Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

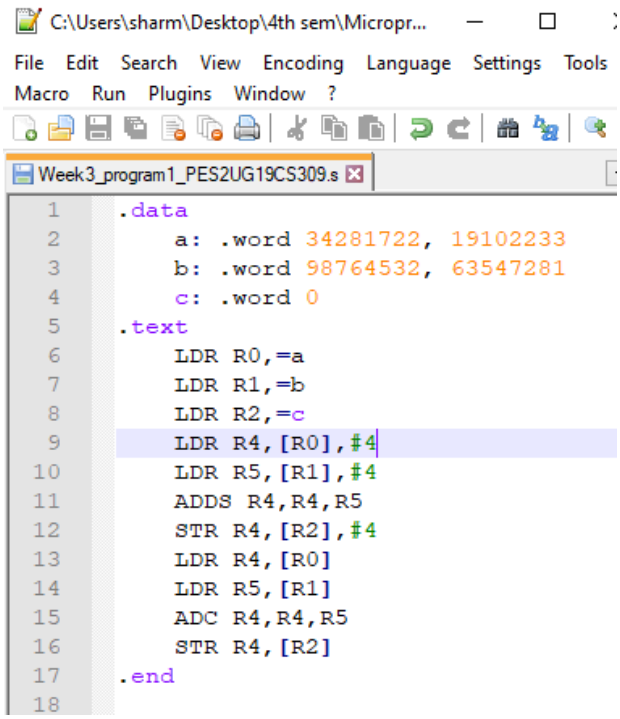
Date:8/02/2021

Name: R Sharmila	SRN: PES2UG19CS309	Section E

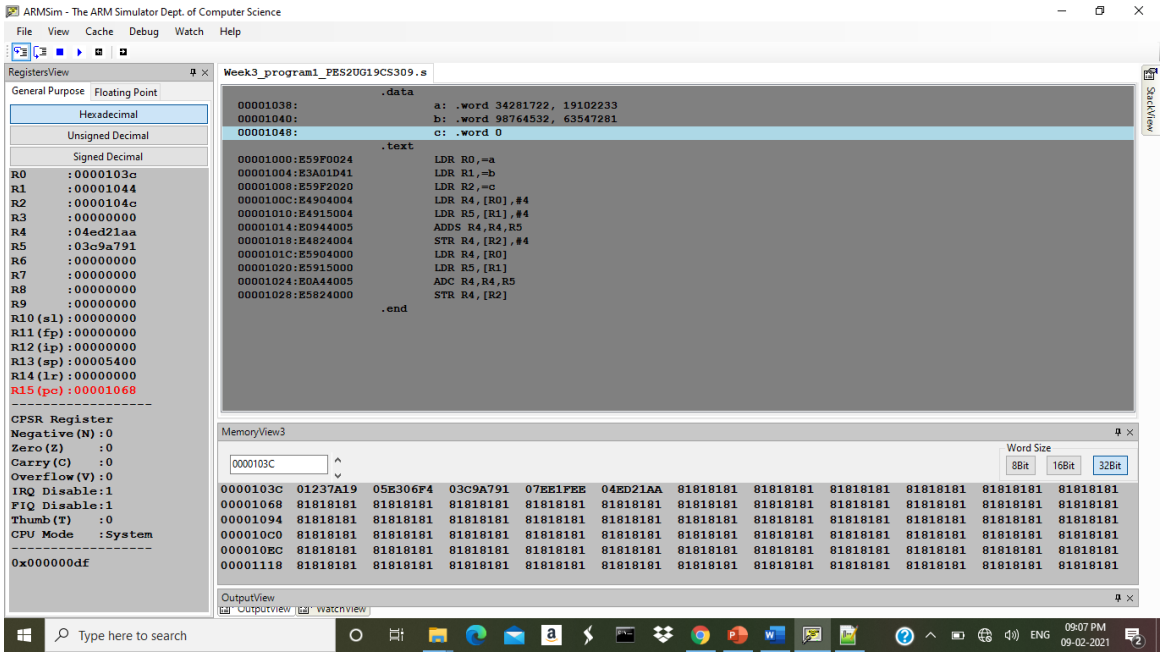
Week#____3_____ Program Number: ____1__

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.



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



III. Output Table for the program

	a: .word 34281722, 19102233 **b: .word 98764532, 63547281**	
	Upper 32 bits	**Lower 32 bits**
a: .word	19102233 **(01237A19)**	34281722 **(020B18FA)**
b: .word	63547281 **(03C9A791)**	98764532 **(05E306FA)**
c: .word	101984676 **(04ED21AA)**	110977975 **(07EE1FEE)**

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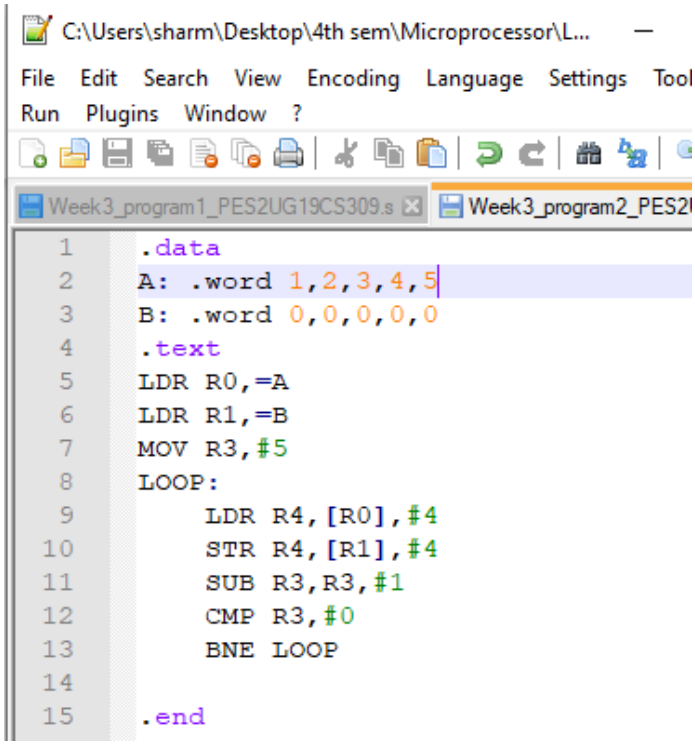
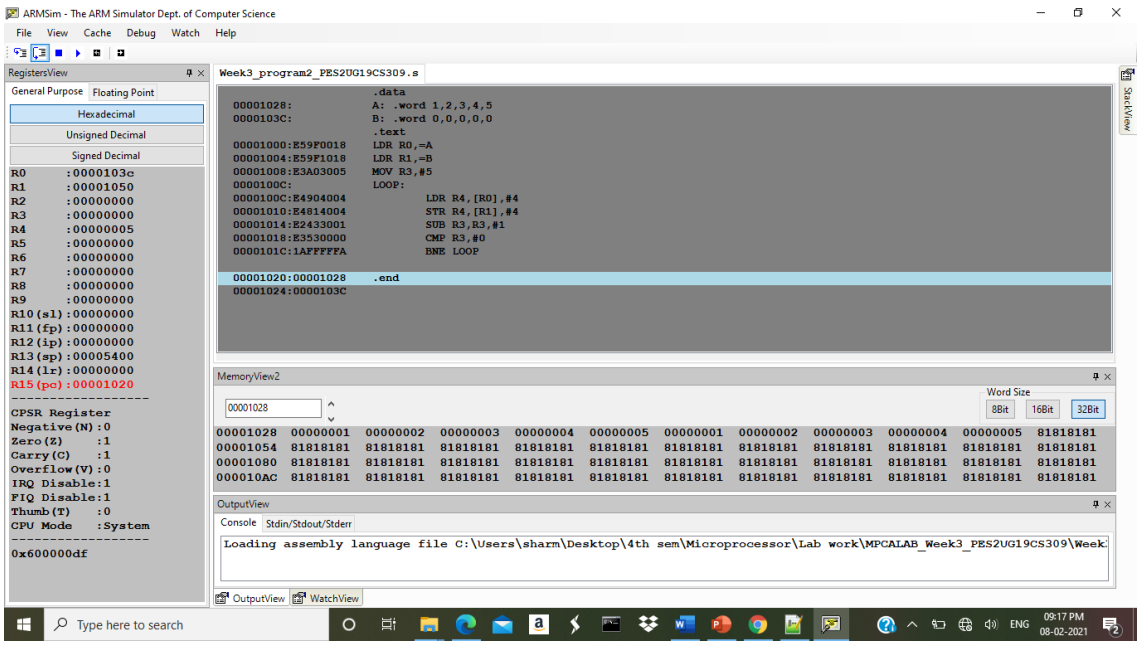
Week#____3_____ Program Number: ____2__

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

I. ARM Assembly Code for the program.



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



III. Output Table for the program

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

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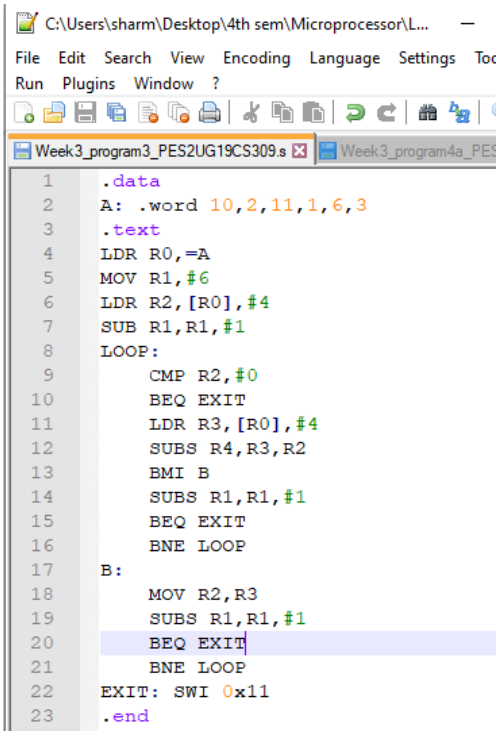
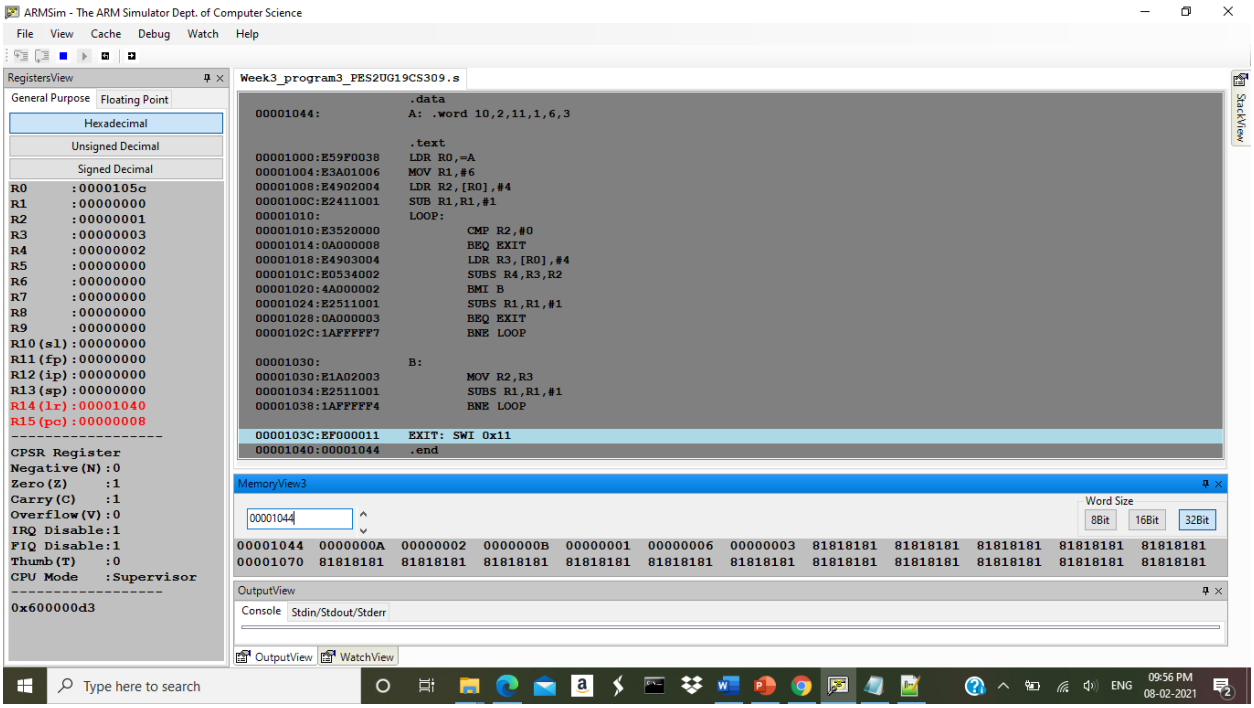
Week#____3_____ Program Number: ____3__

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

I. ARM Assembly Code for the program.



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



III. Output Table for the program

a: .word 10,2,11,1,6,3	
1st Iteration	R2=10, R3=2 (R3<R2)
2nd Iteration	R2=2, R3=11(R3>R2)
3rd Iteration	R2=2, R3=1 (R3<R2)
4th Iteration	R2=1, R3=6 (R3>R2)
5th Iteration	R2=1, R3=3 (R3>R2)
Smallest number is present in R2	

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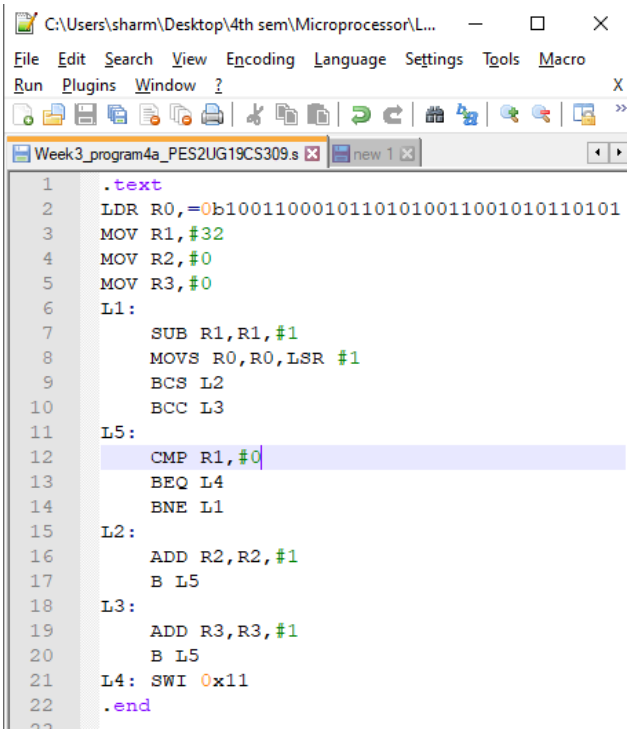
Week#____3_____ Program Number: ____4a_

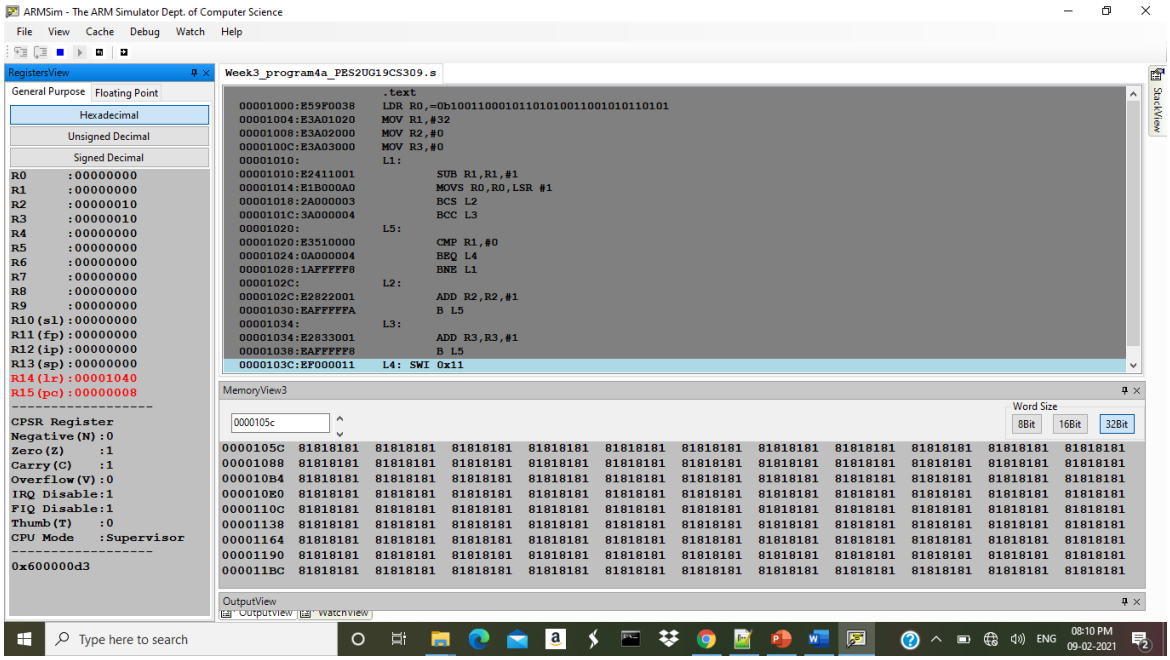
Write an ALP to count the number of 1's and 0's in a given 32 bit number.

I. ARM Assembly Code for the program.




```
1   .text
2   LDR R0,=0b10011000101101010011001010110101
3   MOV R1,#32
4   MOV R2,#0
5   MOV R3,#0
6   L1:
7       SUB R1,R1,#1
8       MOVS R0,R0,LSR #1
9       BCS L2
10      BCC L3
11  L5:
12      CMP R1,#0
13      BEQ L4
14      BNE L1
15  L2:
16      ADD R2,R2,#1
17      B L5
18  L3:
19      ADD R3,R3,#1
20      B L5
21  L4: SWI 0x11
22  .end
```

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



III. Output Table for the program

	r0, =0b10011000101101010011001010110101	
r1	32	
r2	After execution	16 (=10 in hex)
r3	After execution	16 (=10 in hex)

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Week#____3_____ Program Number: ____4b_

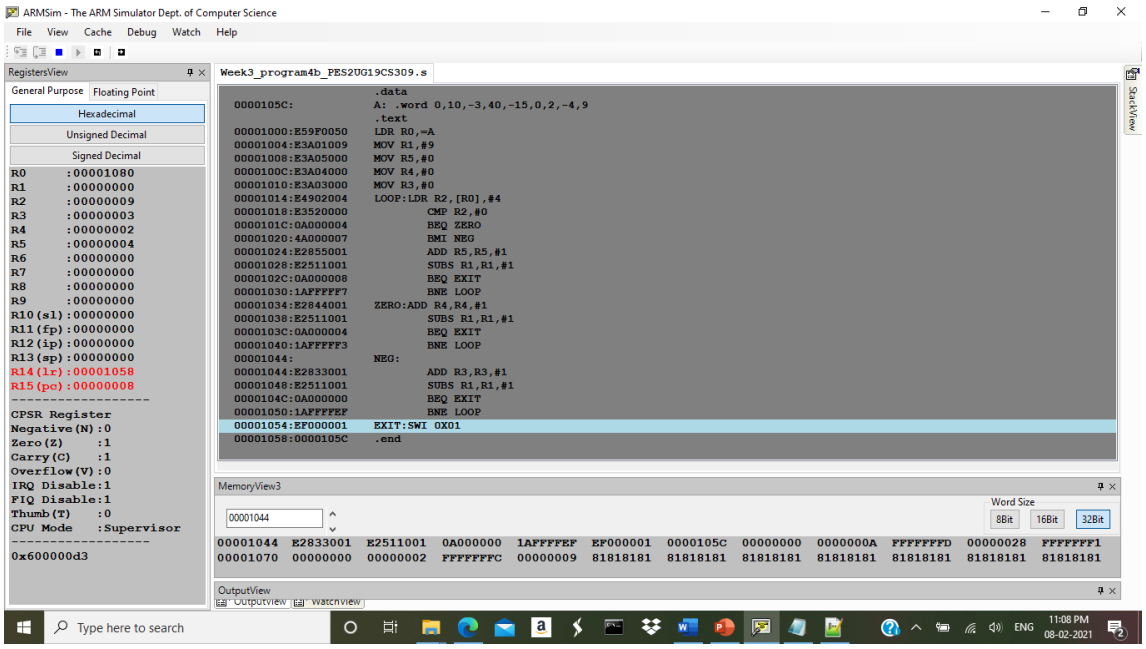
Write an ALP to find the number of zeroes, positive and negative numbers in a given array

I. ARM Assembly Code for the program.

Week3_program4b_PES2UG19CS309.s

```
.data
A: .word 0,10,-3,40,-15,0,2,-4,9
.text
LDR R0,=A
MOV R1,#9
MOV R5,#0
MOV R4,#0
MOV R3,#0
LOOP:LDR R2,[R0],#4
    CMP R2,#0
    BEQ ZERO
    BMI NEG
    ADD R5,R5,#1
    SUBS R1,R1,#1
    BEQ EXIT
    BNE LOOP
ZERO:ADD R4,R4,#1
    SUBS R1,R1,#1
    BEQ EXIT
    BNE LOOP
NEG:
    ADD R3,R3,#1
    SUBS R1,R1,#1
    BEQ EXIT
    BNE LOOP
EXIT:SWI 0X01
.end
```

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



III. Output Table for the program

a:.word 0,10,-3,40,-15,0,2,-4,9		
R3	3	
R4	2	
R5	4	

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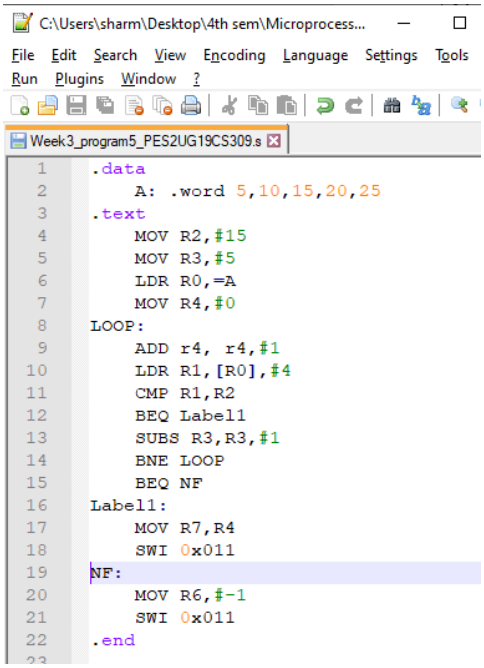
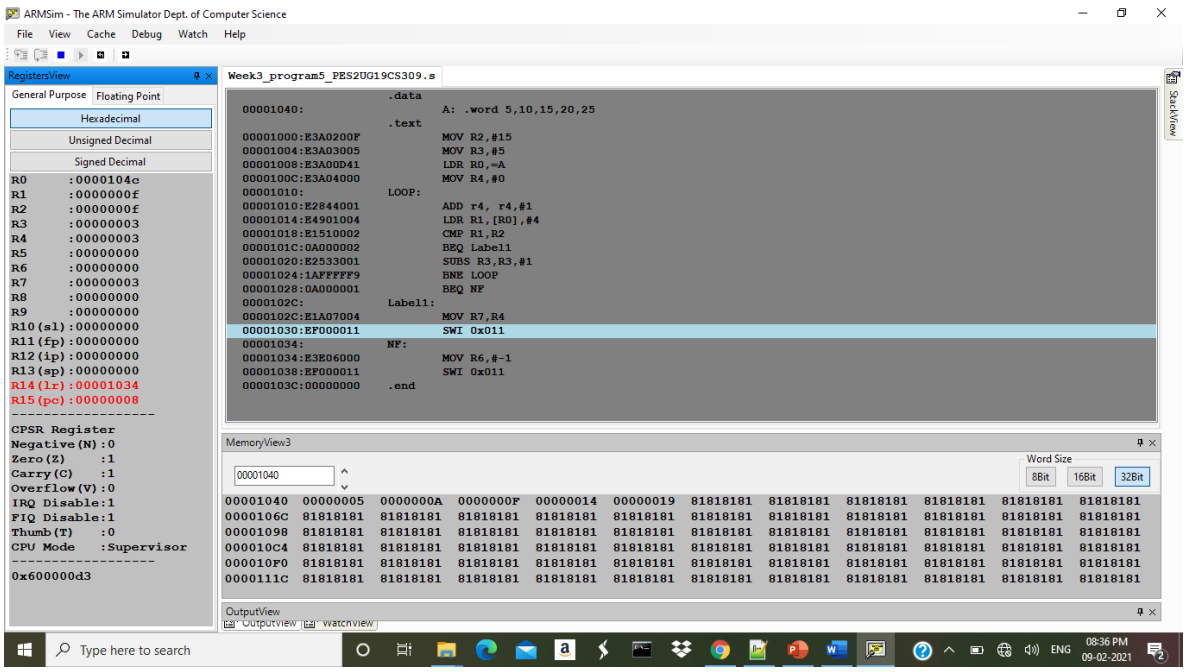
Week#____3_____ Program Number: ____5_

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.



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



III. Output Table for the program

		HEX value
A:.WORD 5,10,15,20,25		
R2	KEY =15	0F
R3	COUNT =5	
R0	Address of A	0000104C
R3	After Execution=3	Position of key element =3

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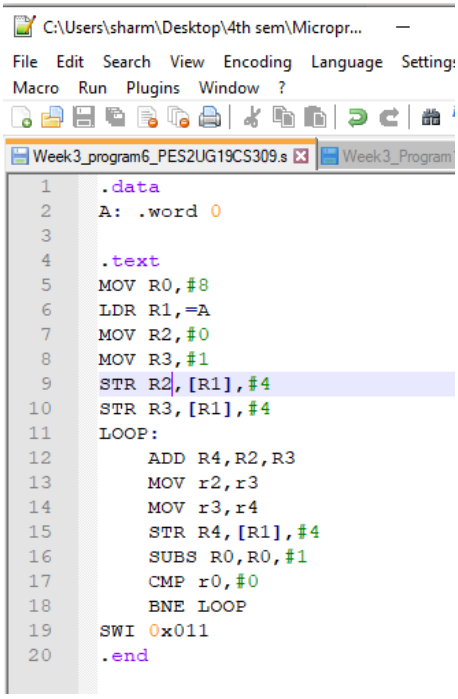
Week#____3_____ Program Number: ____6_

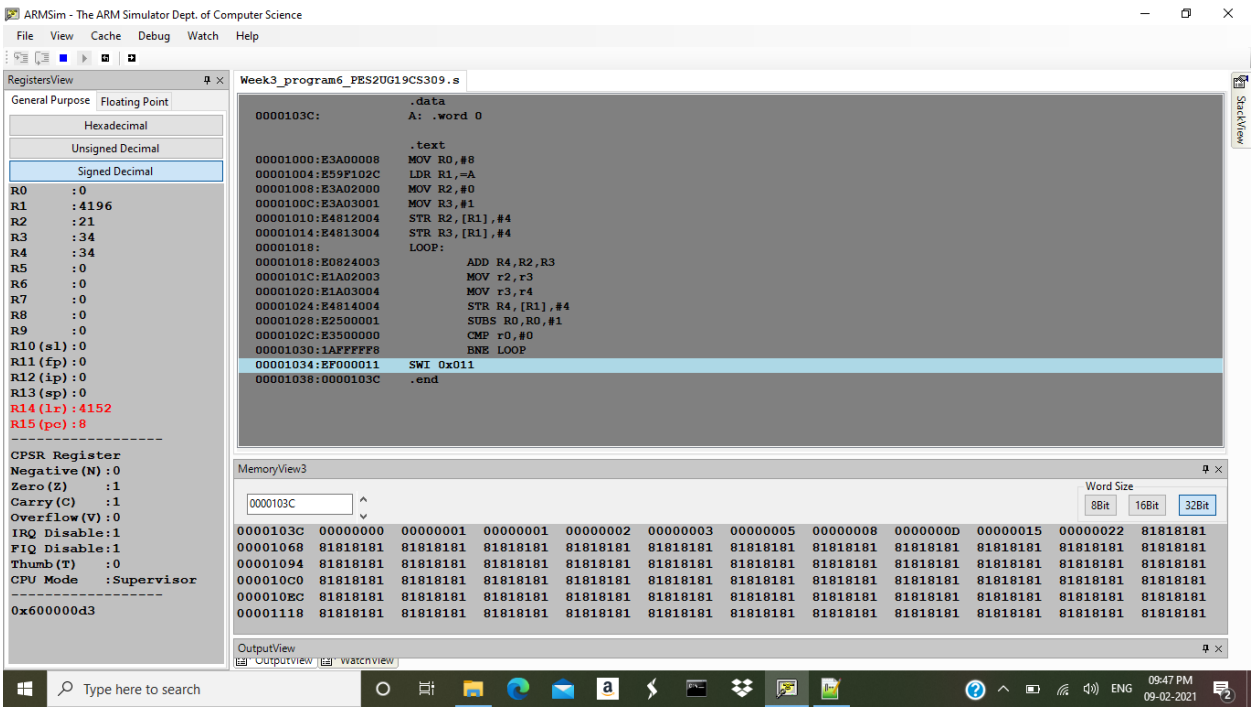
Write an ALP to generate Fibonacci Series and store them in an array

I. ARM Assembly Code for the program.




```
1   .data
2   A: .word 0
3
4   .text
5   MOV R0,#8
6   LDR R1,=A
7   MOV R2,#0
8   MOV R3,#1
9   STR R2,[R1],#4
10  STR R3,[R1],#4
11  LOOP:
12      ADD R4,R2,R3
13      MOV r2,r3
14      MOV r3,r4
15      STR R4,[R1],#4
16      SUBS R0,R0,#1
17      CMP r0,#0
18      BNE LOOP
19  SWI 0x011
20  .end
```

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



III. Output Table for the program

R0	**Fibonacci Count**	**8**
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**
R4	**5th Iteration**	**5+3=8**

R4	**6th Iteration**	**8+5=13**
R4	**7th Iteration**	**13+8=21**
R4	**8th Iteration**	**21+13=34=22**

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: R Sharmila
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