Microprocessor and Computer Architecture

UE21CS251B

4th Semester, Academic Year 2022-23

Date: 30-1-2023

Name: NAGAVENI L G	SRN: PES2UG21CS315	Section: F

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)

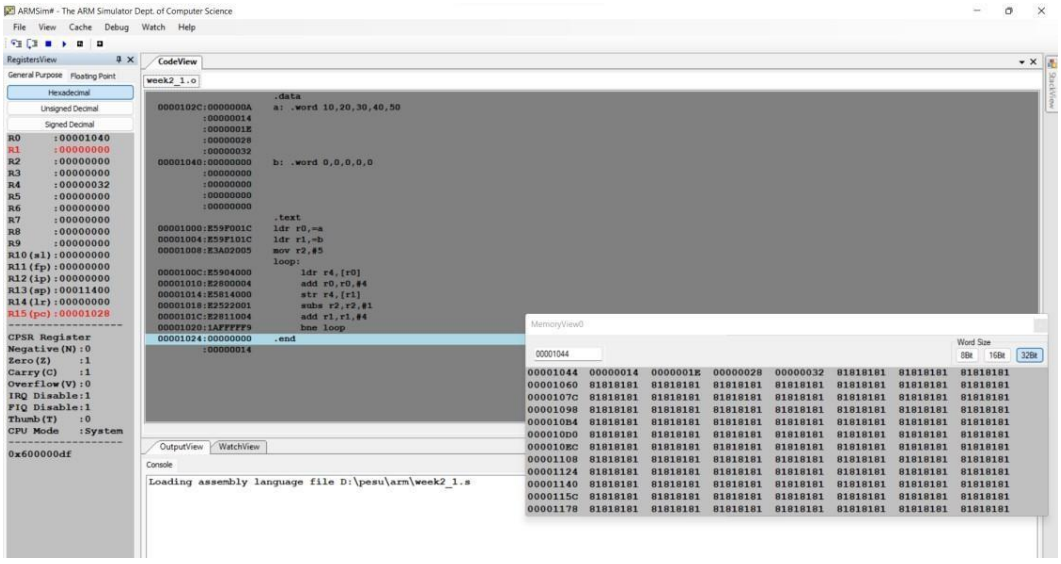
I. ARM Assembly Code
II. Output Screen Shots (Three)
The output should be verified for word, half word, byte

I.

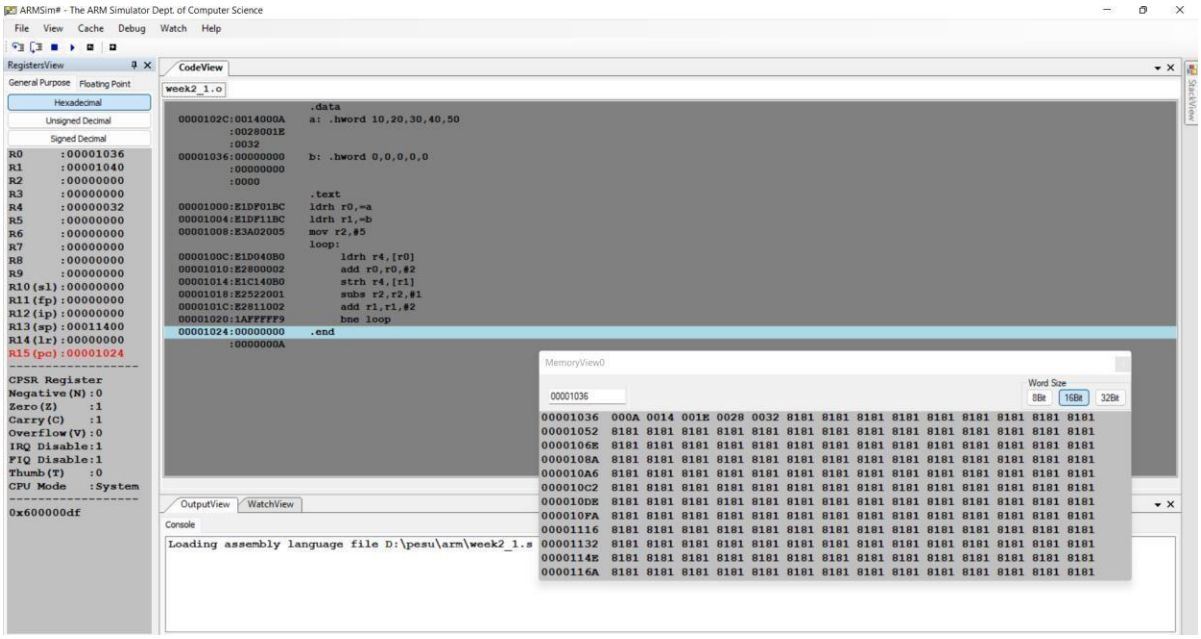
a)

```
.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)

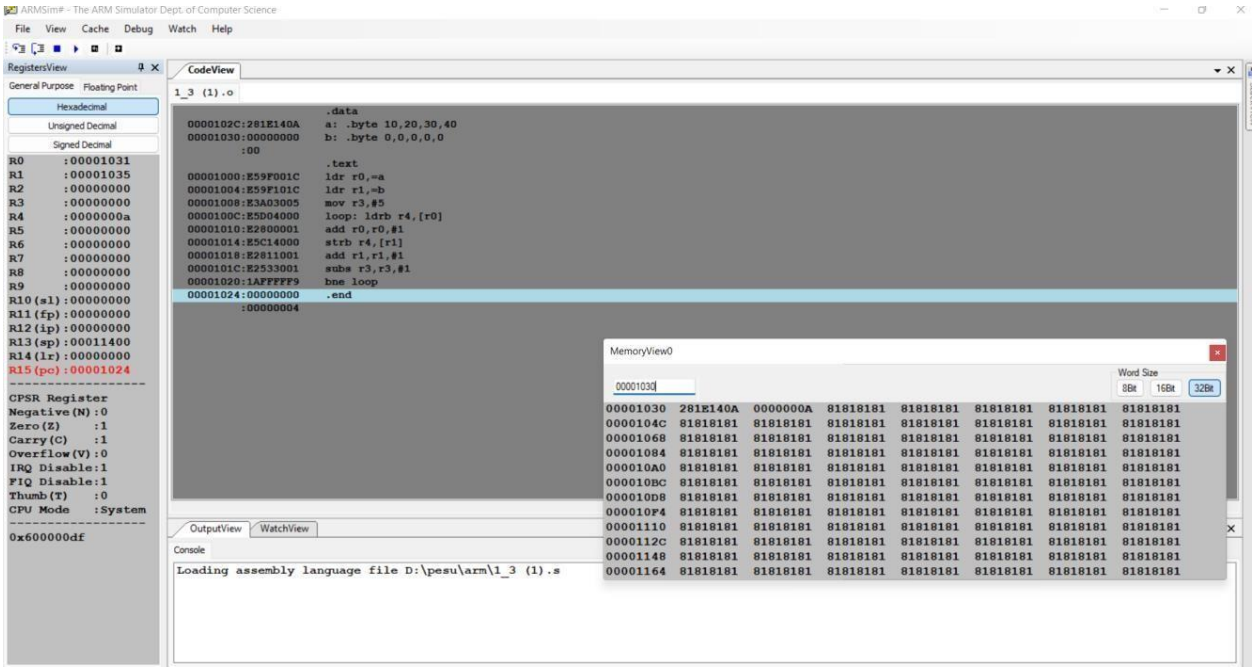
```
.data
a: .byte 10,20,30,40
b: .byte 0,0,0,0,0
.text
ldr    r0,=a
ldr    r1,=b
mov r3,#5
loop: ldrb r4,[r0]
add  r0,r0,#1
strb r4,[r1]
```

add r1,r1,#1

subs r3,r3,#1

bne loop

.end



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Name: NAGAVENI L G	SRN: PES2UG21CS315	Section F

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)

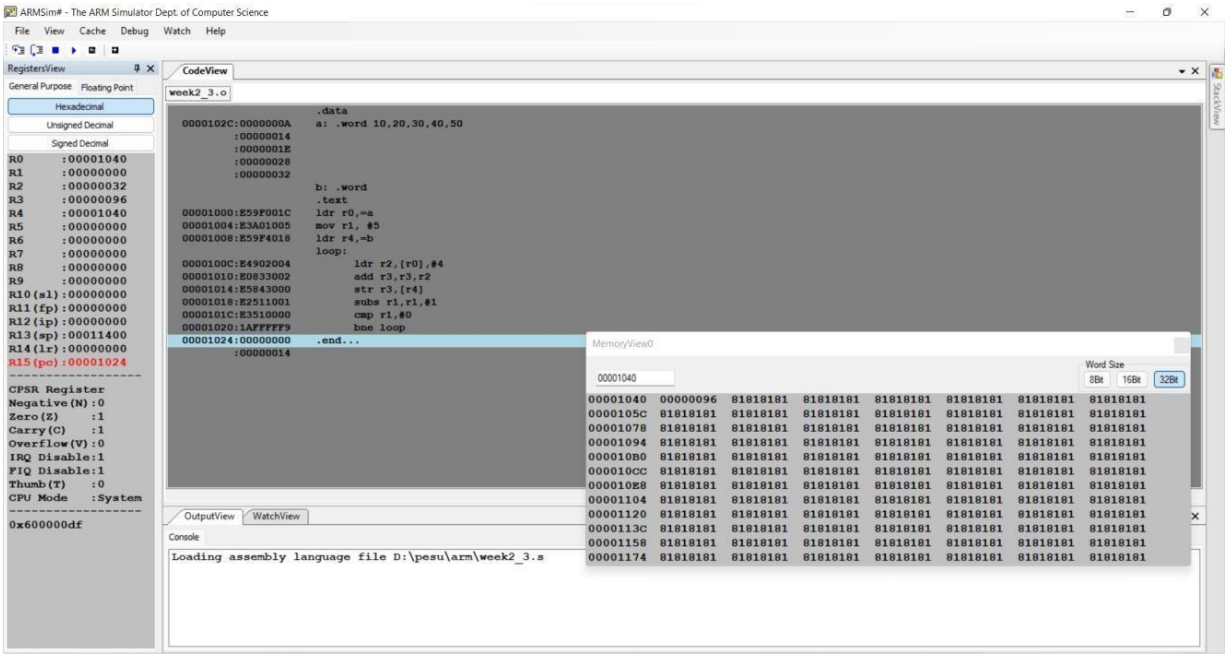
I. ARM Assembly Code

II. Output Screen Shots (Three)

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

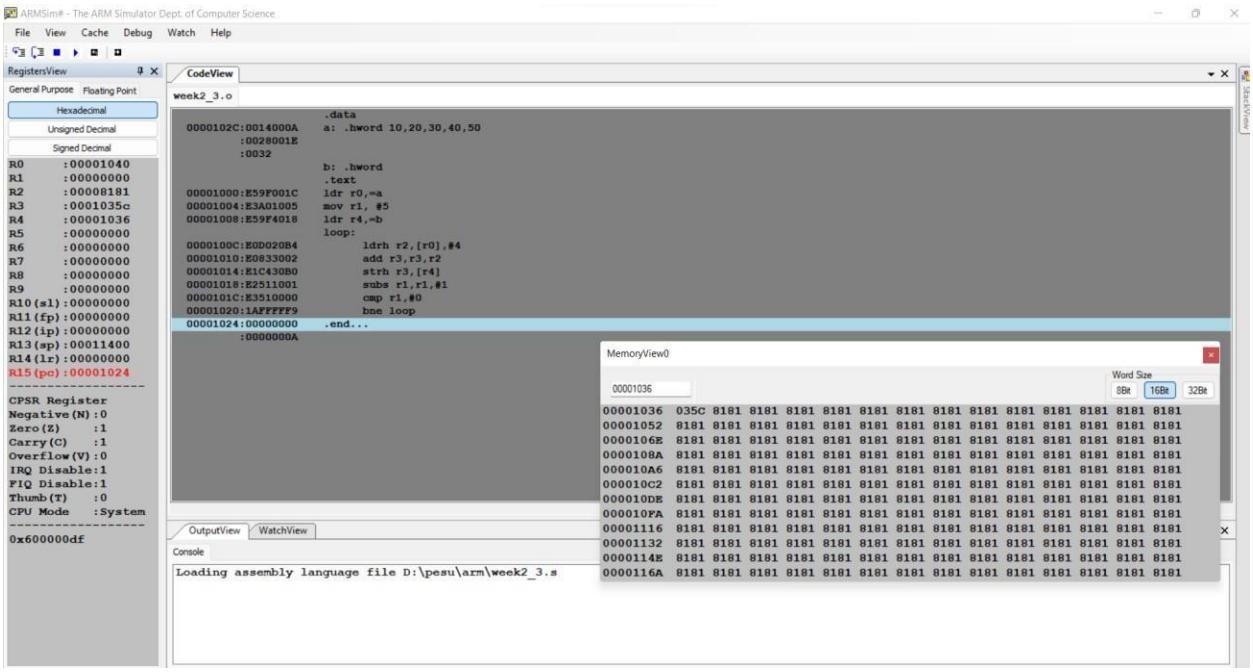
a)

```
.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)

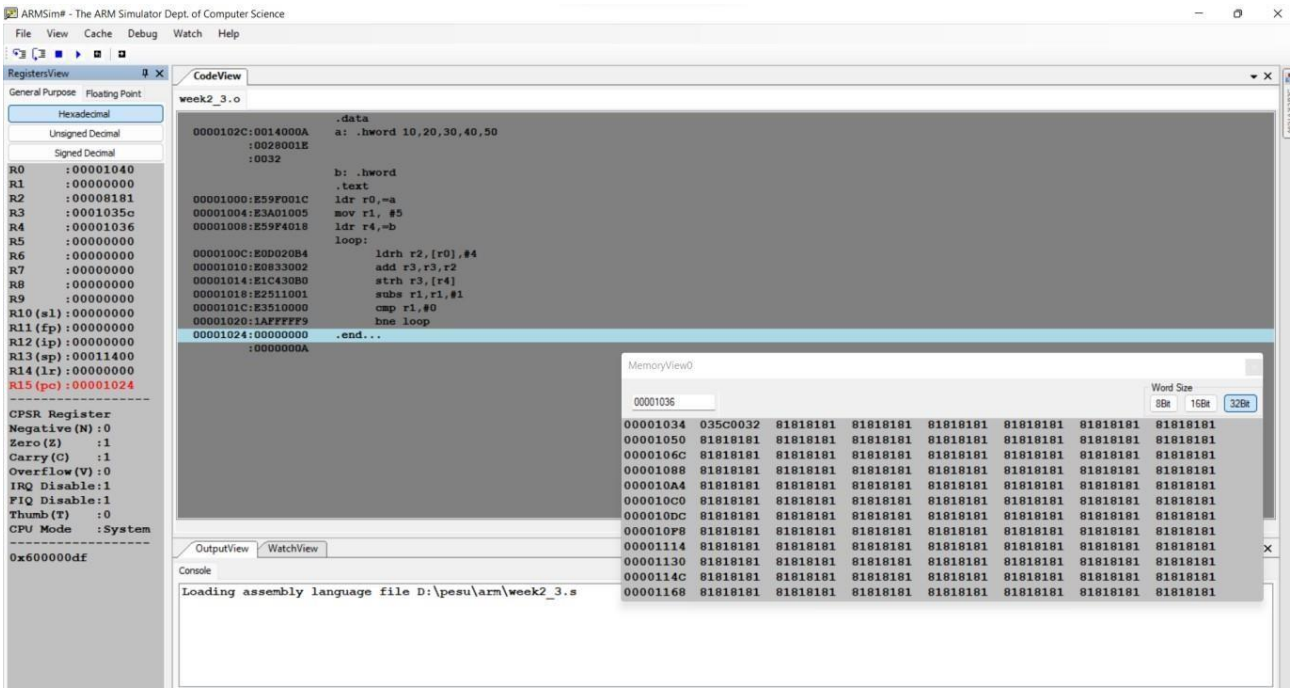
```
.data
a: .hword 10,20,30,40,50
b: .hword 0,0,0,0,0
.text
ldr r0,=a
ldr r1,=b
mov r2,#5
loop:
    ldr r4,[r0]
    add r0,r0,#4
    str r4,[r1]
    subs r2,r2,#1
    add r1,r1,#4
    bne loop
.end
```



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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Name: NAGAVENI L G	SRN: PES2UG21CS315	Section F

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:
```

add R1,R1,R3

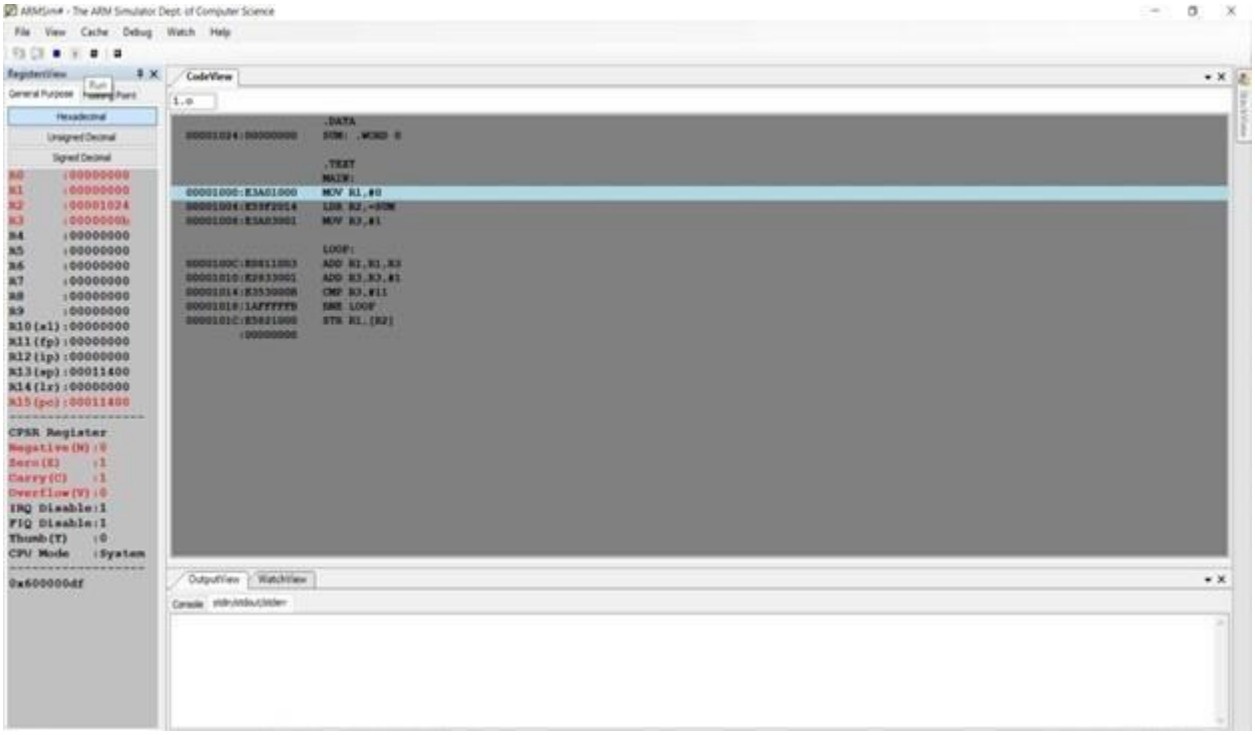
add R3,R3,#1

cmp R3,#11

bne loop

str R1,[R2]

II. Output Screen Shots (One)



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Week#____2_____ Program Number:_____4____

Title of the Program

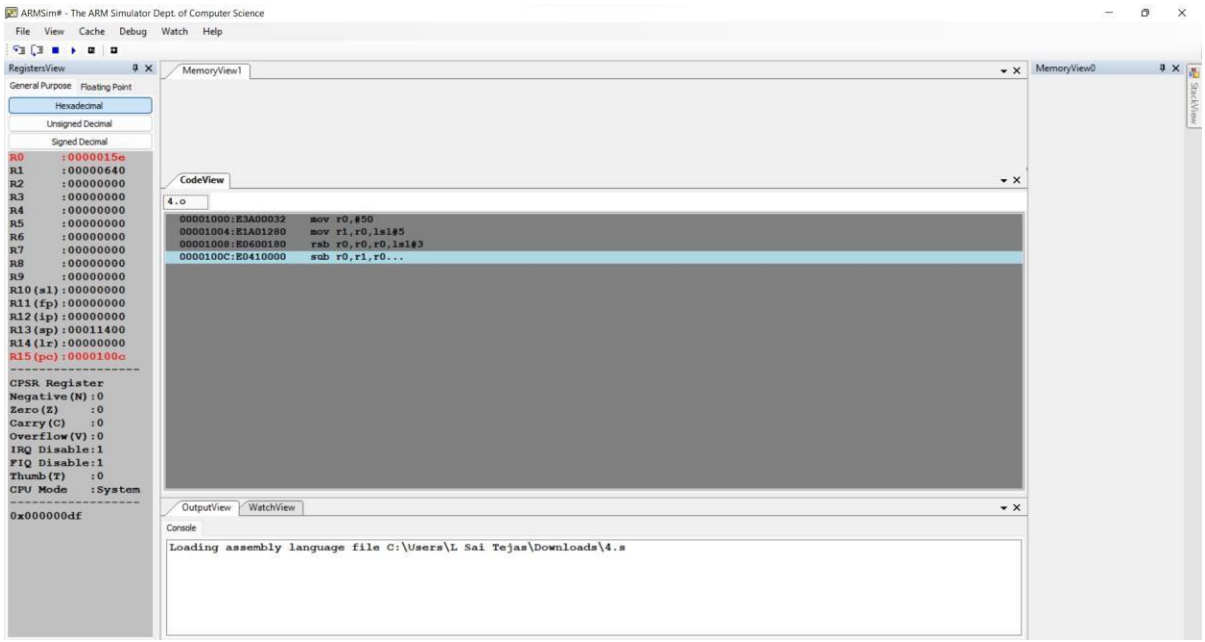
Write a program in ARM7TDMI-ISA to find the product of two 32bit numbers using barrel shifter.

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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Name: NAGAVENI L G	SRN: PES2UG21CS315	Section: F

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.

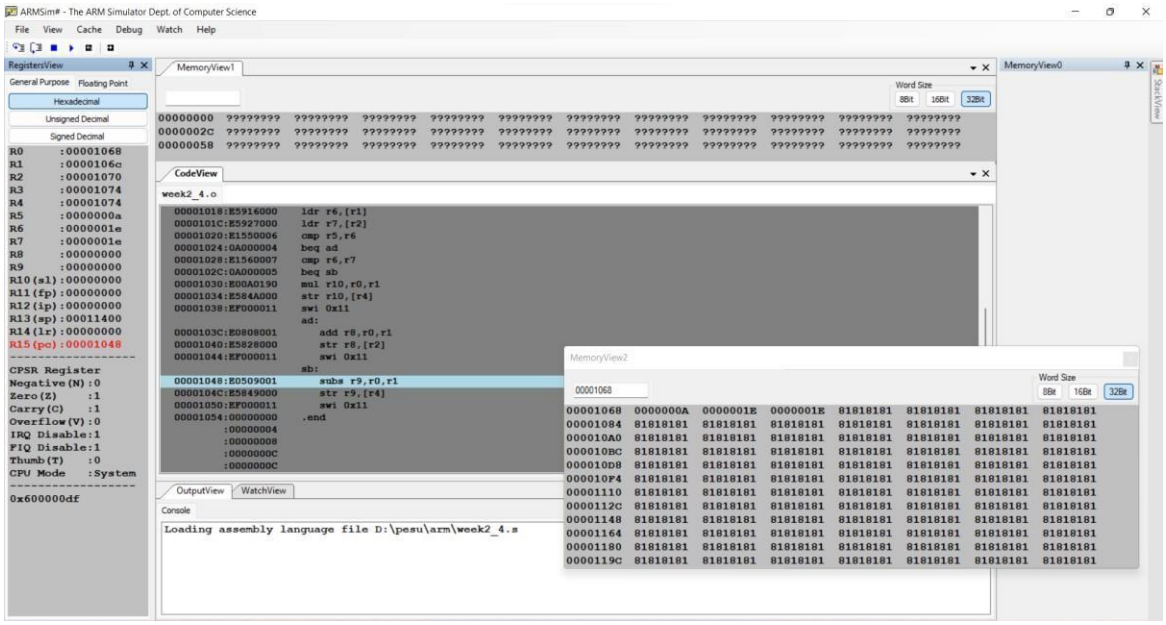
I. ARM Assembly Code

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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Name: NAGAVENI L G	SRN: PES2UG21CS315	Section: F

Week#____2_____ Program Number:_____6___

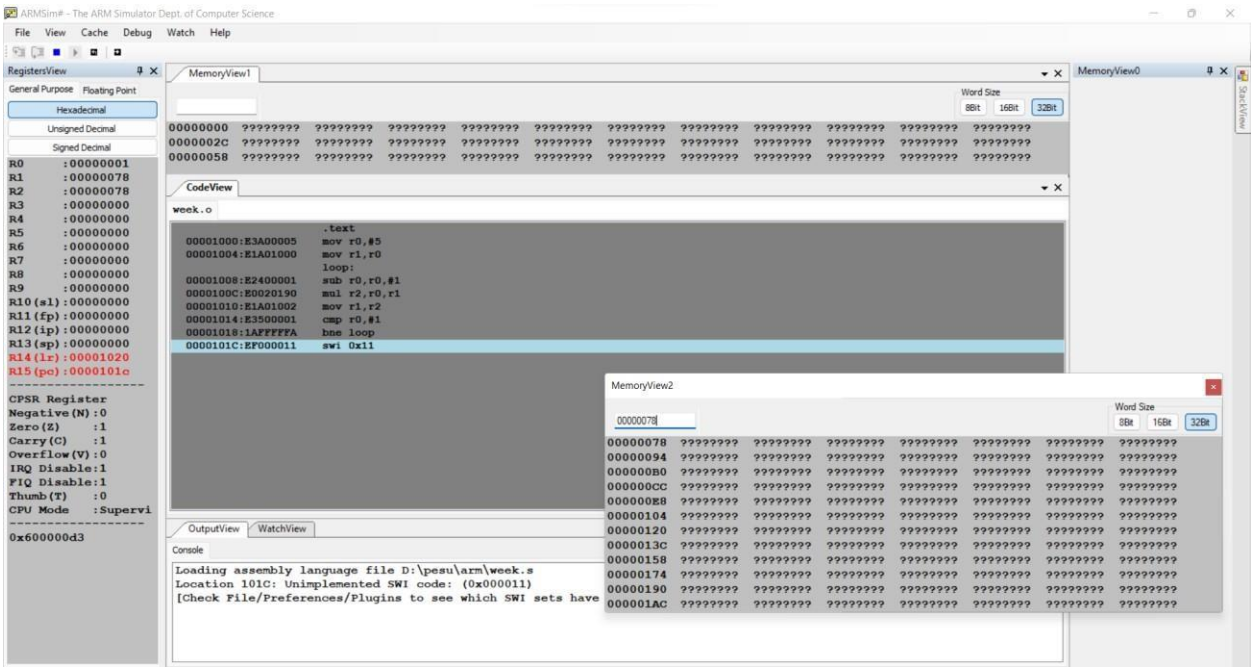
Title of the Program

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:

Name: NAGAVENI L G

SRN: PES2UG21CS315
Section: F
Date:30-01-2023