Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

Date:17/2/21

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Week#____4_____Program Number: ____1___

Write an ALP to add corresponding elements of an array.

I.ARM Assembly Code

```
.data
a: .word 10, 20, 30, 40, 50
b: .word 10, 20, 30, 40, 50
c: .word 0,0,0,0,0
.text
LDR r0,=a
LDR r1,=b
LDR r2,=c
mov r3,#1
loop:
    ldr r4,[r0],#4
```

ldr r5,[r1],#4

add r6,r4,r5

str r6,[r2],#4

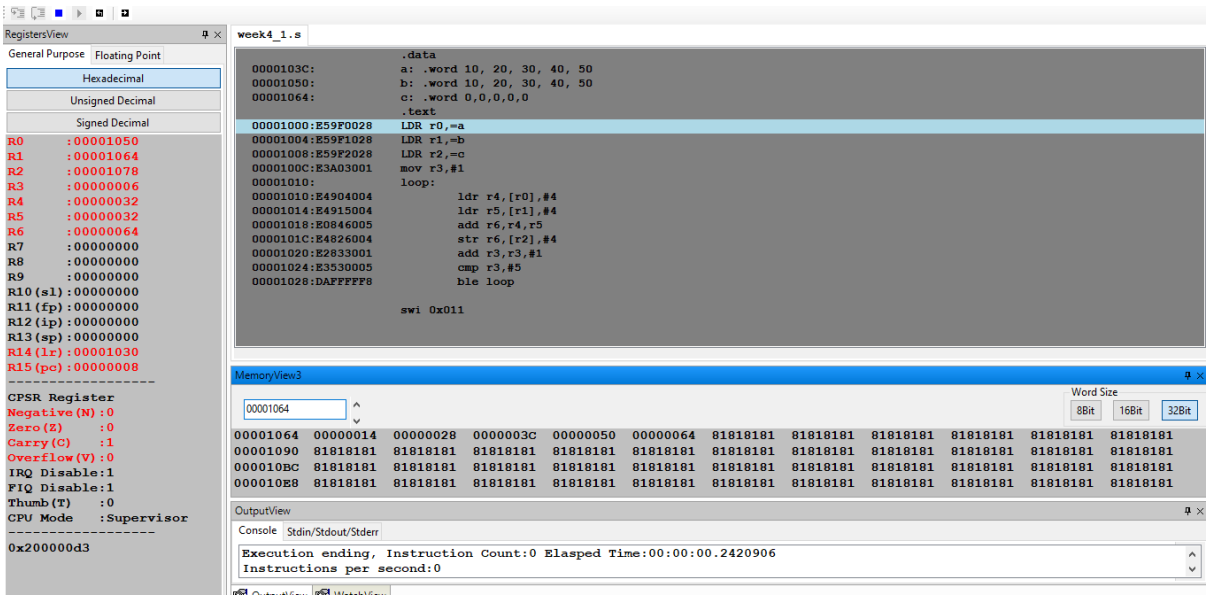
add r3,r3,#1

cmp r3,#5

ble loop

swi 0x011

II.Output



Week#____4_____Program Number: ____2___

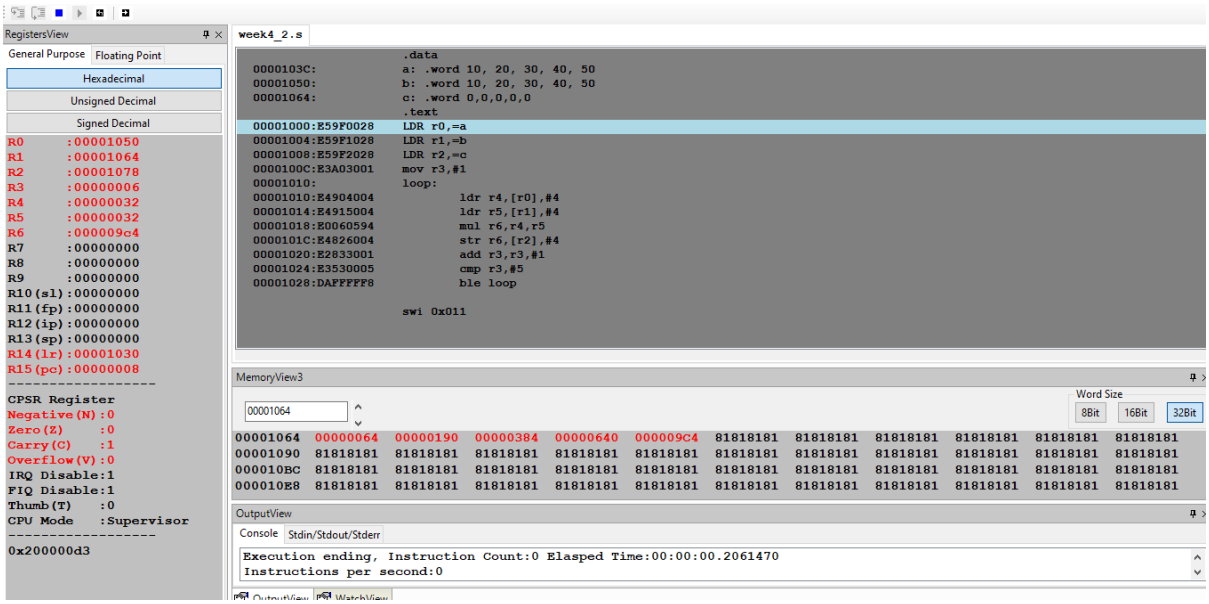
Write an ALP to find the product of corresponding elements of an array.

I.ARM Assembly Code

```
.data
a: .word 10, 20, 30, 40, 50
b: .word 10, 20, 30, 40, 50
c: .word 0,0,0,0,0
.text
LDR r0,=a
LDR r1,=b
LDR r2,=c
mov r3,#1
loop:
    ldr r4,[r0],#4
    ldr r5,[r1],#4
    mul r6,r4,r5
    str r6,[r2],#4
    add r3,r3,#1
    cmp r3,#5
    ble loop
```

swi 0x011

II.Output



Week#____4_____Program Number: ____3a___

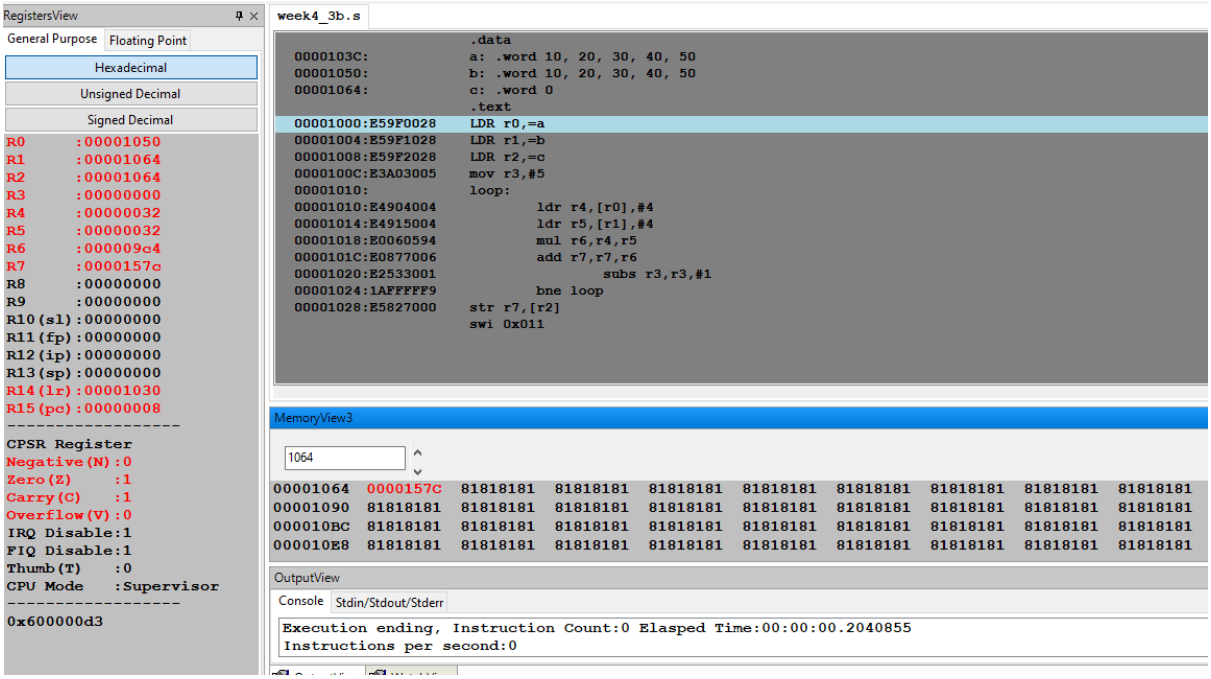
Write an ALP to perform Convolution operation using MUL instruction (Addition of multiplication of respective numbers of loc A and loc B)

I.ARM Assembly Code

```
.data
a: .word 10, 20, 30, 40, 50
b: .word 10, 20, 30, 40, 50
c: .word 0
.text
LDR r0,=a
LDR r1,=b
LDR r2,=c
mov r3,#5
loop:
        ldr r4,[r0],#4
        ldr r5,[r1],#4
        mul r6,r4,r5
        add r7,r7,r6
         subs r3,r3,#1
        bne loop
str r7,[r2]
```

swi 0x011

II.Output



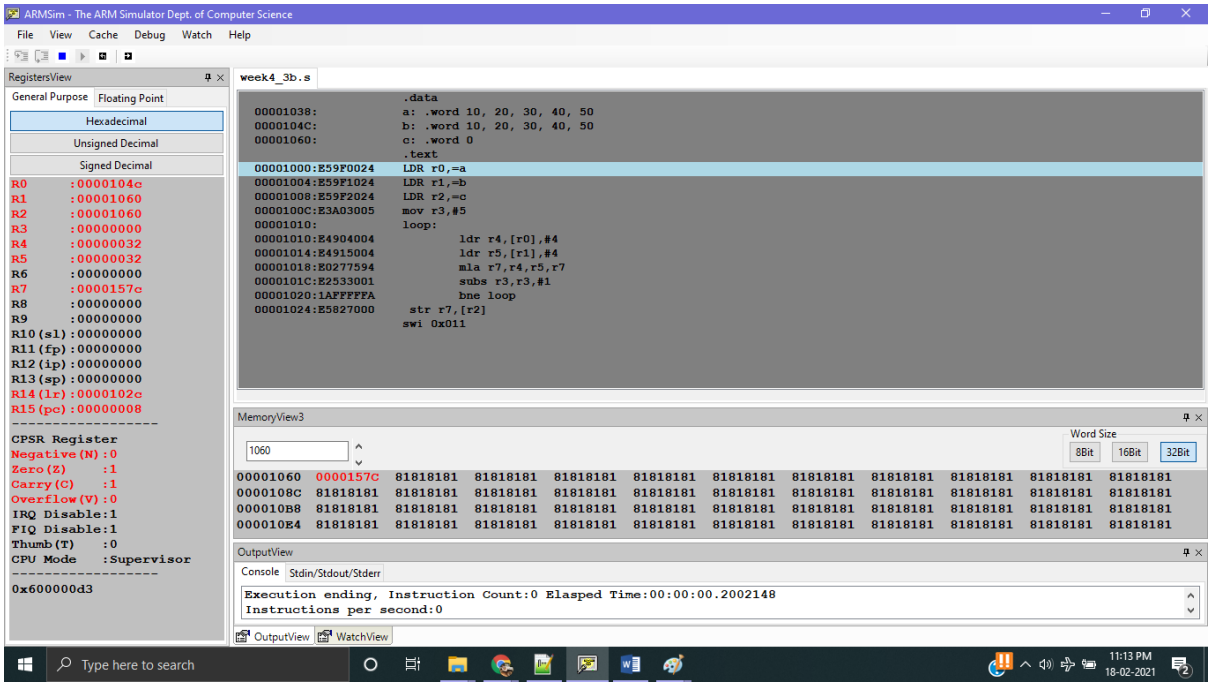
Week#____4_____Program Number: ____3b___

Write an ALP 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 10, 20, 30, 40, 50
b: .word 10, 20, 30, 40, 50
c: .word 0
.text
LDR r0,=a
LDR r1,=b
LDR r2,=c
mov r3,#5
loop:
        ldr r4,[r0],#4
        ldr r5,[r1],#4
        mla r7,r4,r5,r7
        subs r3,r3,#1
        bne loop
 str r7,[r2]
swi 0x011
```

II.Output


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 :0000104c
R1 :00001060
R2 :00001060
R3 :00000000
R4 :00000032
R5 :00000032
R6 :00000000
R7 :0000157c
R8 :00000000
R9 :00000000
R10(sl):00000000
R11(fp):00000000
R12(ip):00000000
R13(sp):00000000
R14(lr):0000102c
R15(pc):00000008
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 :Supervisor
0x600000d3
week4_3b.s
.data
00001038: a: .word 10, 20, 30, 40, 50
0000104C: b: .word 10, 20, 30, 40, 50
00001060: c: .word 0
.text
00001000:E59F0024 LDR r0,=a
00001004:E59F1024 LDR r1,=b
00001008:E59F2024 LDR r2,=c
0000100C:E3A03005 mov r3,#5
00001010: loop:
00001010:E4904004 ldr r4,[r0],#4
00001014:E4915004 ldr r5,[r1],#4
00001018:E0277594 mla r7,r4,r5,r7
0000101C:E2533001 subs r3,r3,#1
00001020:1AFFFFFA bne loop
00001024:E5827000 str r7,[r2]
swi 0x011
MemoryView3
1060
Word Size
8Bit 16Bit 32Bit
00001060 0000157C 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
0000108C 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
000010B8 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
000010E4 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
OutputView
Console Stdin/Stdout/Stderr
Execution ending, Instruction Count:0 Elasped Time:00:00:00.2002148
Instructions per second:0
OutputView WatchView
Type here to search
11:13 PM
18-02-2021

Week#____4_____Program Number: ____4___

Consider an 2D array. Write an ALP using ARM7TDMI-ISA, to retrieve / access any element from the array.

I.ARM Assembly Code

```
.data
a: .byte 1, 2, 3, 4, 5,6,7,8,9

.text
LDR r0,=a
mov r1,#0;row
mov r2,#0;col
mov r3,#3;no of elements per row
mla r4,r1,r3,r2
ldrb r5,[r0,r4]
```