MPCA LAB – 3

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Section : L

Roll No : 5

1. Generate Fibonacci Series and store them in an array.

```
.DATA
        N: .WORD 10
        A: .WORD

.TEXT
        LDR R5,=N
        LDR R4,[R5]
        LDR R6,=A
        MOV R0,#0
        MOV R1,#1
        STR R0,[R6],#4
```

STR R1,[R6],#4

SUB R4,R4,#1

loop:

ADD R3,R0,R1

MOV R1,R0

MOV R0,R3

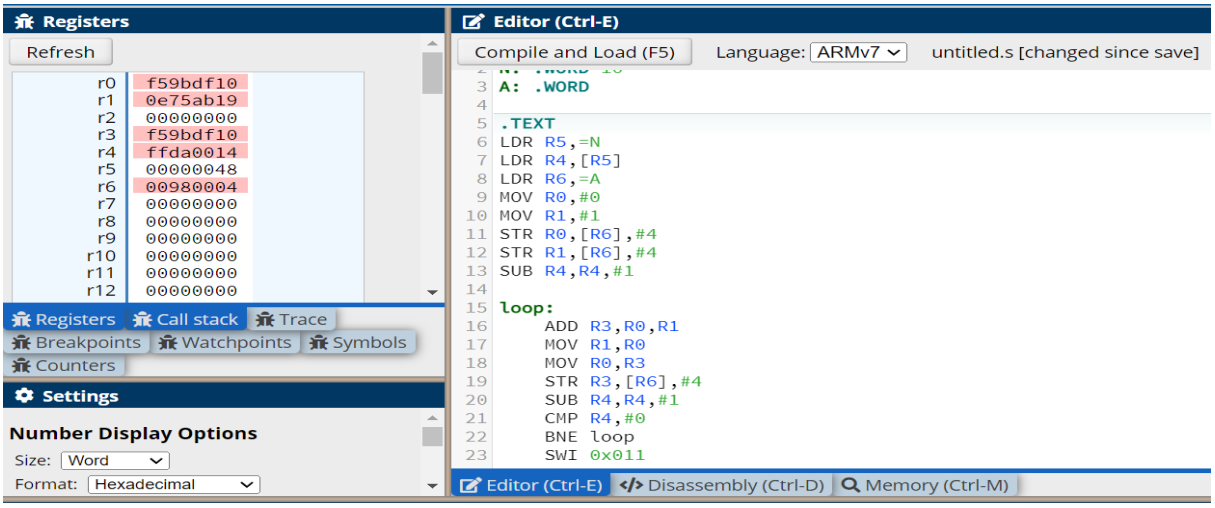
STR R3,[R6],#4

SUB R4,R4,#1

CMP R4,#0

BNE loop

SWI 0x011

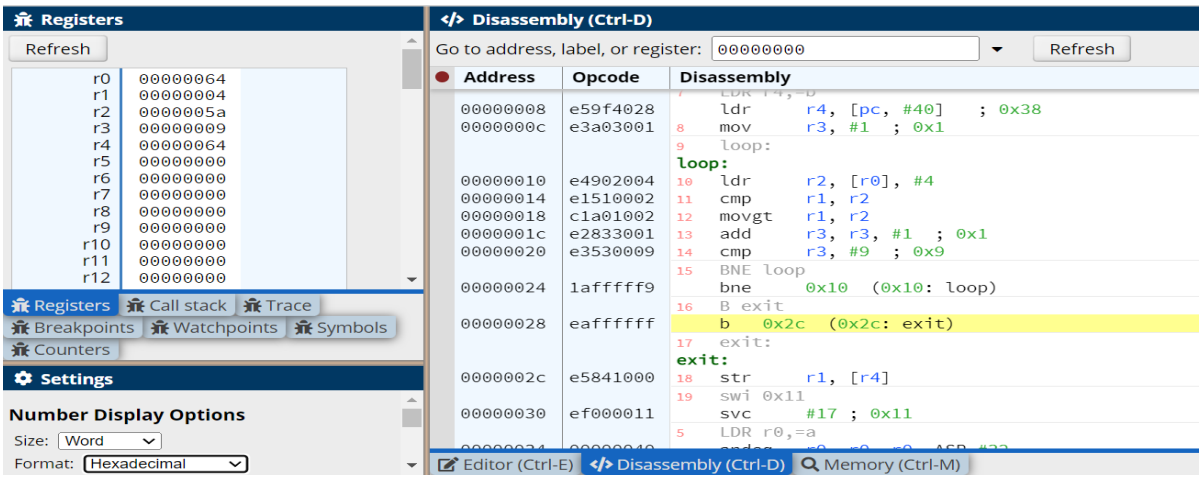


2. Write an ALP to find smallest number in an array of n 32 bit numbers

.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
```



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

```
.DATA
        A: .WORD 10,20,30,40,50,60,70,80,90,100
        B: .WORD 1,2,3,4,5,6,7,8,9,10
        C: .WORD
        N: .WORD 10
.TEXT
        LDR R0,=A
        LDR R1,=B
        LDR R2,=C
        LDR R8,=N
        LDR R9,[R8]
loop:
LDR R4,[R0],#4
LDR R5,[R1],#4
```

MUL R6,R4,R5

ADD R7,R6,R7

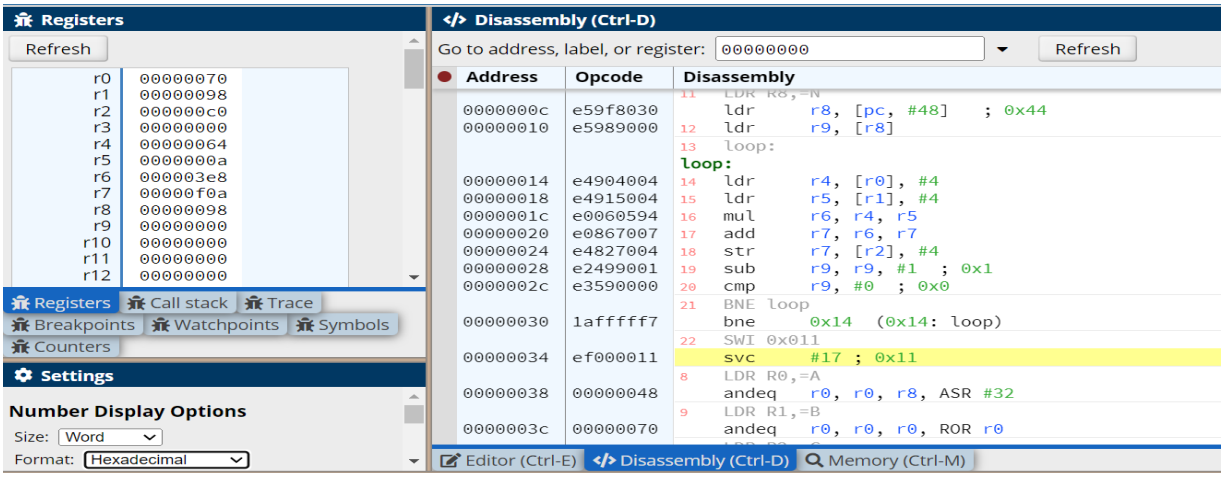
STR R7,[R2],#4

SUB R9,R9,#1

CMP R9,#0

BNE loop

SWI 0x011



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

.DATA

A: .WORD 10,20,30,40,50,60,70,80,90,100

B: .WORD 1,2,3,4,5,6,7,8,9,10

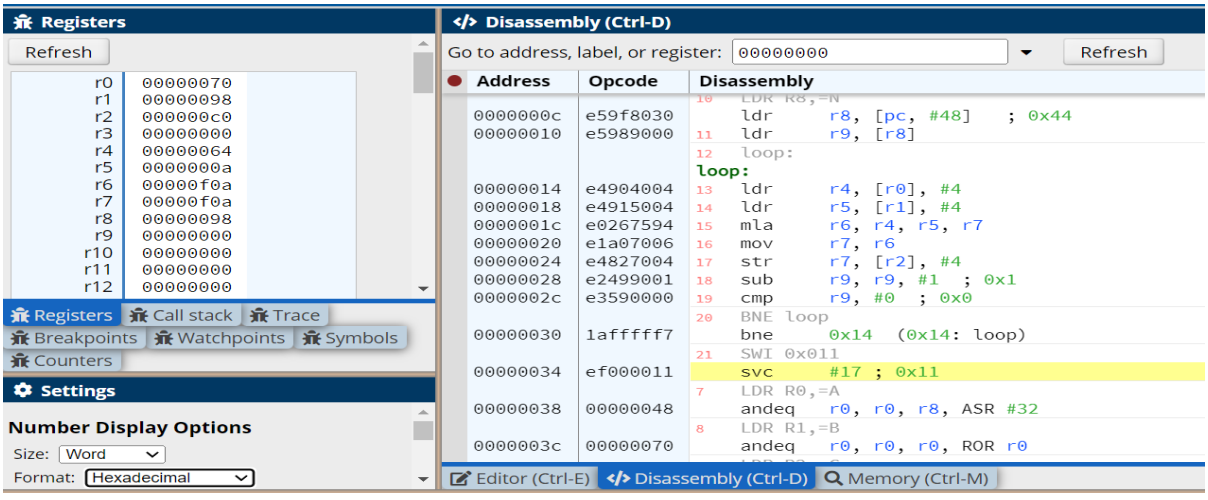
C: .WORD

N: .WORD 10

.TEXT

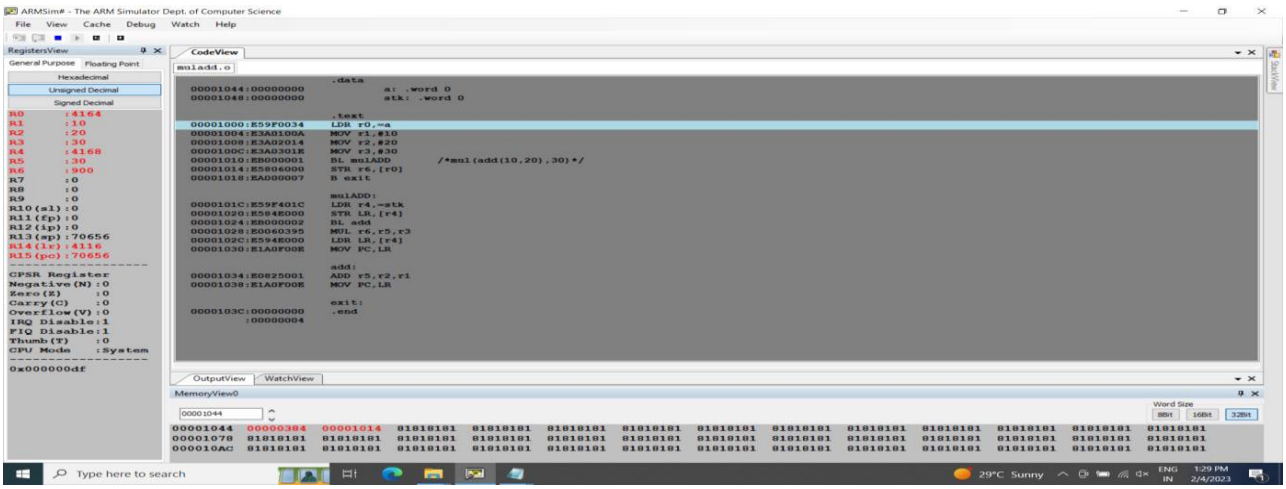
LDR R0,=A

```
        LDR R1,=B
        LDR R2,=C
        LDR R8,=N
        LDR R9,[R8]
loop:
LDR R4,[R0],#4
LDR R5,[R1],#4
MLA R6,R4,R5,R7
MOV R7,R6
STR R7,[R2],#4
SUB R9,R9,#1
CMP R9,#0
BNE loop
SWI 0x011
```



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

```
.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
```



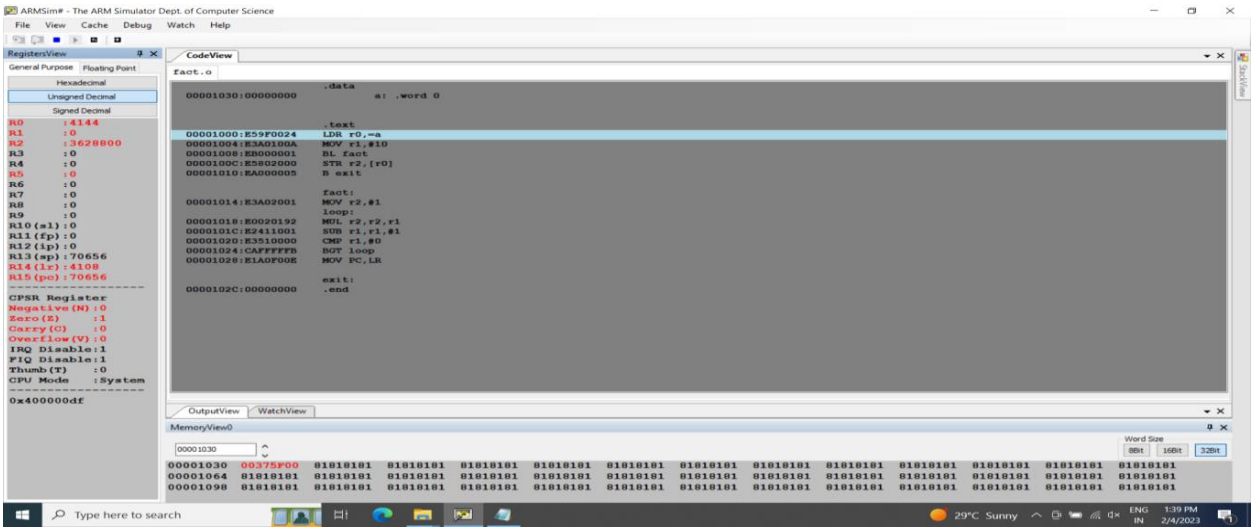
6. Write an ALP to find factorial using subroutine

```
.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



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

```
mov r0,#5

mov r1,#9

mov r2,#0


loop:

   cmp r1,#0

   ble exit

   tst r1,#1

   addne r2,r2,r0

   mov r0,r0,lsl #1
```

```
    mov r1,r1,lsr #1
    b loop
exit:
    swi 0x011
```