR r3,[r0],#4

ADD r4,r4,#1

CMP r4,#11

BNE loop

MOV PC,LR

exit:

.end

II. Output Screen Shots (One)

ARMSim# - The ARM Simulator Dept. of Computer Science

File View Cache Debug Watch Help

RegistersView

General Purpose Floating Point

Hexadecimal
Unsigned Decimal
Signed Decimal

R0 : 0
R1 : 0
R2 : 34
R3 : 55
R4 : 11
R5 : 0
R6 : 0
R7 : 0
R8 : 0
R9 : 0
R10 (s1) : 0
R11 (fp) : 0
R12 (ip) : 0
R13 (sp) : 70656
R14 (lr) : 4120
R15 (pc) : 70656

CPSR Register
Negative (N) : 0
Zero (Z) : 1
Carry (C) : 1
Overflow (V) : 0
IRQ Disable : 1
FIQ Disable : 1
Thumb (T) : 0
CPU Mode : System
0x600000df

CodeView

fib.o

```
.data
0000103C:00000000      a: .word 0,0,0,0,0,0,0,0,0
:00000000
:00000000
:00000000
:00000000

.text
00001000:E59F0030    LDR r0,=a
00001004:E3A01000    MOV r1,#0
00001008:E3A02001    MOV r2,#1
0000100C:E3A04002    MOV r4,#2
00001010:E8AD0006    STMIA r0!,{r1,r2}
00001014:E8000000    BL fib
00001018:EAD00006    B exit

fib:
loop:
0000101C:E9100006    LDMDB r0,{r1,r2}
00001020:E0813002    ADD r3,r1,r2
00001024:E4803004    STR r3,[r0],#4
00001028:E2844001    ADD r4,r4,#1
0000102C:E354000B    CMP r4,r4,#11
00001030:1AFFFFF9    BNE loop
00001034:E1ADFF0E    MOV PC,LR

exit:
00001038:00000000    .end
```

OutputView WatchView

Console stdin/stdout/stderr

MemoryView0

Word Size 8bit 16bit 32bit

0000103C	00000000	00000001	00000001	00000002	00000003	00000005	00000008	0000000D	00000015	00000022	00000037	81818181	81818181
00001070	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181
000010A4	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181	81818181

Type here to search

27°C Sunny 11:57 AM 2/4/2023

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Week# 3 Program Number: 2

Title of the Program

Write an ALP to find smallest number in an array of n 32-bit numbers

I.ARM Assembly Code

.data

a: .word 16,10,32,52,4,9,20,13,90

b: .word -1

.text

LDR r0,=a

LDR r1,[r0],#4

LDR r4,=b

MOV r3,#1

loop:

LDR r2,[r0],#4

CMP r1,r2

MOVGT r1,r2

ADD r3,r3,#1

CMP r3,#9

BNE loop

B exit

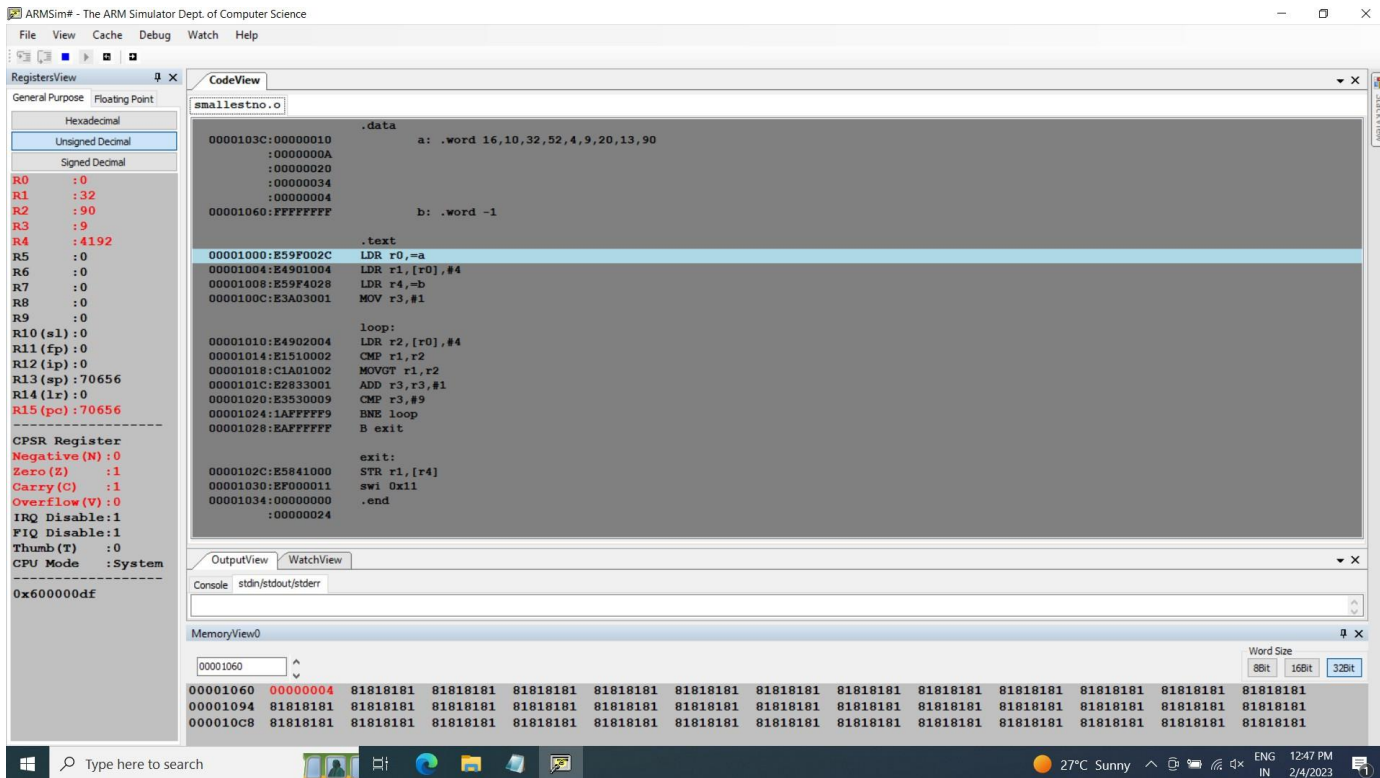
exit:

STR r1,[r4]

swi 0x11

.end

II. Output Screen Shots (One)



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Week#____2_____

Program Number:____3____

Title of the Program

To perform Convolution using MUL instruction (Addition of multiplication of respective numbers of loc A and loc B)

I.ARM Assembly Code

.data

a: .word 1,2,3,4,5,6,7,8,9

b: .word 10,20,30,40,50,60,70,80,90

c: .word 0

.text

LDR r0,=a

LDR r1,=b

LDR r2,=c

MOV r5,#0

MOV r6,#1

loop:

LDR r3,[r0],#4

LDR r4,[r1],#4

MUL r7,r3,r4

ADD r5,r5,r7

ADD r6,r6,#1

CMP r6,#10

BNE loop

B exit

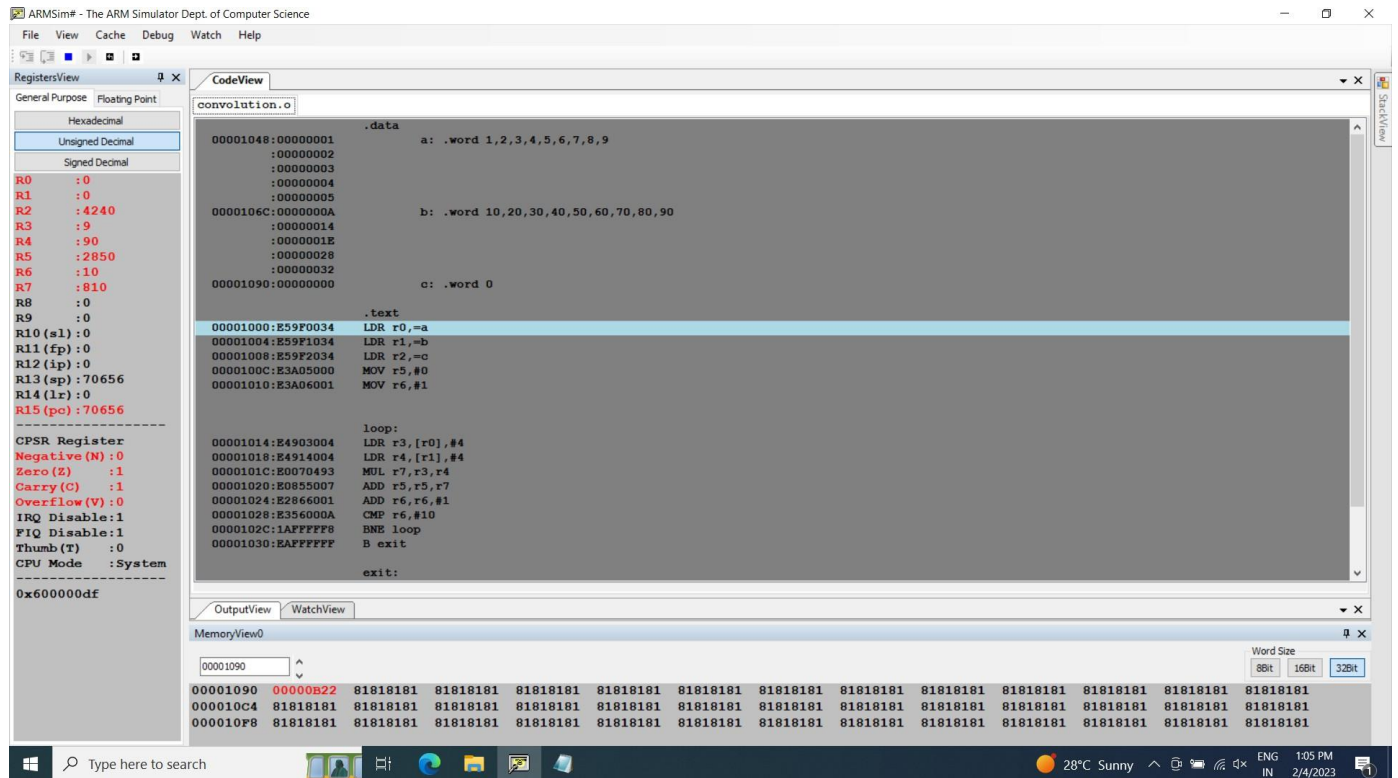
exit:

STR r5,[r2]

swi 0x11

.end

II. Output Screen Shot (One)



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Week# 2 Program Number: 4

Title of the Program

To perform Convolution using MLA instruction (Addition of multiplication of respective numbers of loc A and loc B).

I.ARM Assembly Code

.data

a: .word 1,2,3,4,5,6,7,8,9

b: .word 10,20,30,40,50,60,70,80,90

c: .word 0

.text

LDR r0,=a

LDR r1,=b

LDR r2,=c

MOV r5,#0

MOV r6,#1

loop:

LDR r3,[r0],#4

LDR r4,[r1],#4

MLA r5,r3,r4,r5

ADD r6,r6,#1

CMP r6,#10

BNE loop

B exit

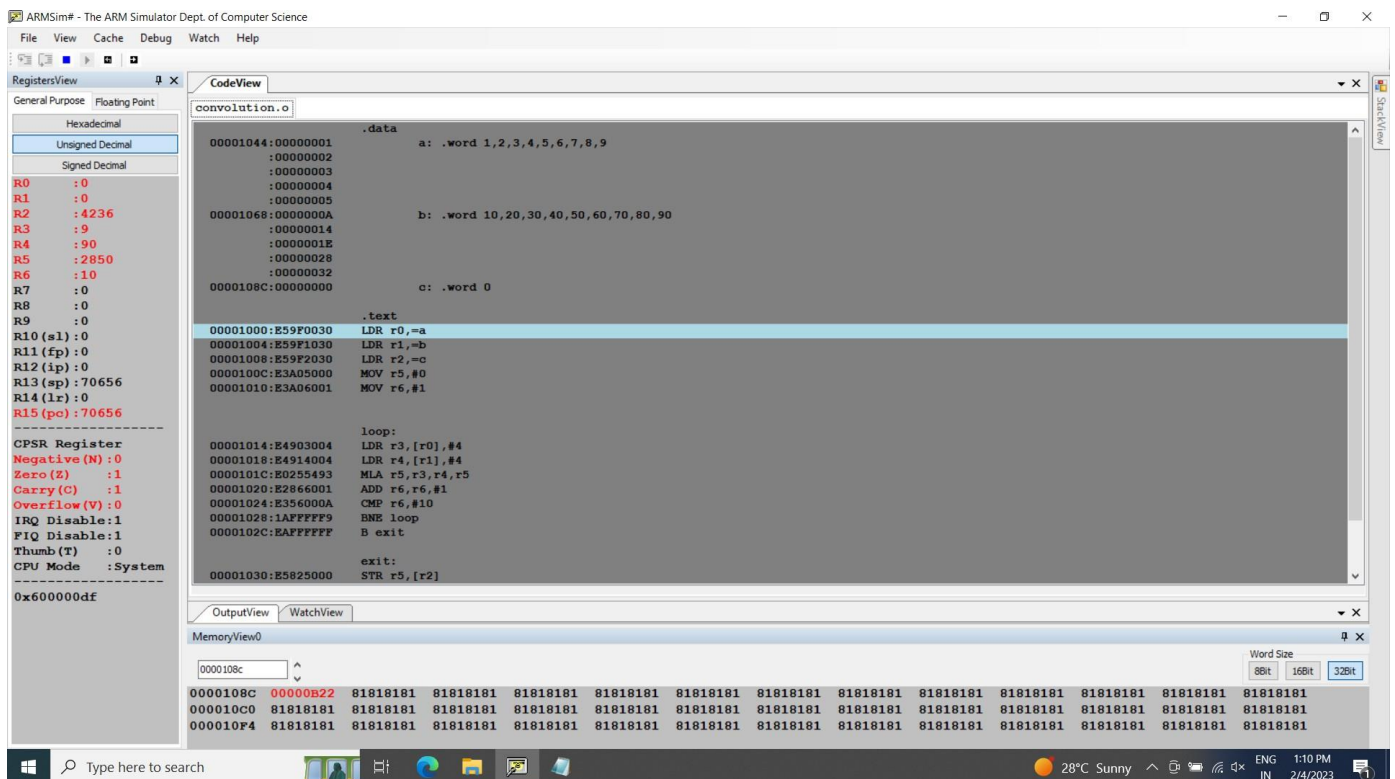
exit:

STR r5,[r2]

swi 0x11

.end

II. Output Screen Shot (One)



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Week# 2 Program Number: 5

Title of the Program

Write an ALP to find mul (add(a,b),c)

I.ARM Assembly Code

.data

a: .word 0

stk: .word 0

.text

LDR r0,=a

MOV r1,#10

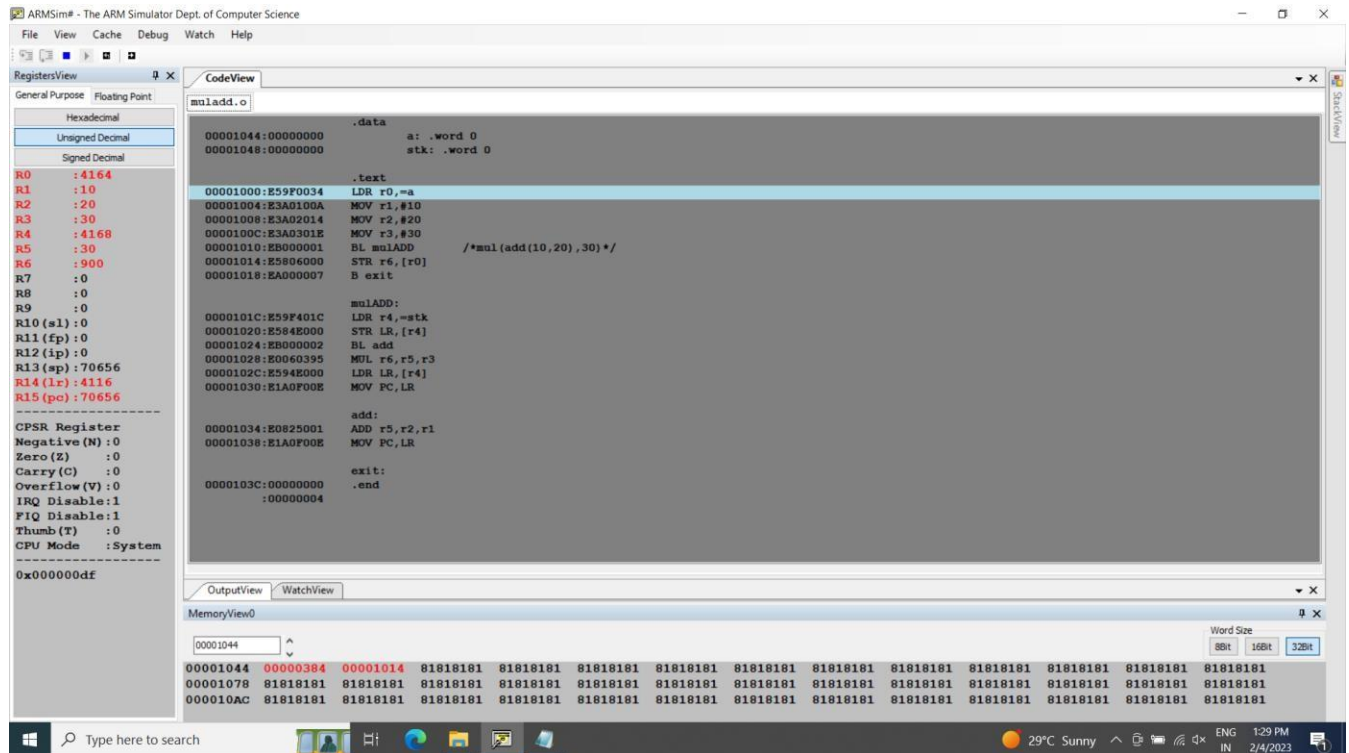
```
MOV r2,#20
MOV r3,#30
BL mulADD    /*mul(add(10,20),30)*/
STR r6,[r0]
B exit
```

```
mulADD:
LDR r4,=stk
STR LR,[r4]
BL add
MUL r6,r5,r3
LDR LR,[r4]
MOV PC,LR
```

```
add:
ADD r5,r2,r1
MOV PC,LR
```

```
exit:
.end
```

II. Output Screen Shot (One)



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Week# 2 Program Number: 6

Title of the Program

Write an ALP to find factorial using subroutine

I. ARM Assembly Code

.data

a: .word 0

.text

LDR r0,=a

MOV r1,#10

BL fact

STR r2,[r0]

B exit

fact:

MOV r2,#1

loop:

MUL r2,r2,r1

SUB r1,r1,#1

CMP r1,#0

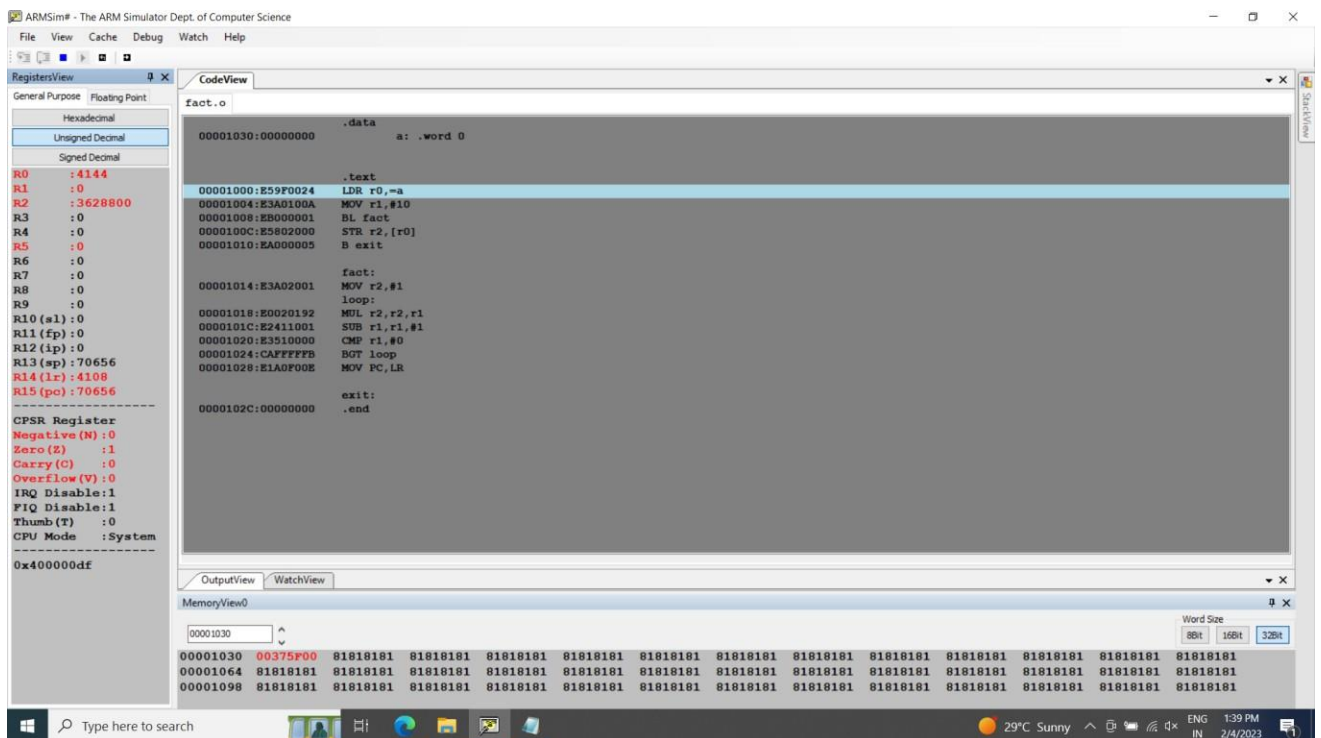
BGT loop

MOV PC,LR

exit:

.end

II. Output Screen Shot (One)



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Week# 2 Program Number: 7

Title of the Program

Write an ALP to perform multiplication using shift method (without using MUL)

I.ARM Assembly Code

.text

@25 multiplied by 56

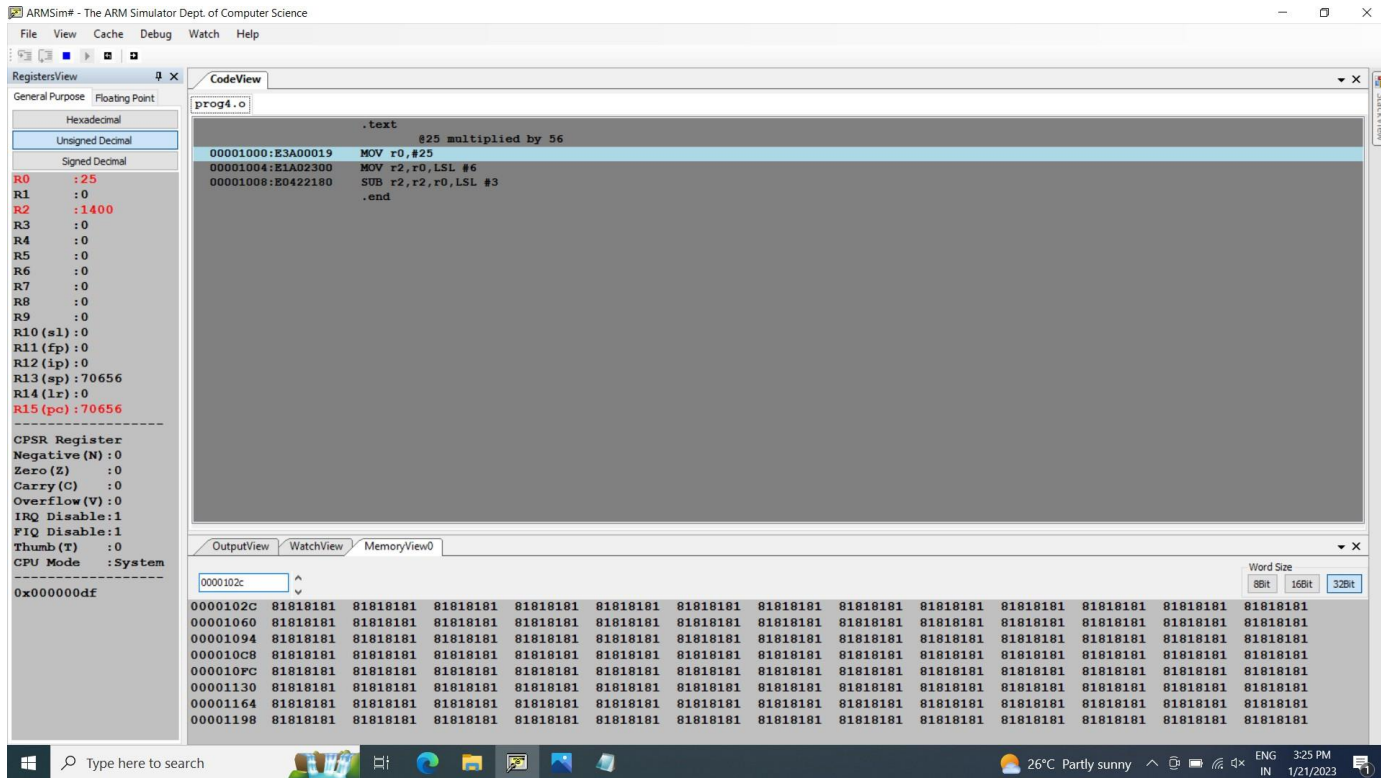
MOV r0,#25

MOV r2,r0,LSL #6

SUB r2,r2,r0,LSL #3

.end

II. Output Screen Shot (One)



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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