Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

Date: 10/02/2021

Name: SUHAN B REVANKAR	SRN:PES2UG19CS412	Section:G

Week#____3_____ Program Number:____1__

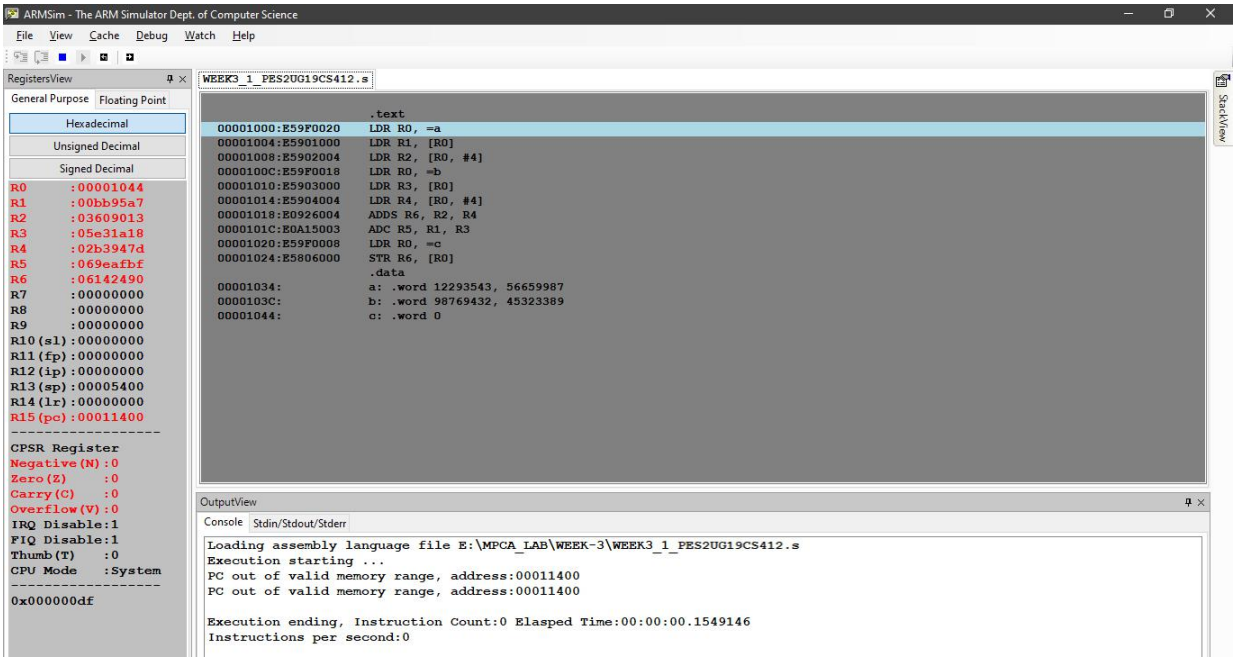
Write an ALP to add two 64 bit numbers loaded from memory and store the result in memory.

I. ARM Assembly Code for the program.

File Edit Format View Help

```
.text
LDR R0, =a
LDR R1, [R0]
LDR R2, [R0, #4]
LDR R0, =b
LDR R3, [R0]
LDR R4, [R0, #4]
ADDS R6, R2, R4
ADC R5, R1, R3
LDR R0, =c
STR R6, [R0]
.data
a: .word 12293543, 56659987
b: .word 98769432, 45323389
c: .word 0
```

II. Output Screen Shot (One Example of your choice)



III. Output Table for the program

```
                    a:
                .word
        12293543,
        56659987

                    b:
                .word
        98769432,
        45323389
```

	Upper 32 bits	**Lower 32 bits**
a: .word	56659987 **(03609013)**	12293543 **(00bb95A7)**
b: .word	4 5 3 2 3 3 8 9 **(02B3947D)**	98769432 **(05E31A18)**
c: .word	101984376 **(06142878)**	110977975 **(069D63B7)**

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Name: SUHAN B REVANKAR	SRN:PES2UG19CS412	Section:G

Week#____3_____ Program Number:____2___

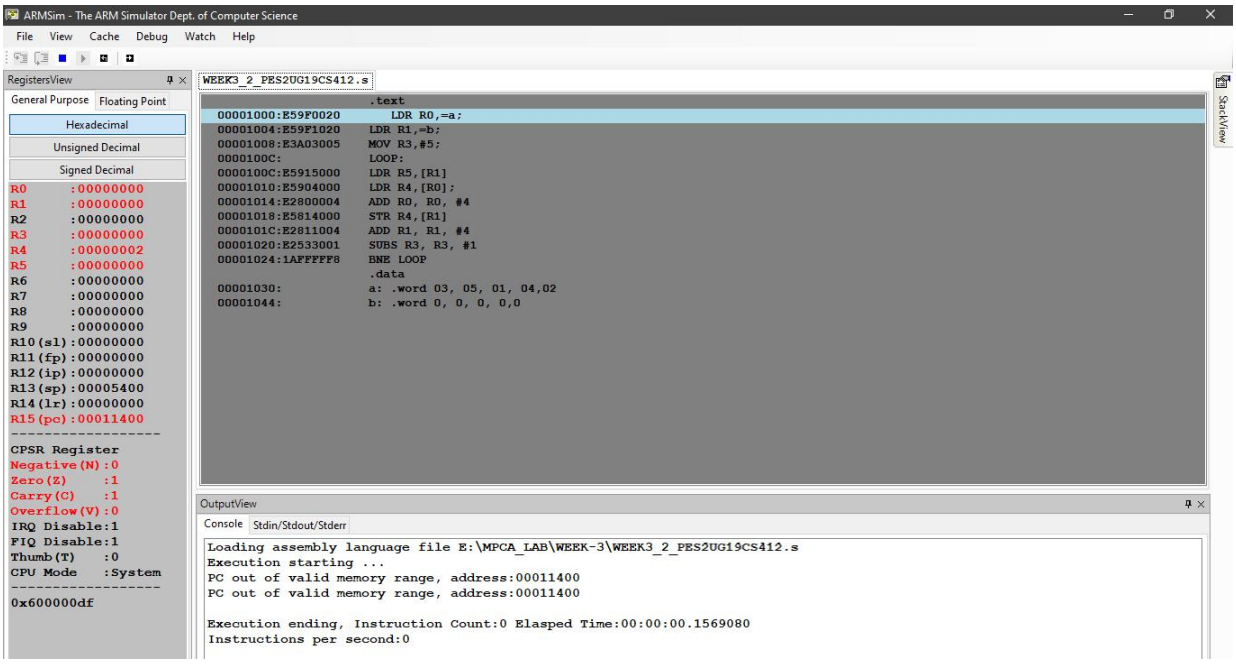
Write an ALP to copy n numbers from Memory Location A to Memory Location B

I. ARM Assembly Code for the program.

File Edit Format View Help

```
.text
   LDR R0,=a;
LDR R1,=b;
MOV R3,#5;
LOOP:
LDR R5,[R1]
LDR R4,[R0];
ADD R0, R0, #4
STR R4,[R1]
ADD R1, R1, #4
SUBS R3, R3, #1
BNE LOOP
.data
a: .word 03, 05, 01, 04,02
b: .word 0, 0, 0, 0,0
```

II. Output Screen Shot (One Example of your choice)



III. Output Table for the program

.data a: .word 3, 5, 1, 4,2 **b: .word 0, 0, 0, 0,0**	
1st Iteration	a: .word 03, 05, 01, 04,02 b: .word 03, 00, 00, 00,00
2nd Iteration	a: .word 03, 05, 01, 04,02 b: .word 03, 05, 0, 0,0
3rd Iteration	a: .word 03, 05, 01, 04,02 b: .word 03, 05, 01, 0,0
4th Iteration	a: .word 03, 05, 01, 04,02 b: .word 03, 05, 01, 04,0
5th Iteration	a: .word 03, 05, 01, 04,02 a: .word 03, 05, 01, 04,02

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Name: SUHAN B REVANKAR	SRN:PES2UG19CS412	Section:G

Week#____3_____ Program Number:____3__

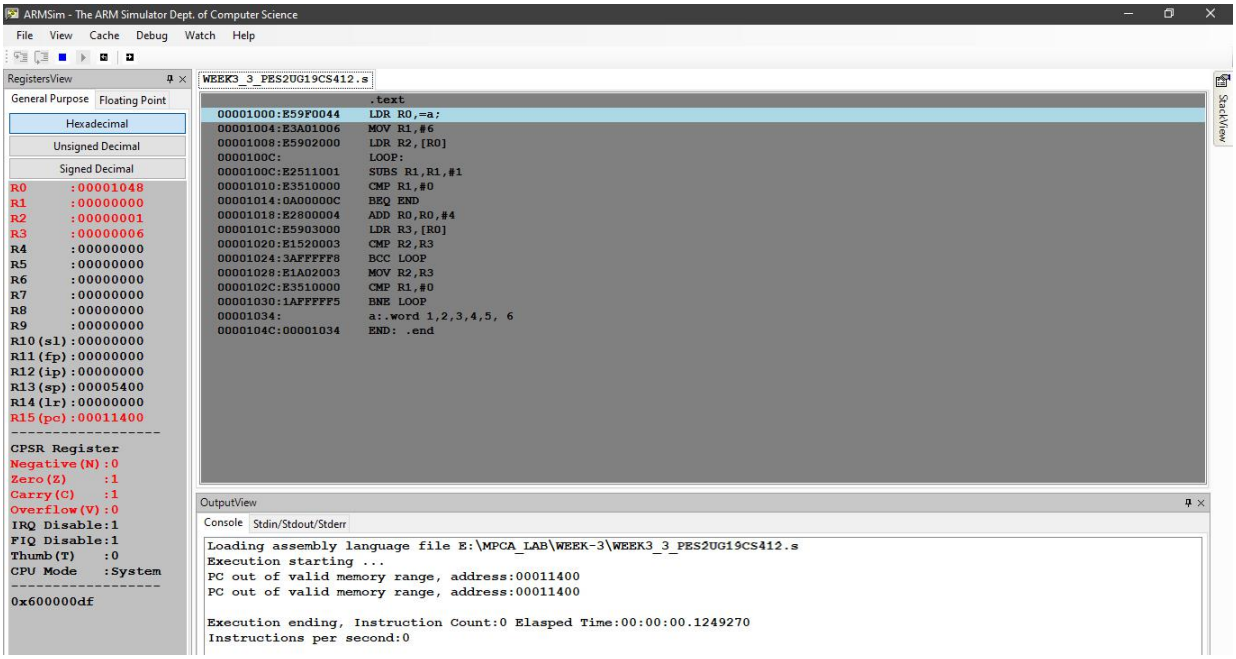
Write an ALP to find smallest number in an array of n 32 bitnumbers

I. ARM Assembly Code for the program.

File Edit Format View Help

```
.text
LDR R0,=a;
MOV R1,#6
LDR R2,[R0]
LOOP:
SUBS R1,R1,#1
CMP R1,#0
BEQ END
ADD R0,R0,#4
LDR R3,[R0]
CMP R2,R3
BCC LOOP
MOV R2,R3
CMP R1,#0
BNE LOOP
a:.word 1,2,3,4,5, 6
END: .end
```

II. Output Screen Shot (One Example of your choice)



III. Output Table for the program

a:.word 1,2,3,4,5, 6	
1st Iteration	R2=1,R3=2 (R3>R2)
2nd Iteration	R2=1, R3=3 (R3>R2)
3rd Iteration	R2=1, R3=4 (R3>R2)
4th Iteration	R2=1, R3=5 (R3>R2)
5th Iteration	R2=1, R3=6 (R3>R2)
Smallest number is present in R2	

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Week#____3_____ Program Number:____4a_

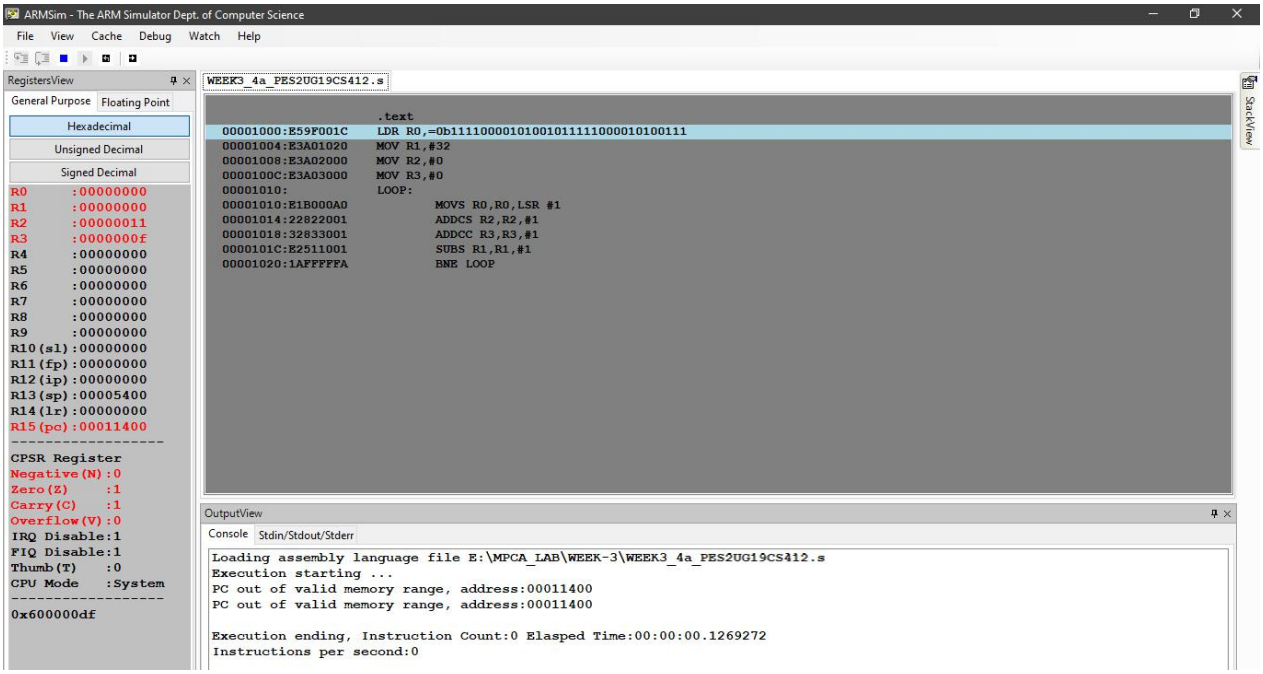
Write an ALP to count the number of 1's and 0's in a given 32 bit number.

I. ARM Assembly Code for the program.

File Edit Format View Help

```
.text
LDR R0,=0b11110000101001011111000010100111
MOV R1,#32
MOV R2,#0
MOV R3,#0
LOOP:
        MOVS R0,R0,LSR #1
        ADDCS R2,R2,#1
        ADDCC R3,R3,#1
        SUBS R1,R1,#1
        BNE LOOP
```

II. Output Screen Shot (One Example of your choice)



III. Output Table for the program

r0, =0b11110000101001011111000010100101		
r1	32	
r2	After execution	17 (=0F in hex)
r3	After execution	16 (=11 in hex)

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Name: SUHAN B REVANKAR	SRN:PES2UG19CS412	Section:G

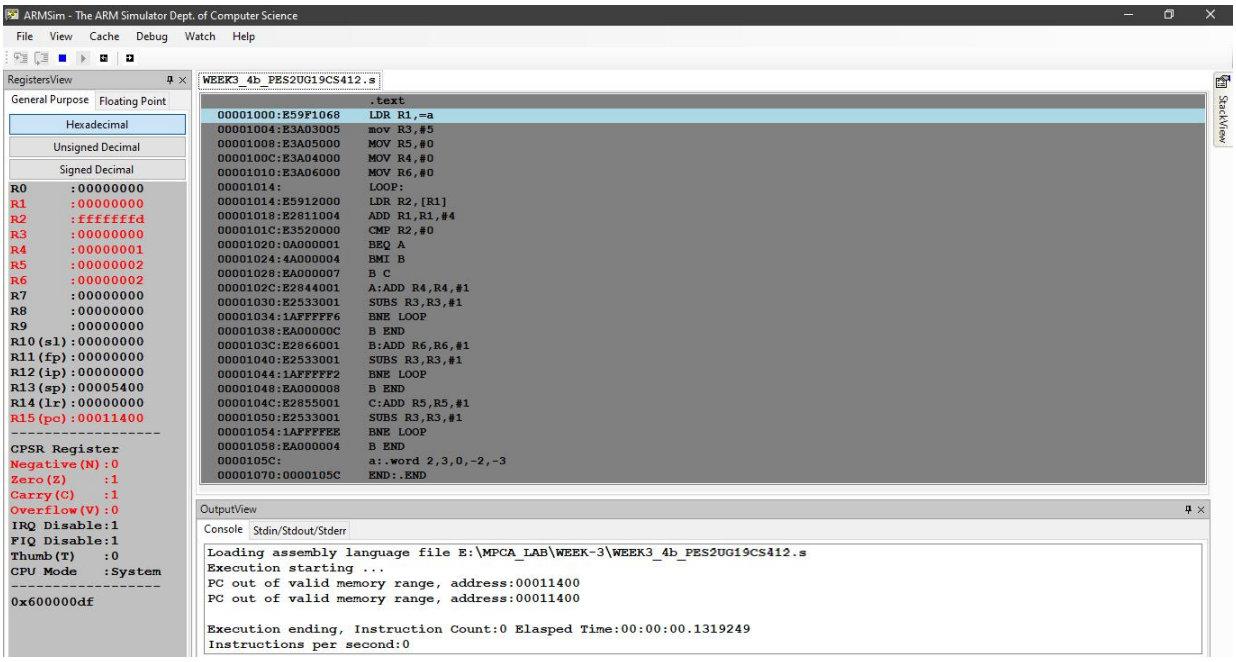
Week#____3_____ Program Number:____4b_

Write an ALP to find the number of zeroes, positive and negative numbers in a given array

I. ARM Assembly Code for the program.

```
File  Edit  Format  View  Help
.text
LDR R1,=a
mov R3,#5
MOV R5,#0
MOV R4,#0
MOV R6,#0
LOOP:
LDR R2,[R1]
ADD R1,R1,#4
CMP R2,#0
BEQ A
BMI B
B C
A:ADD R4,R4,#1
SUBS R3,R3,#1
BNE LOOP
B END
B:ADD R6,R6,#1
SUBS R3,R3,#1
BNE LOOP
B END
C:ADD R5,R5,#1
SUBS R3,R3,#1
BNE LOOP
B END
a:.word 2,3,0,-2,-3
END:.END
```

II. Output Screen Shot (One Example of your choice)



III. Output Table for the program

a:.word 2,3,0,-2,-3		
R4	1	
R5	2	
R6	2	

Microprocessor and Computer Architecture Laboratory

UE19CS256

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Name: SUHAN B REVANKAR	SRN:PES2UG19CS412	Section:G

Week#____3_____ Program Number:____5_

Write an ALP to check whether a given number is present in array using Linear Search (Without SWI 0x02), if found move +1 to R6 and key position to R7

else move -1 to R6 (if number not found)

I. ARM Assembly Code for the program.

A)

File Edit Format View Help

```
.text
LDR R0,=A
MOV R2,#4
MOV R3,#5
MOV R4,#0
LOOP:
LDR R1,[R0]
ADD R4,R4,#1
CMP R1,R2
BEQ B
ADD R0,R0,#4
SUBS R3,R3,#1
BNE LOOP
MOV R6,#-1
B END
B:MOV R7,R4
A:.WORD 1,2,3,4,5
END: .end
```

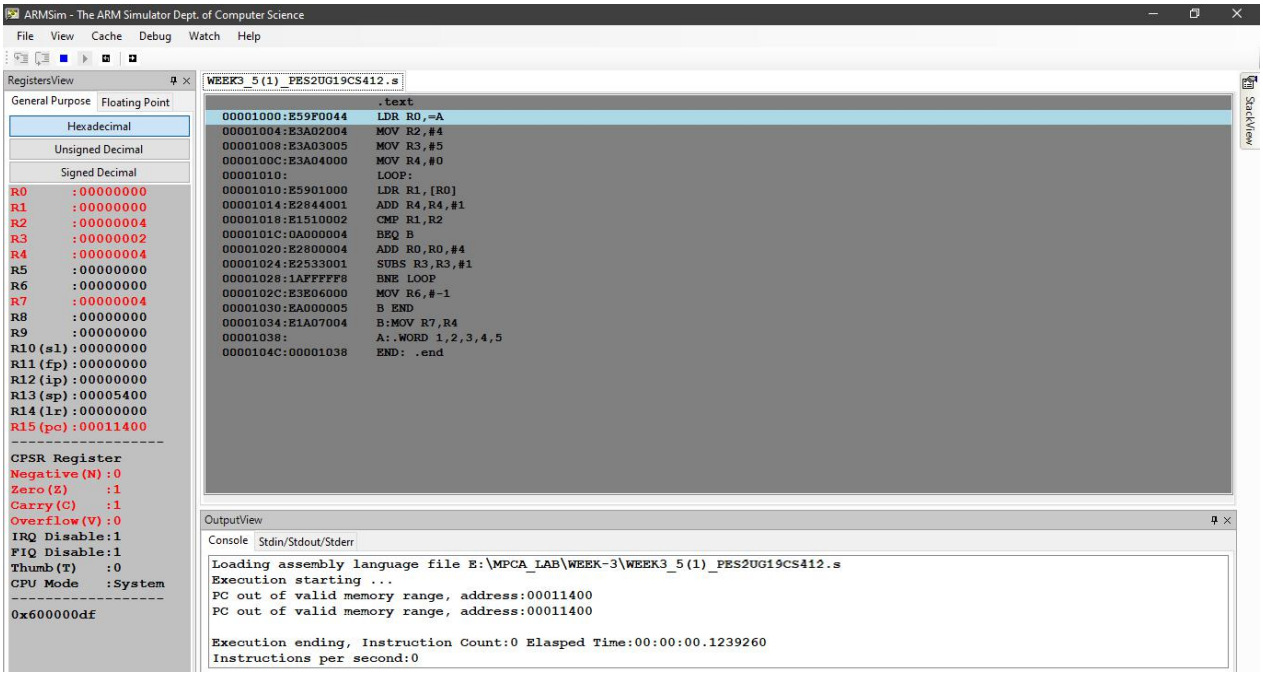
B)

File Edit Format View Help

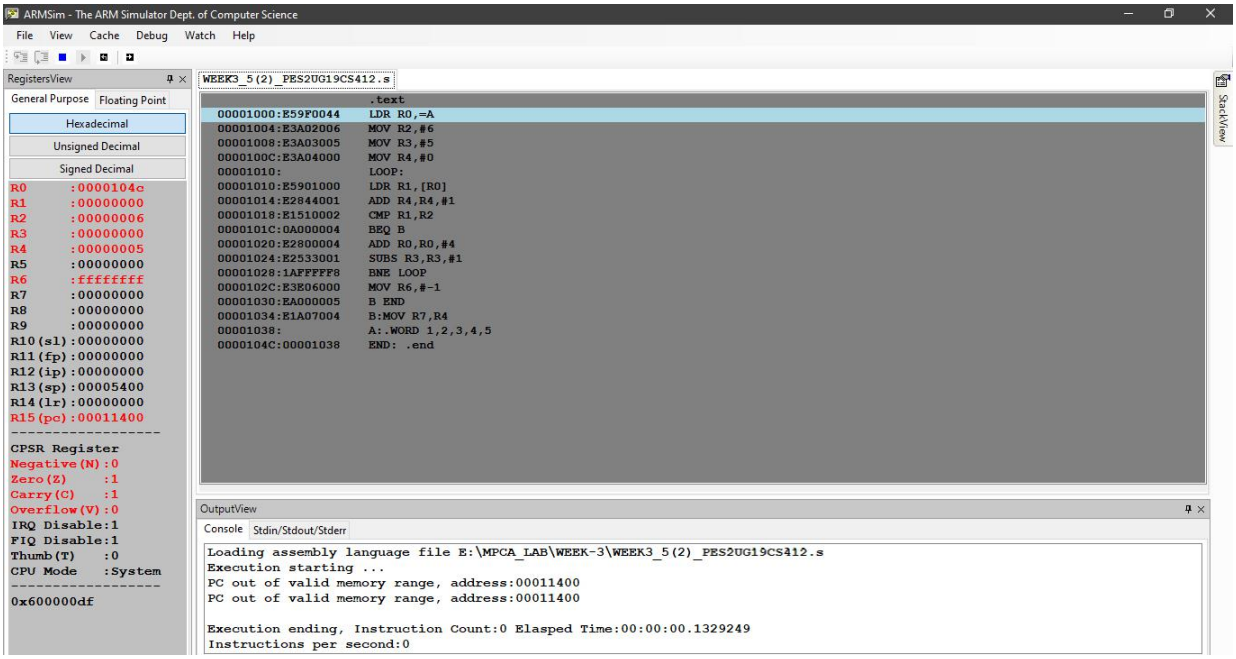
```
.text
LDR R0,=A
MOV R2,#6
MOV R3,#5
MOV R4,#0
LOOP:
LDR R1,[R0]
ADD R4,R4,#1
CMP R1,R2
BEQ B
ADD R0,R0,#4
SUBS R3,R3,#1
BNE LOOP
MOV R6,#-1
B END
B:MOV R7,R4
A:.WORD 1,2,3,4,5
END: .end
```

II. Output Screen Shot (One Example of your choice)

A)



B)



III. Output Table for the program

		HEX value
A:.WORD 1,2,3,4,5		
R2	KEY =3	03
R3	COUNT =5	
R0	Address of A	00001038
R7	After Execution =3	Position of key element =3

		HEX value
A:.WORD 1,2,3,4,5		
R2	KEY =0	00
R3	COUNT =5	
R0	Address of A	00001038
R6	After Execution =-1 (Decimal Form)	Position of key element =Not found

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Name: SUHAN B REVANKAR	SRN:PES2UG19CS412	Section:G

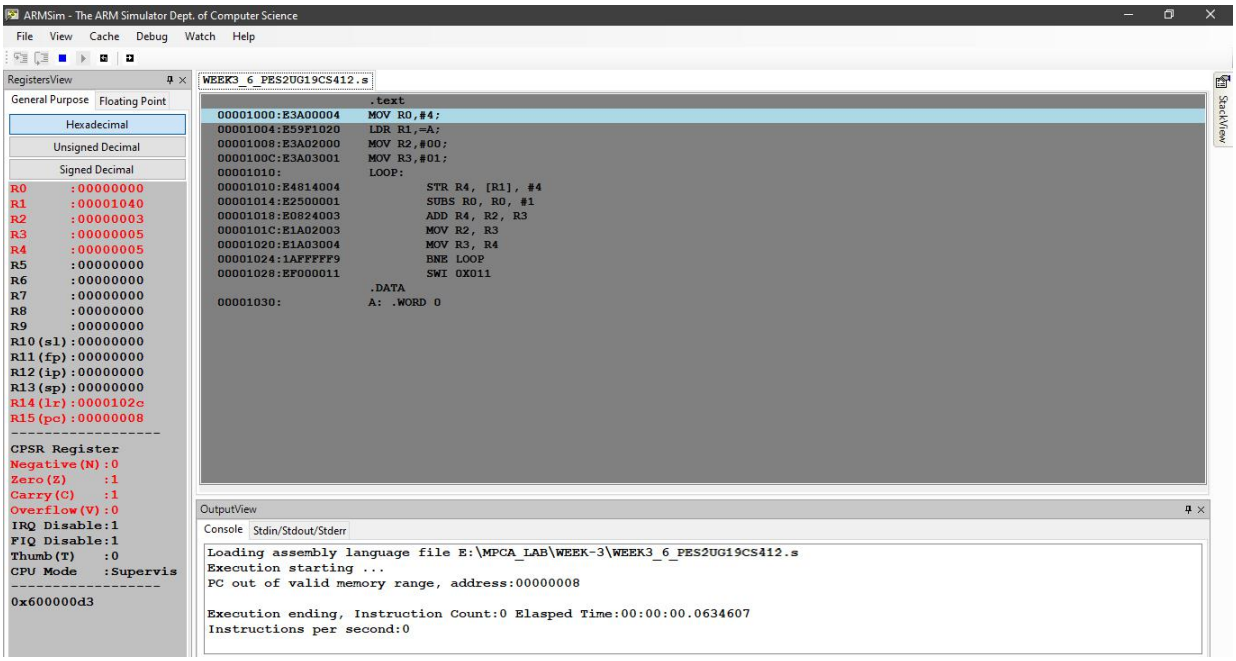
Week#____3_____ Program Number:____6_

Write an ALP to generate Fibonacci Series and store them in an array

I. ARM Assembly Code for the program.

```
File  Edit  Format  View  Help
.text
MOV R0,#4;
LDR R1,=A;
MOV R2,#00;
MOV R3,#01;
LOOP:
        STR R4, [R1], #4
        SUBS R0, R0, #1
        ADD R4, R2, R3
        MOV R2, R3
        MOV R3, R4
        BNE LOOP
        SWI 0X011
.DATA
A: .WORD 0
```

II. Output Screen Shot (One Example of your choice)



III. Output Table for the program

R0	**Fibonacci Count**	**4**
R1	Address of A	
R2	Initially 0	
R3	Initially 1	
R4	1st Iteration	0+1=1
R4	2nd Iteration	1+1=2
R4	3rd Iteration	2+1=3
R4	4th Iteration	3+2=5

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.

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Date: 10/02/2021