

Microprocessor and Computer Architecture

UE21CS251B

4th Semester, Academic Year 2022-23

Date: 30-1-2023

Name: NAGAVENI L G	SRN: PES2UG21CS315	Section: F
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Week# 2 Program Number: 1

Title of the Program

Write a program in ARM7TDMI-ISA to copy a block of N data items from Location A to Location B.

- a. Use Full word (.word directive)**
- b. Use Half word(.hword directive)**
- c. Use Byte wise (.Byte directive)**

I. ARM Assembly Code

II. Output Screen Shots (Three)

The output should be verified for word, half word, byte

I.

a)

.data

a: .word 10,20,30,40,50

b: .word 0,0,0,0,0

.text

ldr r0,=a

ldr r1,=b

mov r2,#5

loop:

ldr r4,[r0]

add r0,r0,#4

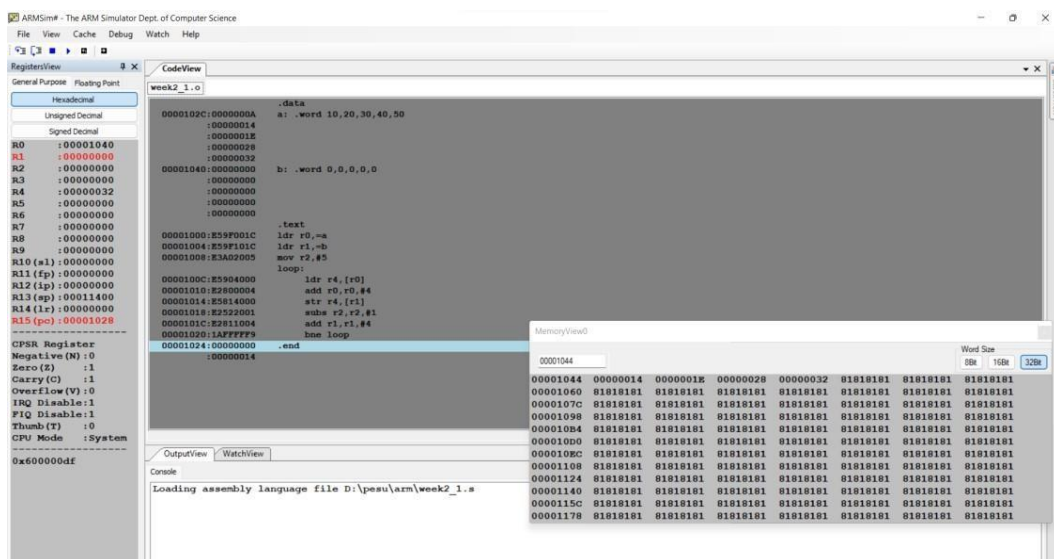
str r4,[r1]

subs r2,r2,#1

add r1,r1,#4

bne loop

.end



b) .data

a: .hword 10,20,30,40,50

b: .hword 0,0,0,0,0

.text

ldrh r0,=a

ldrh r1,=b

mov r2,#5

loop:

ldrh r4,[r0]

add r0,r0,#2

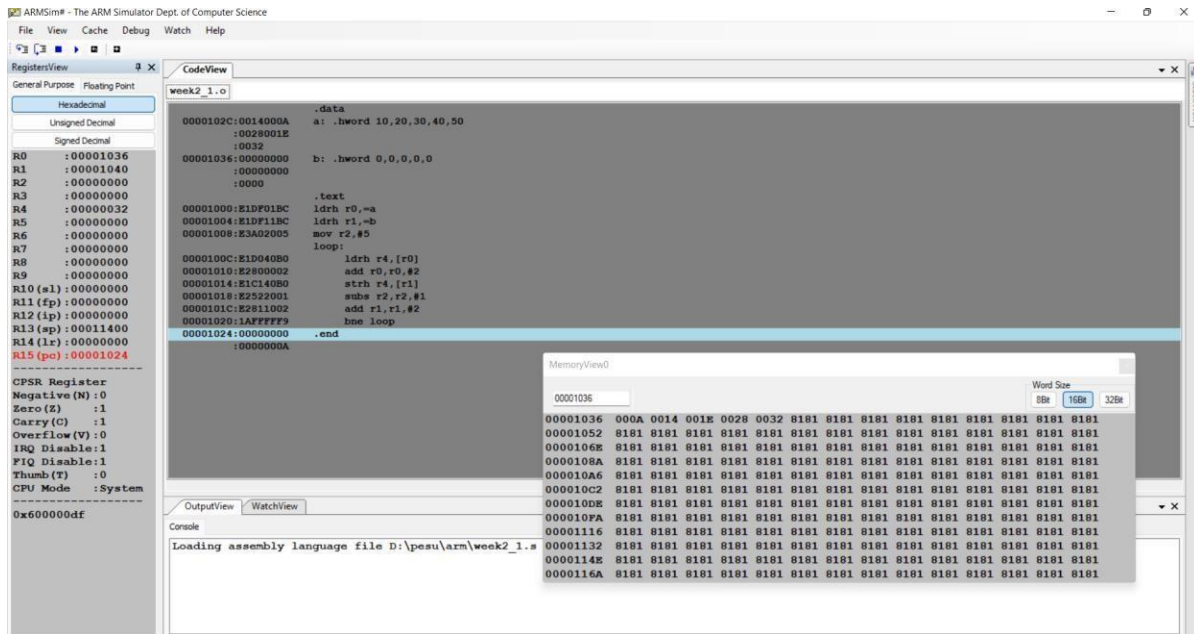
strh r4,[r1]

subs r2,r2,#1

add r1,r1,#2

bne loop

.end



c)

.data

a: .byte 10,20,30,40

b: .byte 0,0,0,0,0

.text

ldr r0,=a

ldr r1,=b

mov r3,#5

loop: ldrb r4,[r0]

add r0,r0,#1

strb r4,[r1]

add r1,r1,#1

subs r3,r3,#1

bne loop

.end

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 : 00001031
R1 : 00001035
R2 : 00000000
R3 : 00000000
R4 : 0000000a
R5 : 00000000
R6 : 00000000
R7 : 00000000
R8 : 00000000
R9 : 00000000
R10 (s1) : 00000000
R11 (fp) : 00000000
R12 (ip) : 00000000
R13 (sp) : 00011400
R14 (lr) : 00000000
R15 (pc) : 00001024

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

1_3 (1).o

```
.data
0000102C:281E140A a: .byte 10,20,30,40
00001030:00000000 b: .byte 0,0,0,0
:00
.text
00001000:E59F001C ldr r0,=a
00001004:E59F101C ldr r1,=b
00001008:E3A03005 mov r3,#5
0000100C:E5D04000 loop: ldrb r4,[r0]
00001010:E2800001 add r0,r0,#1
00001014:E5C14000 strb r4,[r1]
00001018:E2811001 add r1,r1,#1
0000101C:E2533001 subs r3,r3,#1
00001020:1AFF7FF9 bne loop
00001024:00000000 .end
:00000004
```

MemoryView0

00001030

Word Size
8Bx 16Bx 32Bx

00001030	281E140A	0000000A	01010101	01010101	01010101	01010101	01010101
0000104C	01010101	01010101	01010101	01010101	01010101	01010101	01010101
00001068	01010101	01010101	01010101	01010101	01010101	01010101	01010101
00001084	01010101	01010101	01010101	01010101	01010101	01010101	01010101
000010A0	01010101	01010101	01010101	01010101	01010101	01010101	01010101
000010BC	01010101	01010101	01010101	01010101	01010101	01010101	01010101
000010D8	01010101	01010101	01010101	01010101	01010101	01010101	01010101
000010F4	01010101	01010101	01010101	01010101	01010101	01010101	01010101
00001110	01010101	01010101	01010101	01010101	01010101	01010101	01010101
0000112C	01010101	01010101	01010101	01010101	01010101	01010101	01010101
00001148	01010101	01010101	01010101	01010101	01010101	01010101	01010101
00001164	01010101	01010101	01010101	01010101	01010101	01010101	01010101

OutputView WatchView

Console

Loading assembly language file D:\pesu\arm\1_3 (1).s

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Week# 2 Program Number: 2

Title of the Program

Write a program in ARM7TDMI-ISA to find the sum of N data items in the memory. Store the result in the memory location.

- a. Use Full word (.word directive)**
- b. Use Half word(.hword directive)**
- c. Use Byte wise (.Byte directive)**

I. ARM Assembly Code

II. Output Screen Shots (Three)

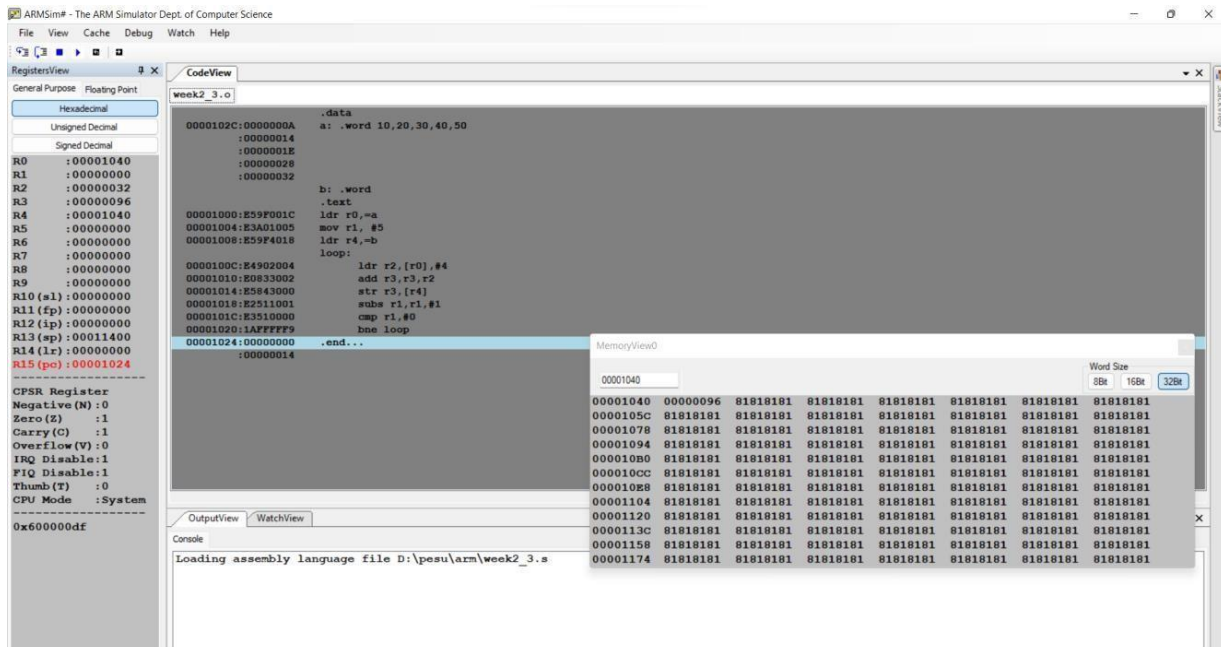
The output should be verified for word, half word, byte

```

a)
.data
a: .word 10,20,30,40,50
b: .word

.text
ldr r0,=a
mov r1,#5
ldr r4,=b
loop:
    ldr r2,[r0],#4
    add r3,r3,r2
    str r3,[r4]
    subs r1,r1,#1
    cmp r1,#0
    bne loop
.end

```



b)

.data

a: .hword 10,20,30,40,50

b: .hword 0,0,0,0,0

.text

ldr r0,=a

ldr r1,=b

mov r2,#5

loop:

ldr r4,[r0]

add r0,r0,#4

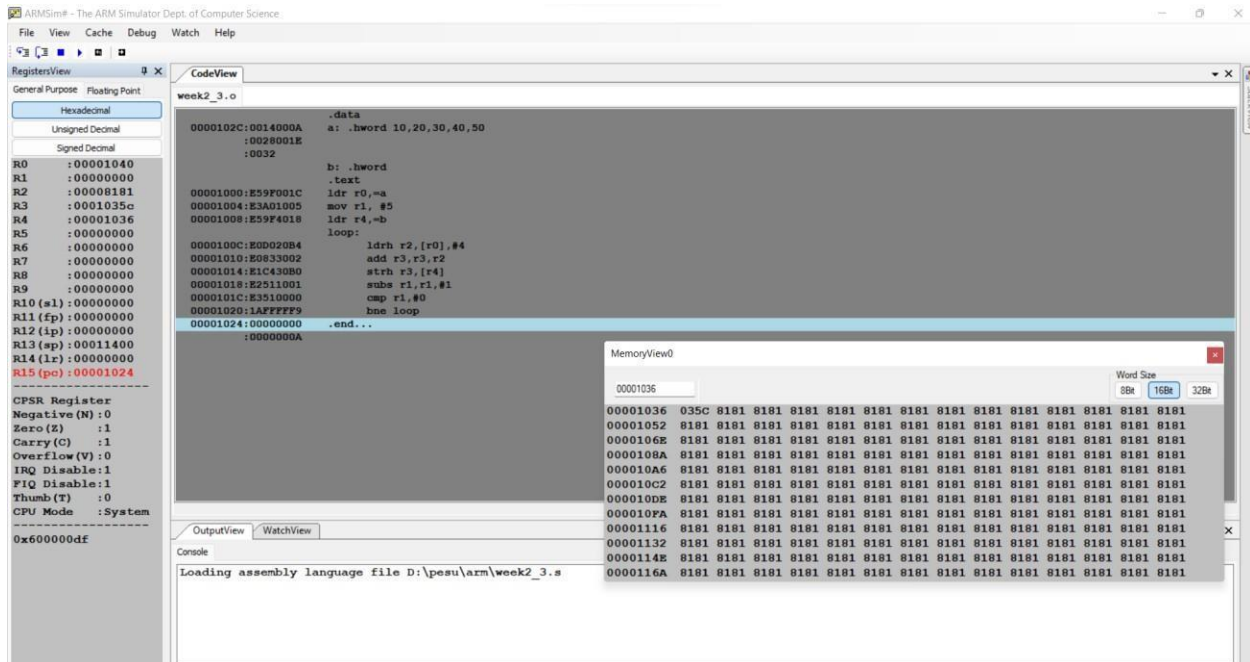
str r4,[r1]

subs r2,r2,#1

add r1,r1,#4

bne loop

.end



c)

.data

a: .byte 10,20,30,40,50

b: .byte 0,0,0,0,0

.text

ldr r0,=a

ldr r1,=b

mov r2,#5

loop:

ldrb r4,[r0]

add r0,r0,#4

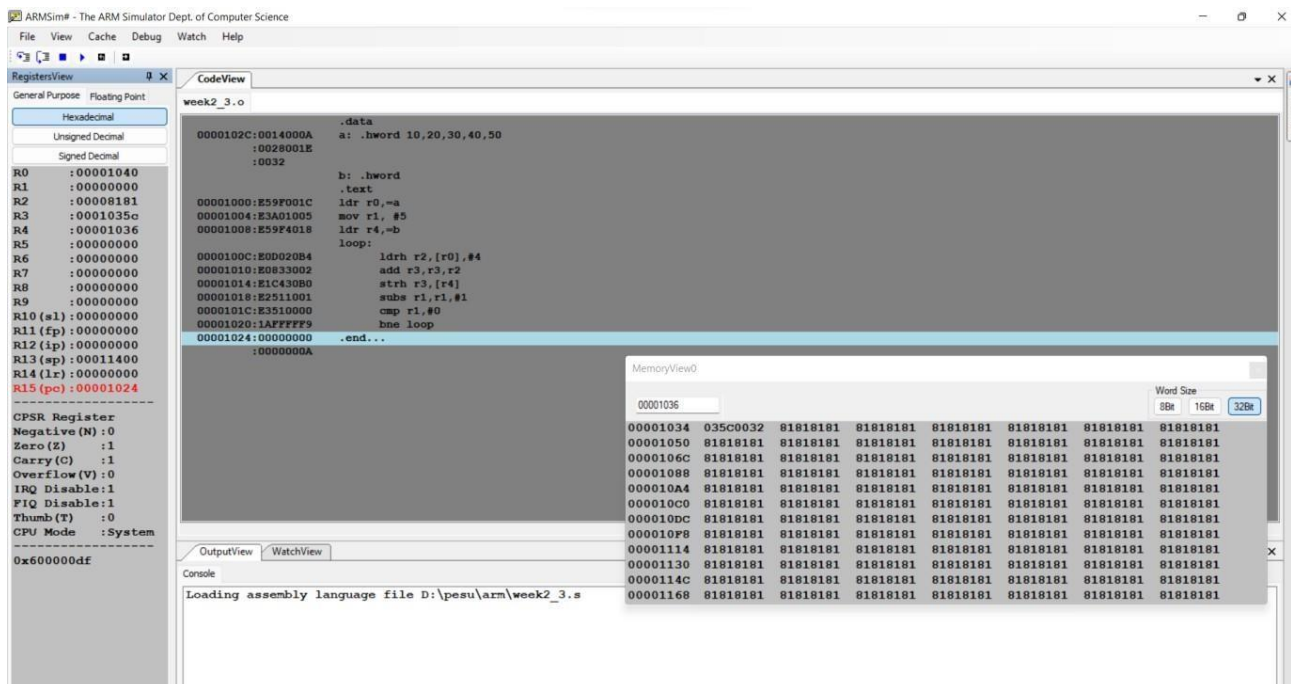
strb r4,[r1]

subs r2,r2,#1

add r1,r1,#4

bne loop

.end



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Week# 2 Program Number: 3

Title of the Program

Write a program in ARM7TDMI-ISA to find the sum of N natural numbers. Store the result in the memory location.

I.ARM Assembly Code

.data

sum:.word 0

.text

main:

mov R1,#0

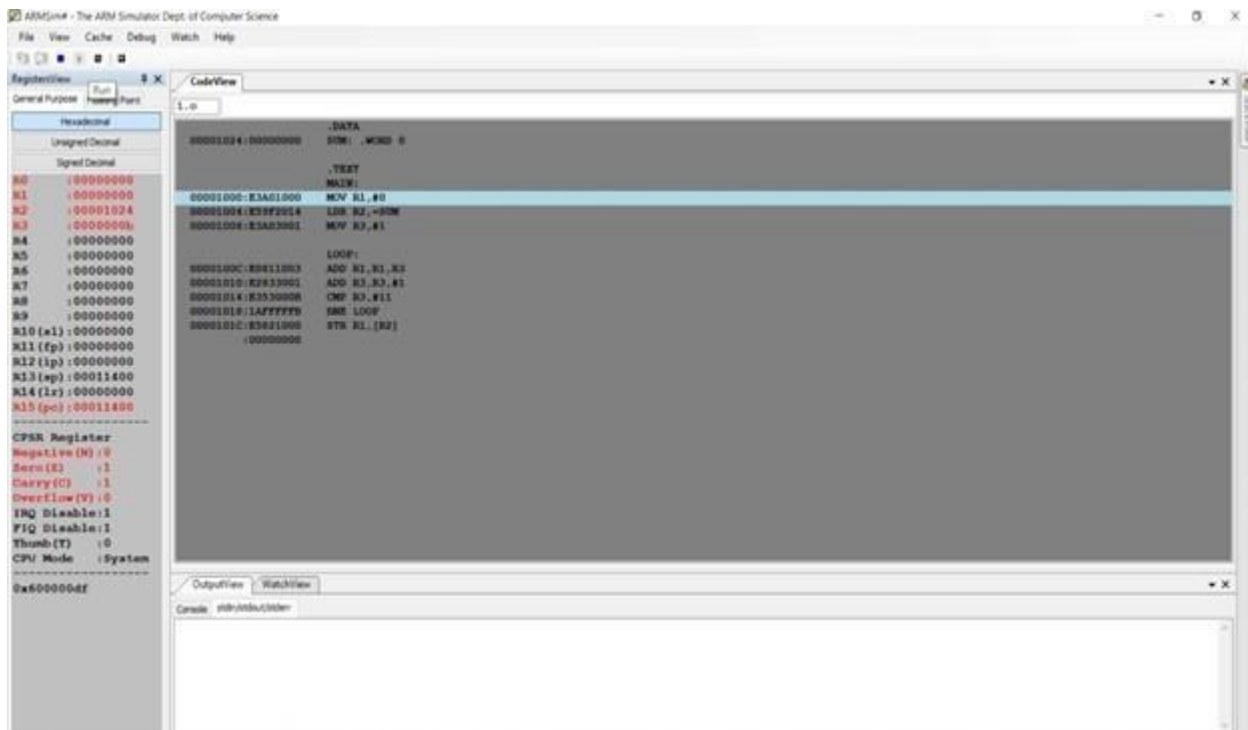
ldr R2,sum

mov R3,#1

loop:

str R1,[R2]

II. Output Screen Shots (One)



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Week# 2

Program Number: 4

Title of the Program

Write a program in ARM7TDMI-ISA to find the product of two 32bit numbers using barrel shifter.

I. ARM Assembly Code

II. Output Screen Shot (One)

```
mov r0,#50
```

```
mov r1,r0,lsl#5
```

```
rsb r0,r0,r0,lsl#3
```

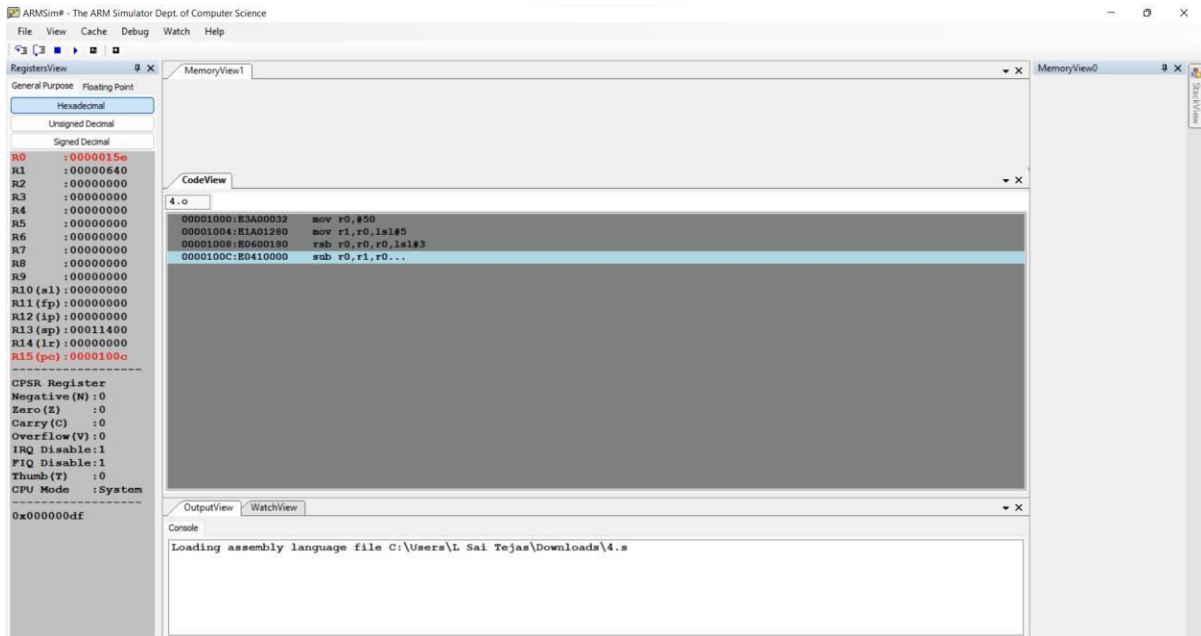
```
sub r0,r1,r0
```

```
mov r0,#50
```

```
mov r1,r0,lsl#5
```

```
rsb r0,r0,r0,lsl#3
```

sub r0,r1,r0



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Week# 2

Program Number: 5

Title of the Program

Convert the following statement in C language into an ALP using ARM7TDMI – ISA.

IF([A]==[B]) then C=[A]+[B];

ELSE IF ([B]==[C]) D=[A]-[B];

ELSE E=[A]*[B]

Where A,B C, D & E are memory locations.

I. ARM Assembly Code

II. Output Screen Shot (One)

.data

a: .word 10

b: .word 30

c: .word 30

d: .word

e: .word

.text

ldr r0,=a

ldr r1,=b

ldr r2,=c

ldr r3,=d

ldr r4,=e

ldr r5,[r0]

ldr r6,[r1]

ldr r7,[r2]

cmp r5,r6

beq ad

cmp r6,r7

beq sb

mul r10,r0,r1

str r10,[r4]

swi 0x11

ad:

add r8,r0,r1

str r8,[r2]

swi 0x11

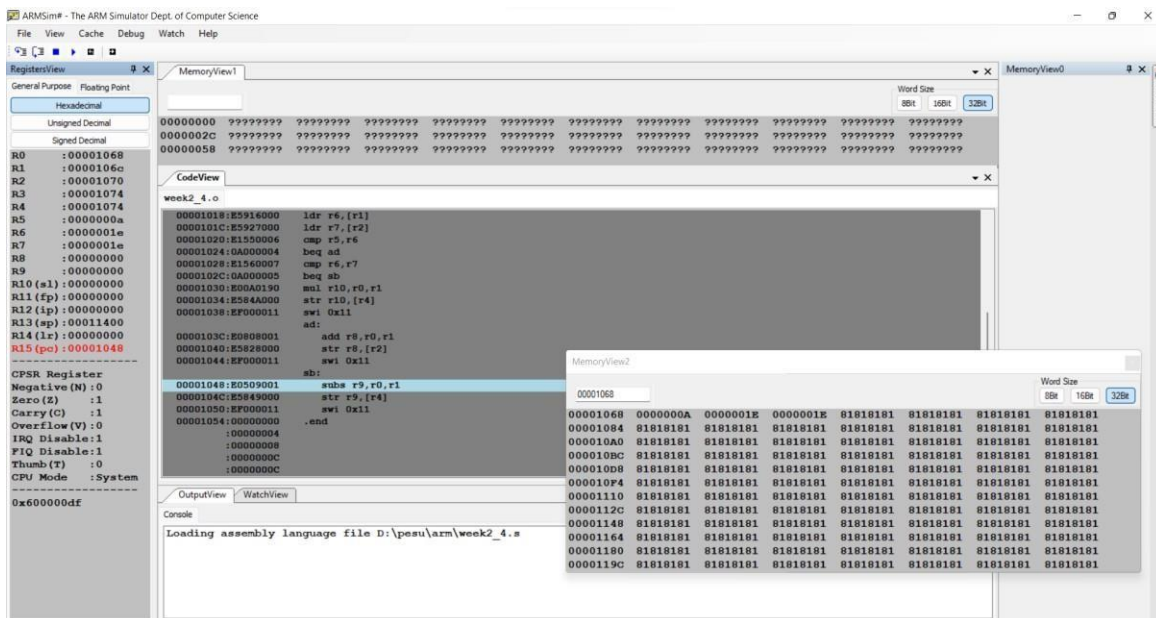
sb:

subs r9,r0,r1

str r9,[r4]

swi 0x11

.end



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Week# ____2____

Program Number: ____6____

Title of the Program

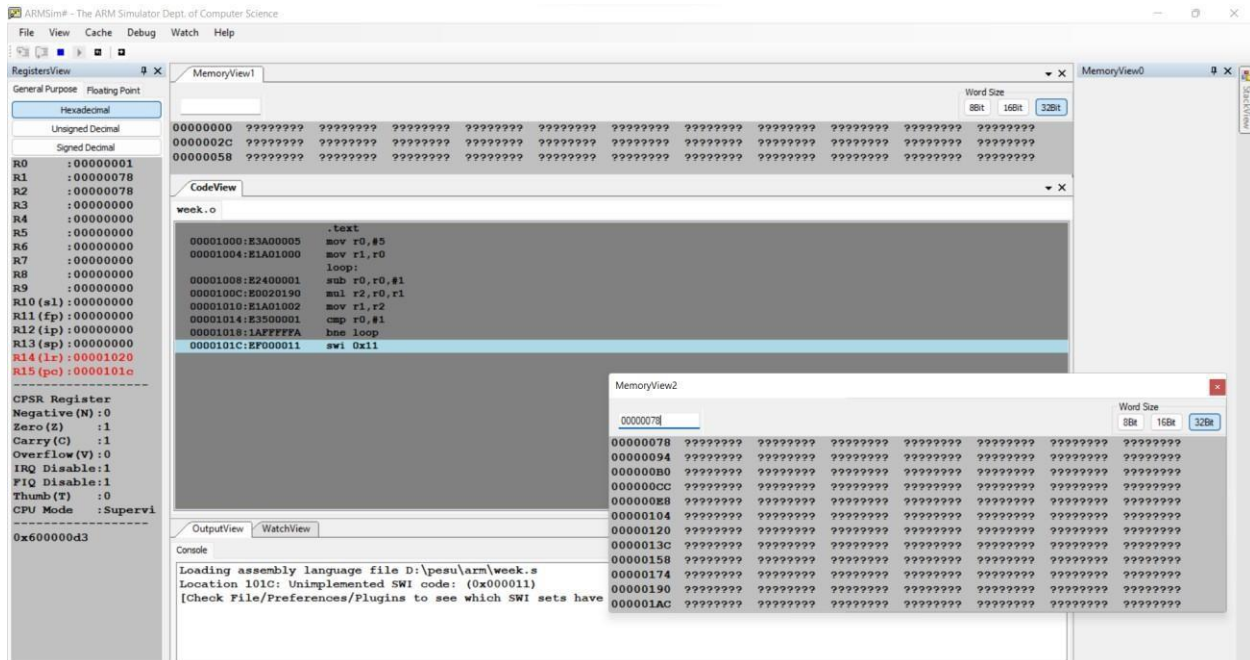
Write a program in ARM7TDMI-ISA to find the factorial of a number.

I. ARM Assembly Code

II. Output Screen Shot (One)

text

```
    mov r0,#5
    mov r1,r0
loop:
    sub r0,r0,#1
    mul r2,r0,r1
    mov r1,r2
    cmp r0,#1
    bne loop
    swi 0x11
```



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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SRN: PES2UG21CS315

Section: F

Date:30-01-2023