

Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

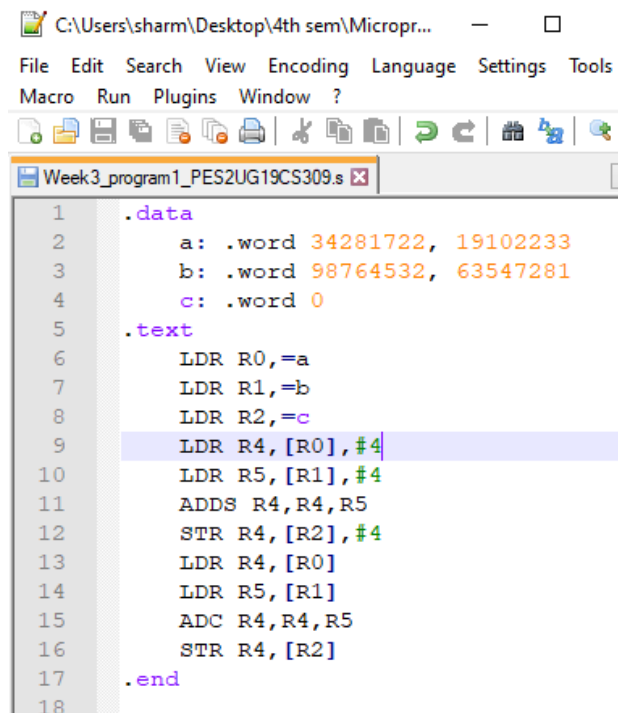
Date:8/02/2021

Name: R Sharmila	SRN: PES2UG19CS309	Section E
------------------	-----------------------	--------------

Week# 3 Program Number: 1

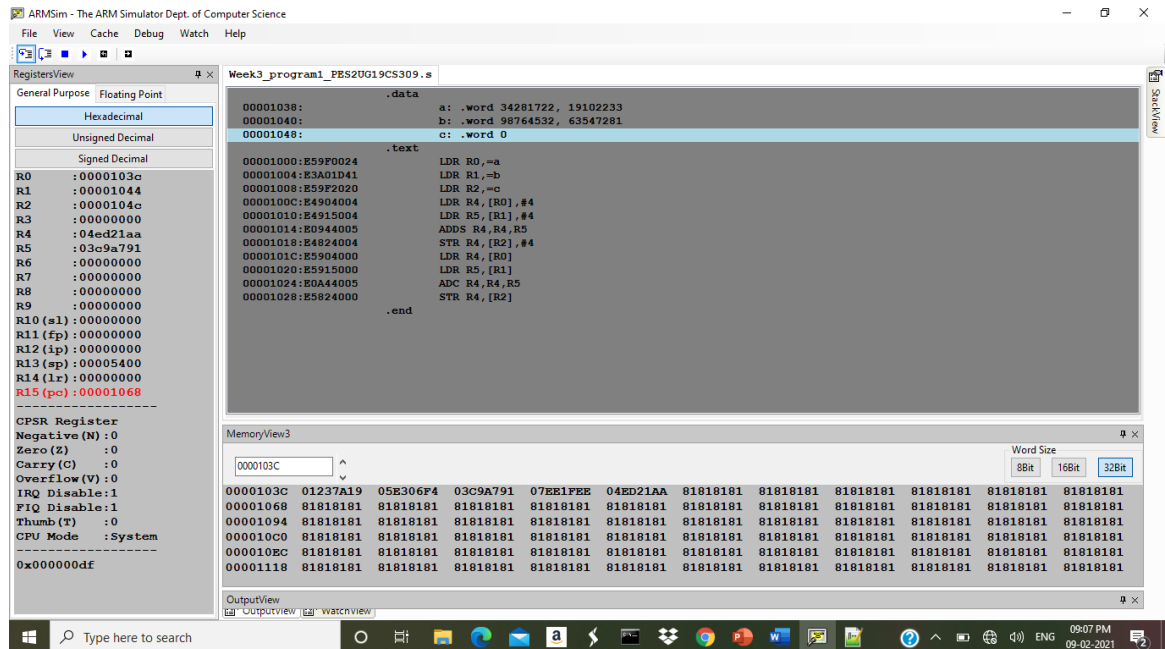
Write an ALP to add two 64 bit numbers loaded from memory and store the result in memory.

I. ARM Assembly Code for the program.



```
1  .data
2      a: .word 34281722, 19102233
3      b: .word 98764532, 63547281
4      c: .word 0
5  .text
6      LDR R0,=a
7      LDR R1,=b
8      LDR R2,=c
9      LDR R4,[R0],#4
10     LDR R5,[R1],#4
11     ADDS R4,R4,R5
12     STR R4,[R2],#4
13     LDR R4,[R0]
14     LDR R5,[R1]
15     ADC R4,R4,R5
16     STR R4,[R2]
17 .end
18
```

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)

Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

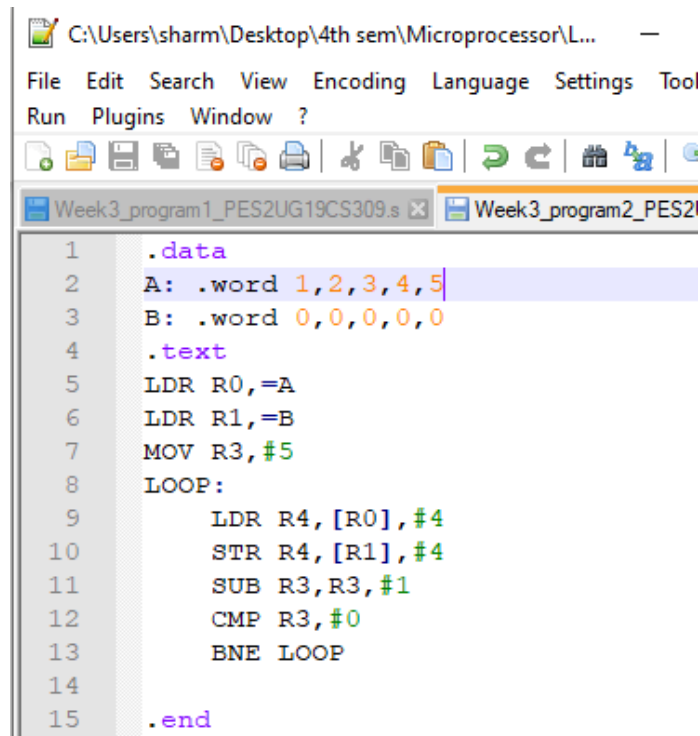
Date: 8/02/2021

Name: R Sharmila	SRN: PES2UG19CS309	Section E
------------------	-----------------------	--------------

Week# 3 Program Number: 2

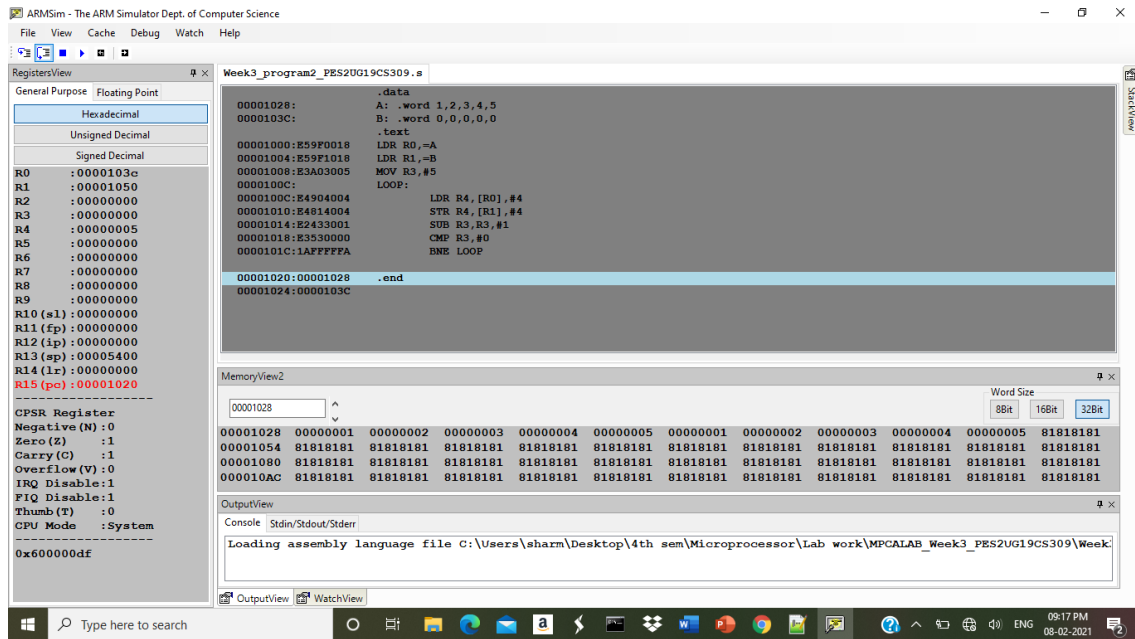
Write an ALP to copy n numbers from Memory Location A to Memory Location B

I. ARM Assembly Code for the program.



```
1  .data
2  A: .word 1,2,3,4,5
3  B: .word 0,0,0,0,0
4  .text
5  LDR R0,=A
6  LDR R1,=B
7  MOV R3,#5
8  LOOP:
9      LDR R4,[R0],#4
10     STR R4,[R1],#4
11     SUB R3,R3,#1
12     CMP R3,#0
13     BNE LOOP
14
15  .end
```

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



III. Output Table for the program

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

Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

Date: 8/02/2021

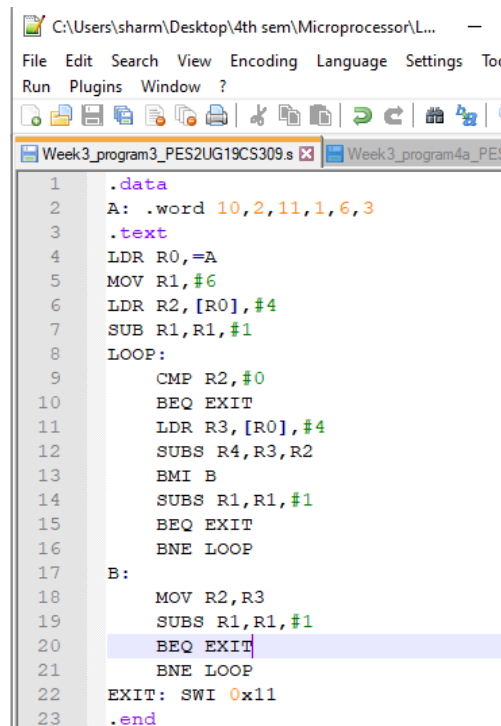
Name: R Sharmila	SRN: PES2UG19CS309	Section E
------------------	-----------------------	--------------

Week# 3

Program Number: 3

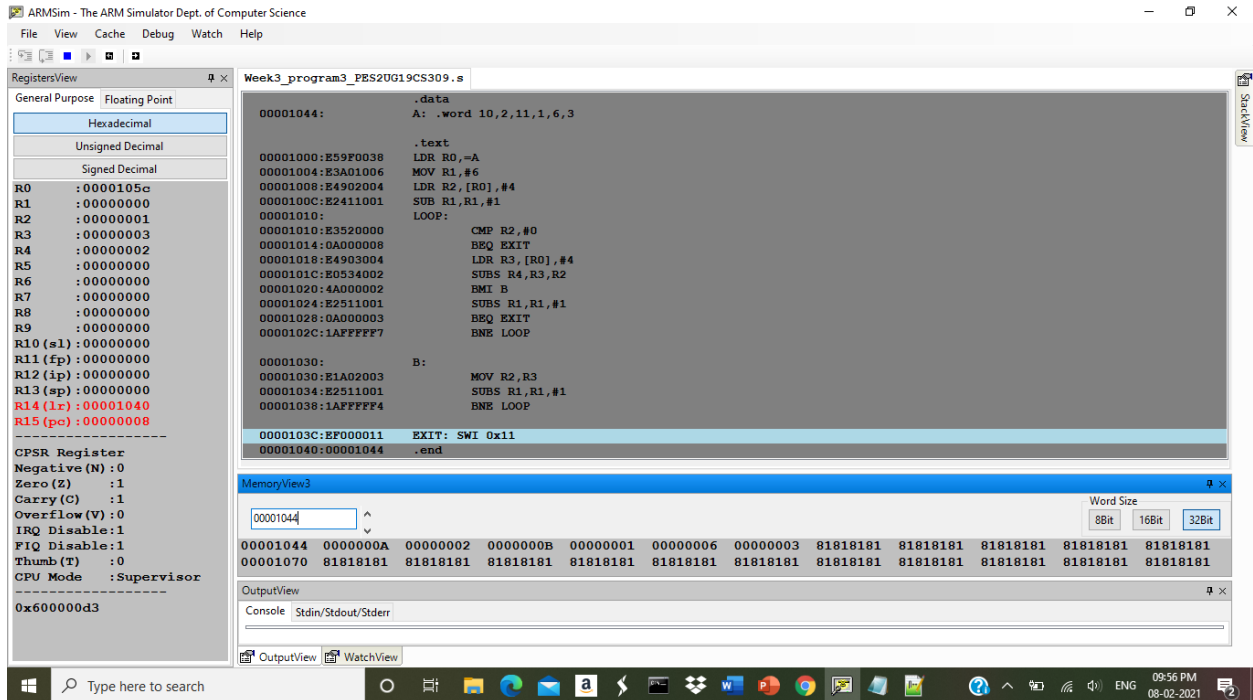
Write an ALP to find smallest number in an array of n 32 bit numbers

I. ARM Assembly Code for the program.



```
1  .data
2  A: .word 10,2,11,1,6,3
3  .text
4  LDR R0,=A
5  MOV R1,#6
6  LDR R2,[R0],#4
7  SUB R1,R1,#1
8  LOOP:
9      CMP R2,#0
10     BEQ EXIT
11     LDR R3,[R0],#4
12     SUBS R4,R3,R2
13     BMI B
14     SUBS R1,R1,#1
15     BEQ EXIT
16     BNE LOOP
17 B:
18     MOV R2,R3
19     SUBS R1,R1,#1
20     BEQ EXIT
21     BNE LOOP
22 EXIT: SWI 0x11
23 .end
```

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



III. Output Table for the program

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

Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

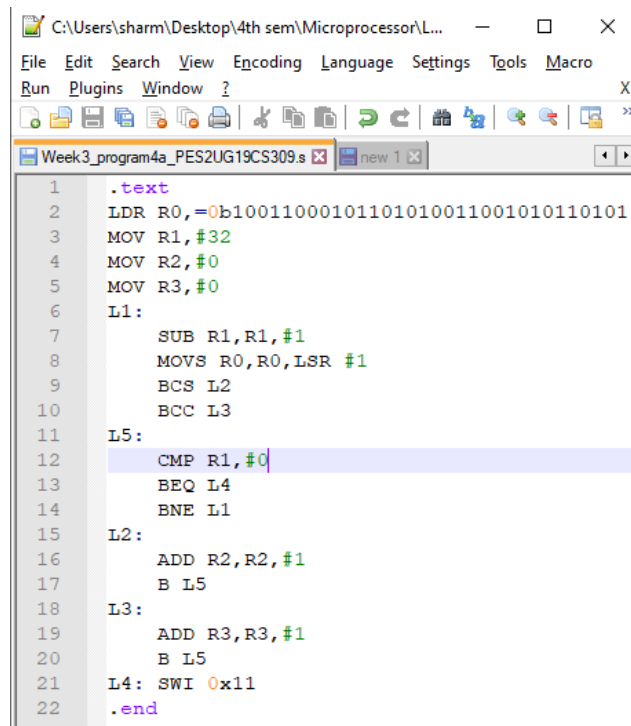
Date: 8/02/2021

Name: R Sharmila	SRN: PES2UG19CS309	Section E
------------------	-----------------------	--------------

Week# 3 Program Number: 4a

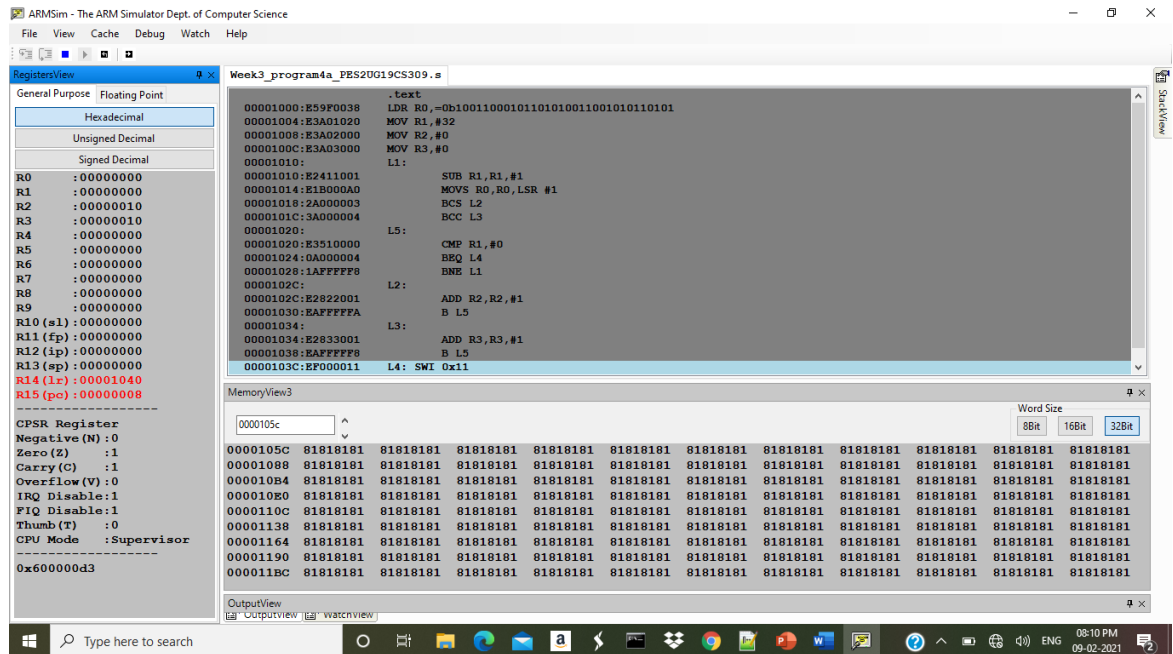
Write an ALP to count the number of 1's and 0's in a given 32 bit number.

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)

Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

Date: 8/02/2021

Name: R Sharmila	SRN: PES2UG19CS309	Section E
------------------	-----------------------	--------------

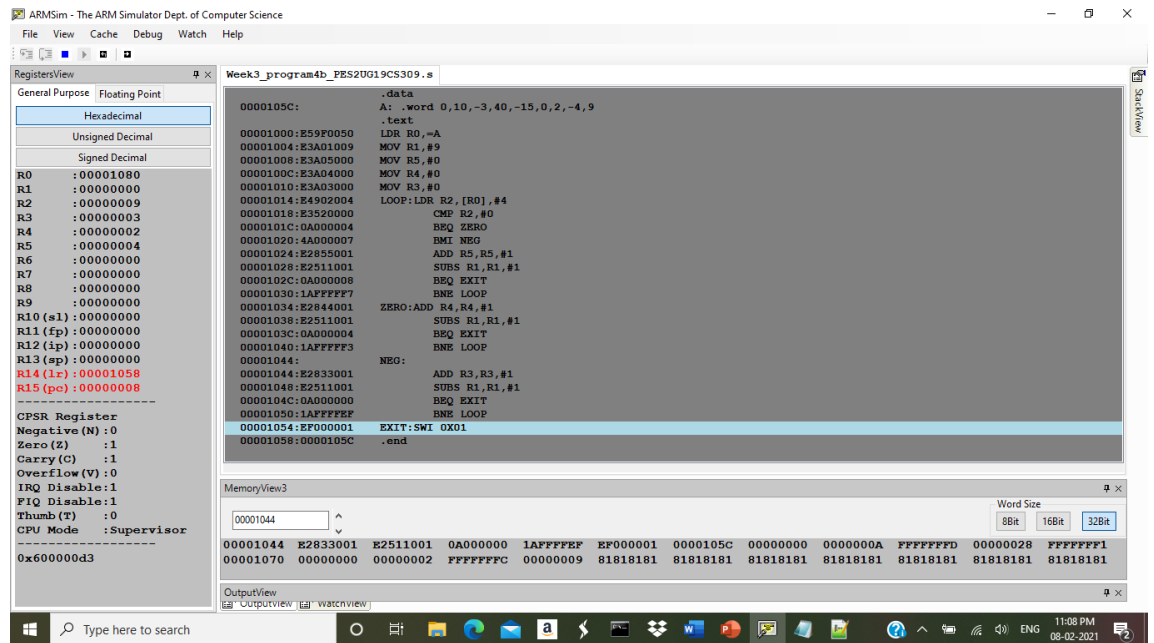
Week# 3 Program Number: 4b

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
1  .data
2  A: .word 0,10,-3,40,-15,0,2,-4,9
3  .text
4  LDR R0,=A
5  MOV R1,#9
6  MOV R5,#0
7  MOV R4,#0
8  MOV R3,#0
9  LOOP:LDR R2,[R0],#4
10     CMP R2,#0
11     BEQ ZERO
12     BMI NEG
13     ADD R5,R5,#1
14     SUBS R1,R1,#1
15     BEQ EXIT
16     BNE LOOP
17 ZERO:ADD R4,R4,#1
18     SUBS R1,R1,#1
19     BEQ EXIT
20     BNE LOOP
21 NEG:
22     ADD R3,R3,#1
23     SUBS R1,R1,#1
24     BEQ EXIT
25     BNE LOOP
26 EXIT:SWI 0X01
27 .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	

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

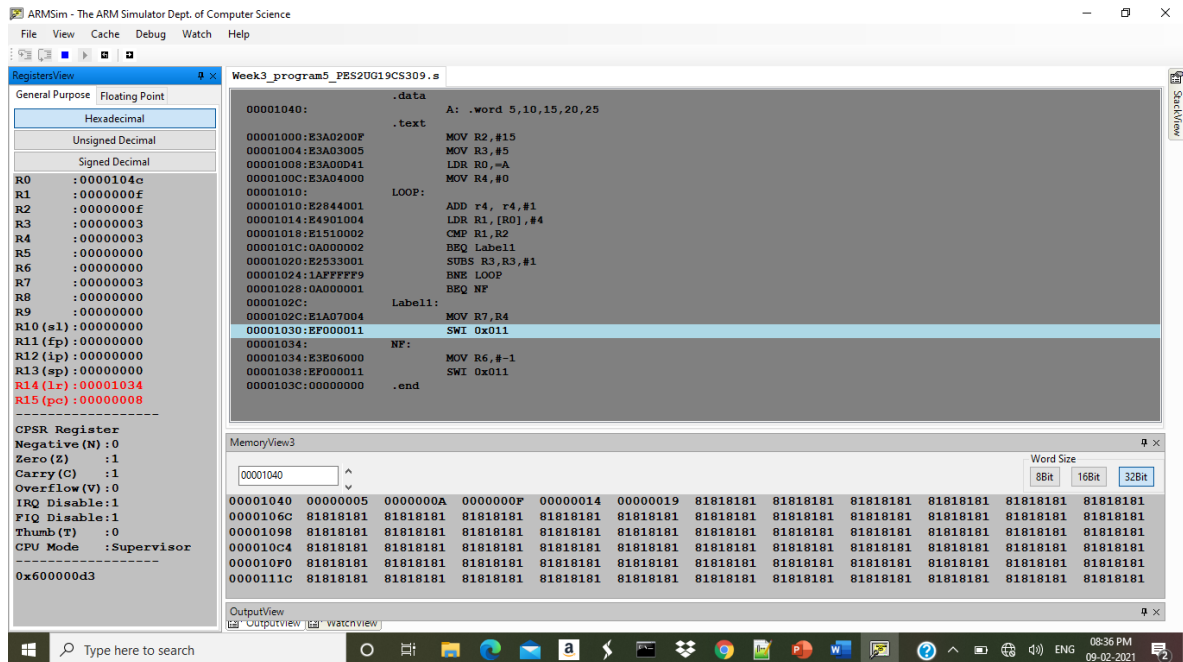
Program Number: 5

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.

```
C:\Users\sharm\Desktop\4th sem\Microprocess...
File Edit Search View Encoding Language Settings Tools
Run Plugins Window ?
Week3_program5_PES2UG19CS309.s
1  .data
2  A: .word 5,10,15,20,25
3  .text
4  MOV R2,#15
5  MOV R3,#5
6  LDR R0,=A
7  MOV R4,#0
8  LOOP:
9  ADD r4, r4,#1
10 LDR R1,[R0],#4
11 CMP R1,R2
12 BEQ Label1
13 SUBS R3,R3,#1
14 BNE LOOP
15 BEQ NF
16 Label1:
17 MOV R7,R4
18 SWI 0x011
19 NF:
20 MOV R6,#-1
21 SWI 0x011
22 .end
23
```

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

Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

Date: 8/02/2021

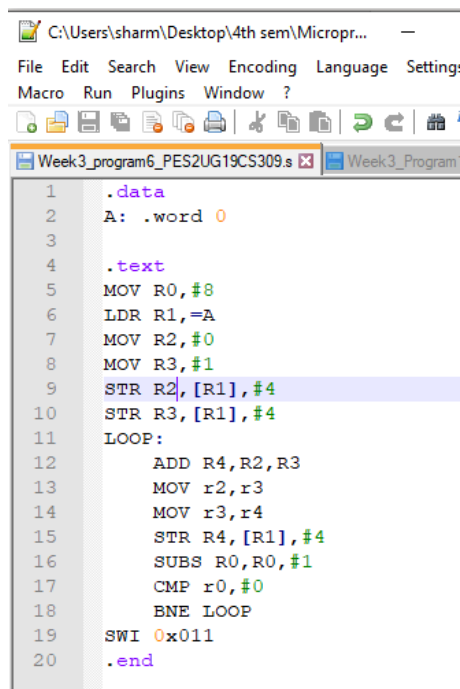
Name: R Sharmila	SRN: PES2UG19CS309	Section E
------------------	-----------------------	--------------

Week# ____3____

Program Number: ____6__

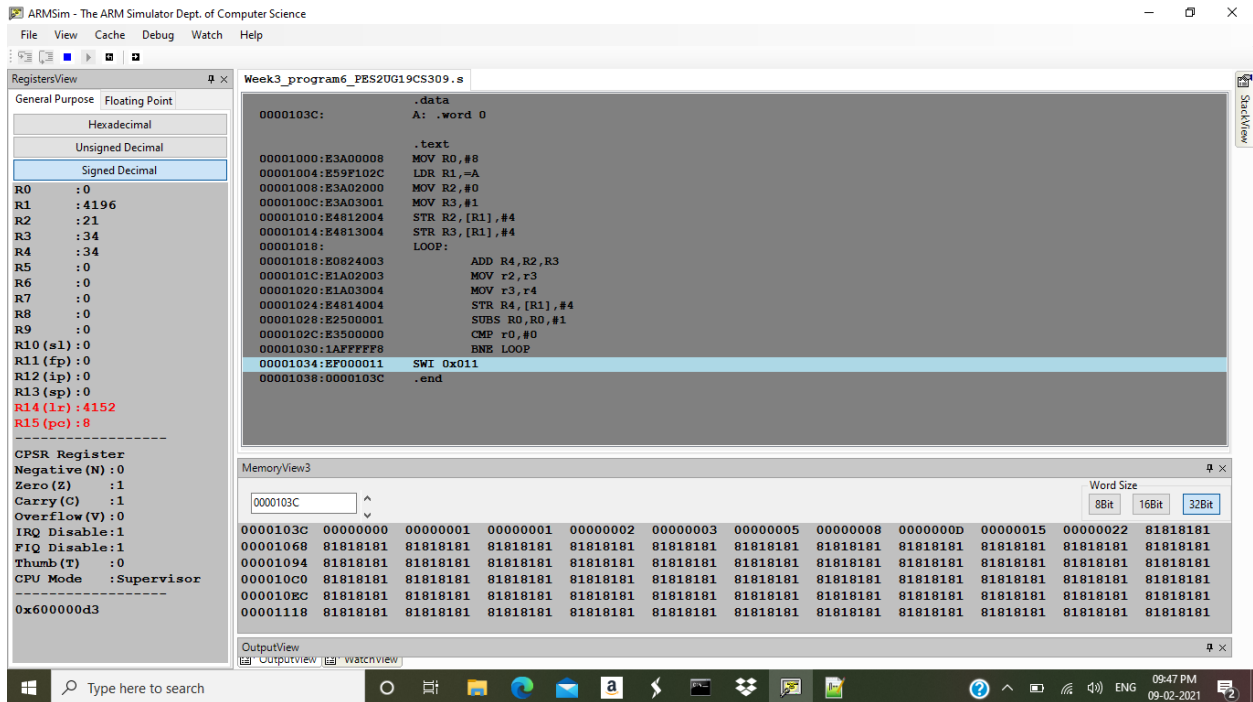
Write an ALP to generate Fibonacci Series and store them in an array

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	1 st Iteration	0+1=1
R4	2 nd Iteration	1+1=2
R4	3 rd Iteration	2+1=3
R4	4 th Iteration	3+2=5
R4	5 th Iteration	5+3=8

R4	6 th Iteration	8+5=13
R4	7 th Iteration	13+8=21
R4	8 th 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

Name: R Sharmila

SRN: PES2UG19CS309

Section: E

Date:8/02/2021