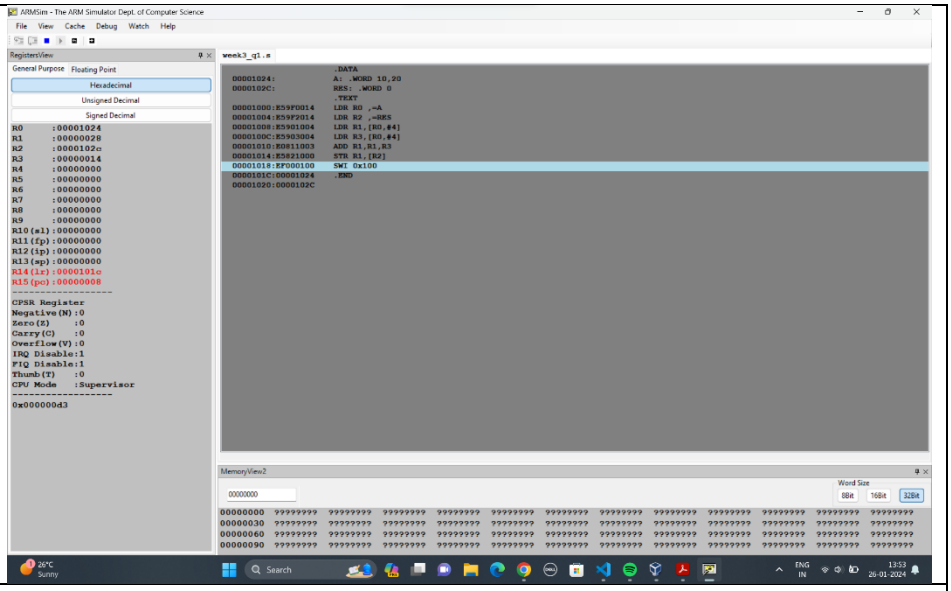
PES UNIVERSITY

Department of Computer Science & Engineering
Microprocessor & Computer Architecture Lab

Lab 2 Submission Format

UE22CS251B

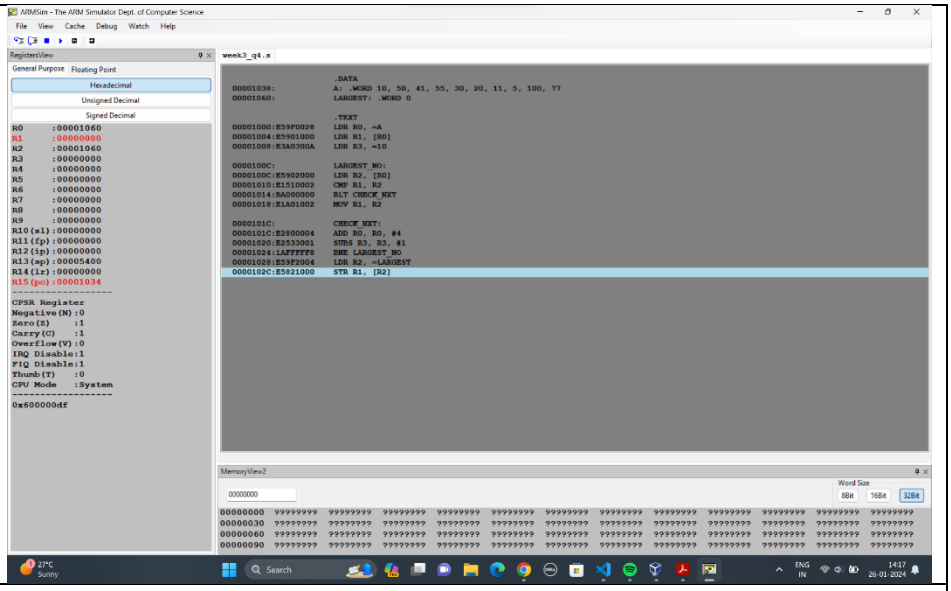
1	Write a program to add two numbers by reading them from memory and store the result back to the memory.
	
	Program:
	
	week3_q1.s
	.DATA
	A: .WORD 10,20
	RES: .WORD 0
	.TEXT
	LDR R0 ,=A
	LDR R2 ,=RES
	LDR R1,[R0,#4]
	LDR R3,[R0,#4]
	ADD R1,R1,R3
	STR R1,[R2]
	SWI 0x100
	.END
	
	Output Screen Shot:

	
2	Write a program to Check if a given set of numbers are even or odd . Then store even and odd numbers in two different memory Locations. Program:

week3_q2.s

```
1    .DATA
2    A: .WORD 10,3,41,55,30,22,11,5,83,90
3    ODD: .WORD 0
4    EVEN: .WORD 0
5
6    .TEXT
7    LDR R0,=A
8    LDR R1,=ODD
9    LDR R2,=EVEN
10   LDR R3,=10
11
12   CHECK_NO:
13   LDR R4, [R0]
14   AND R4,R4,#1
15
16   CMP R4,#1
17   BEQ ODD_NO
18
19   STR R4,[R2],#4
20   B END_PROGRAM
21
22   ODD_NO:
23   STR R4,[R1],#4
24
25   END_PROGRAM:
26   ADD R0,R0,#4
27   SUBS R3,R3,#1
28   BNE CHECK_NO
29
```

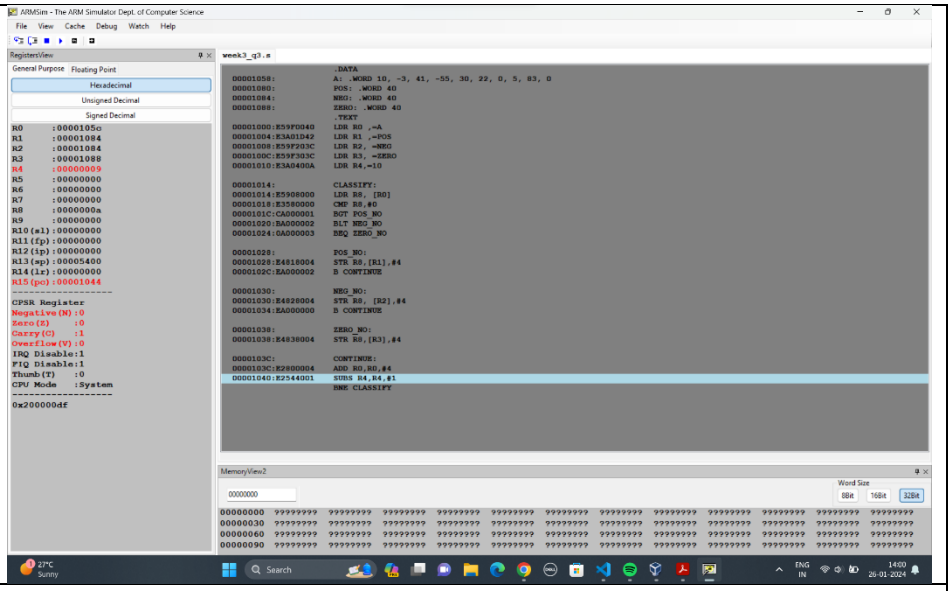
Output Screen Shot:

	
3	Write a program to Classify the given set of numbers as positive, negative or zero and also store them in different memory locations. Program:

week3_q3.s

```
1   .DATA
2   A: .WORD 10, -3, 41, -55, 30, 22, 0, 5, 83, 0
3   POS: .WORD 40
4   NEG: .WORD 40
5   ZERO: .WORD 40
6   .TEXT
7   LDR R0 ,=A
8   LDR R1 ,=POS
9   LDR R2, =NEG
10  LDR R3, =ZERO
11  LDR R4,=10
12
13  CLASSIFY:
14  LDR R8, [R0]
15  CMP R8,#0
16  BGT POS_NO
17  BLT NEG_NO
18  BEQ ZERO_NO
19
20  POS_NO:
21  STR R8,[R1],#4
22  B CONTINUE
23
24  NEG_NO:
25  STR R8, [R2],#4
26  B CONTINUE
27
28  ZERO_NO:
29  STR R8,[R3],#4
30
31  CONTINUE:
32  ADD R0,R0,#4
33  SUBS R4,R4,#1
34  BNE CLASSIFY
35
```

Output Screen Shot:

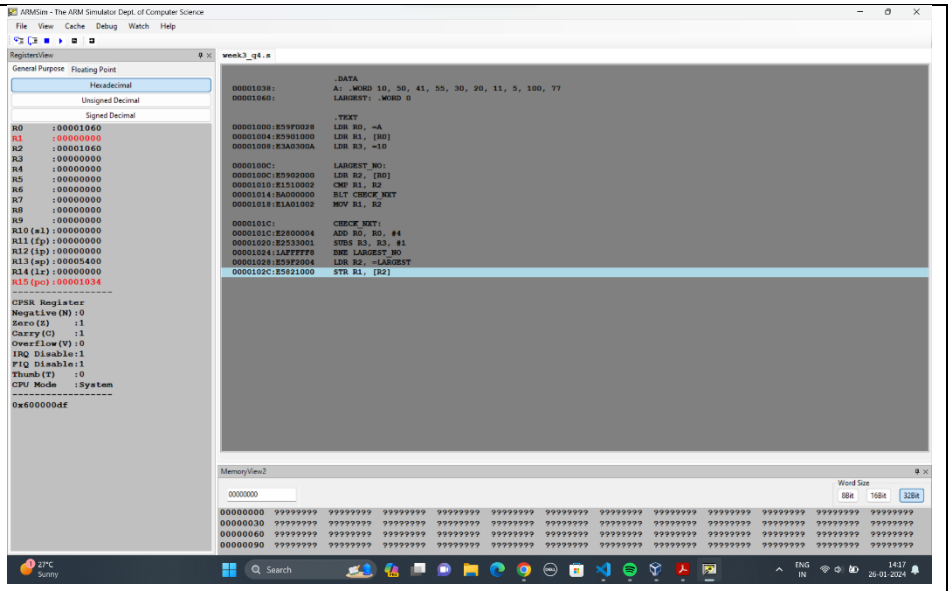


4 Write a program to find the largest number from a given set of numbers.

Program:

```
week3_q4.s
1
2     .DATA
3     A: .WORD 10, 50, 41, 55, 30, 20, 11, 5, 100, 77
4     LARGEST: .WORD 0
5
6     .TEXT
7     LDR R0, =A
8     LDR R1, [R0]
9     LDR R3, =10
10
11    LARGEST_NO:
12    LDR R2, [R0]
13    CMP R1, R2
14    BLT CHECK_NXT
15    MOV R1, R2
16
17    CHECK_NXT:
18    ADD R0, R0, #4
19    SUBS R3, R3, #1
20    BNE LARGEST_NO
21    LDR R2, =LARGEST
22    STR R1, [R2]
```

Output Screen Shot:



5 Assignment Questions:

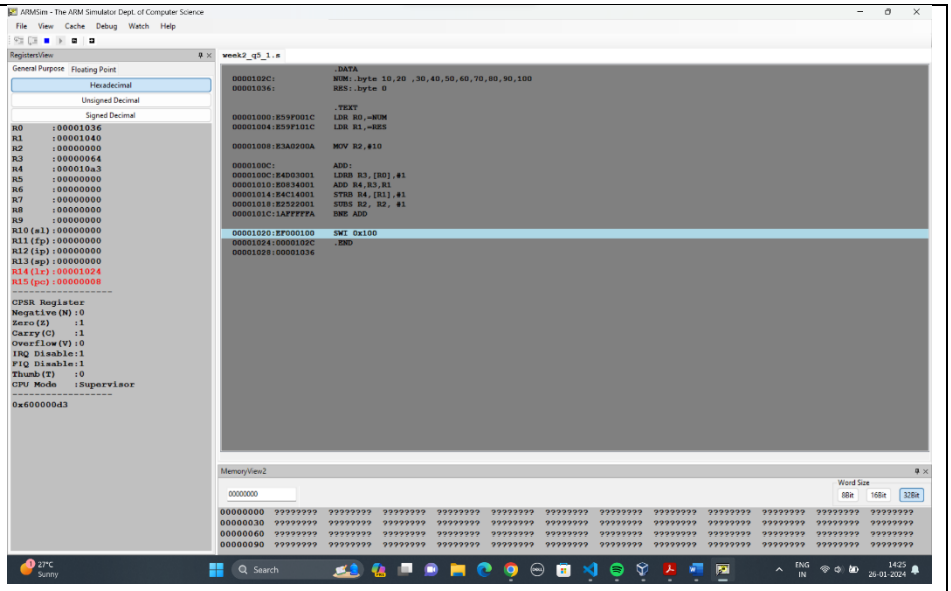
i)
Write a program to add array of ten 8-bit numbers taking data from memory location stored as byte data (use .byte to store the data instead of .word)

Program:

week2_q5_1.s

```
1   .DATA
2   NUM:.byte 10,20 ,30,40,50,60,70,80,90,100
3   RES:.byte 0
4
5   .TEXT
6   LDR R0,=NUM
7   LDR R1,=RES
8
9   MOV R2,#10
10
11  ADD:
12  LDRB R3,[R0],#1
13  ADD R4,R3,R1
14  STRB R4,[R1],#1
15  SUBS R2, R2, #1
16  BNE ADD
17
18  SWI 0x100
19  .END
```

Output Screen Shot:



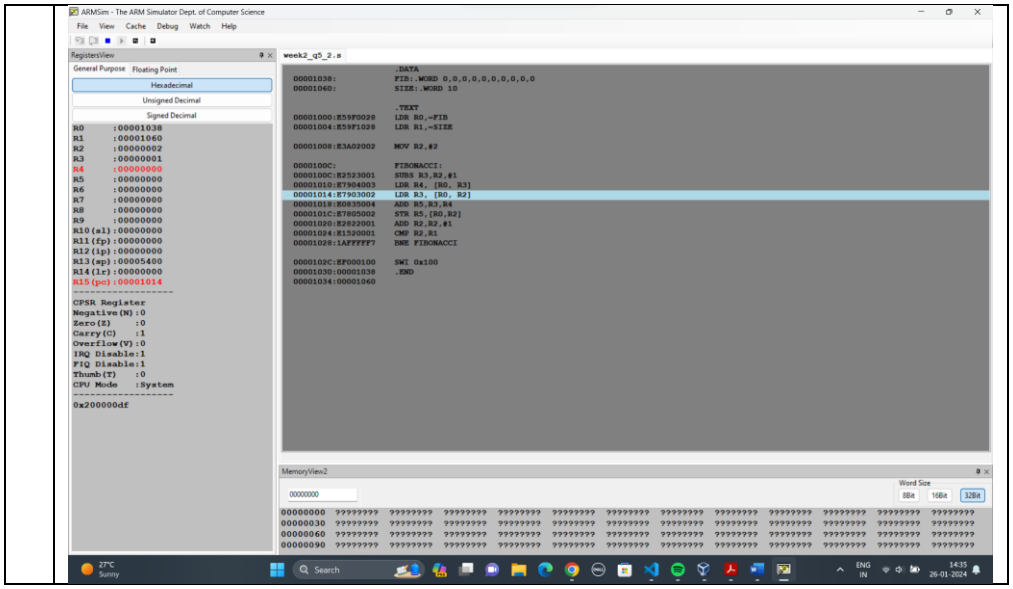
ii)

Generate Fibonacci Series and store them in an array / memory location.

Program:

```
week2_q5_2.s
1    .DATA
2    FIB:.WORD 0,0,0,0,0,0,0,0,0,0
3    SIZE:.WORD 10
4
5    .TEXT
6    LDR R0,=FIB
7    LDR R1,=SIZE
8
9    MOV R2,#2
10
11   FIBONACCI:
12   SUBS R3,R2,#1
13   LDR R4, [R0, R3]
14   LDR R3, [R0, R2]
15   ADD R5,R3,R4
16   STR R5,[R0,R2]
17   ADD R2,R2,#1
18   CMP R2,R1
19   BNE FIBONACCI
20
21   SWI 0x100
22   .END
```

Output Screen Shot:



Note:

- Link to upload the file:
  - Will be provided by the respective Theory Teacher
- Upload PDF only.
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