Microprocessor and Computer Architecture UE22CS251B

4th Semester, Academic Year 2023-24

Date: 06-02-24

Name: Ankith Gowda B S	SRN: PES2UG22CS077	Section: B

LAB #____2_____ Program Number: ____1___

Title of the Program

Write a program to add two numbers by reading them from memory and store the result back to the memory.

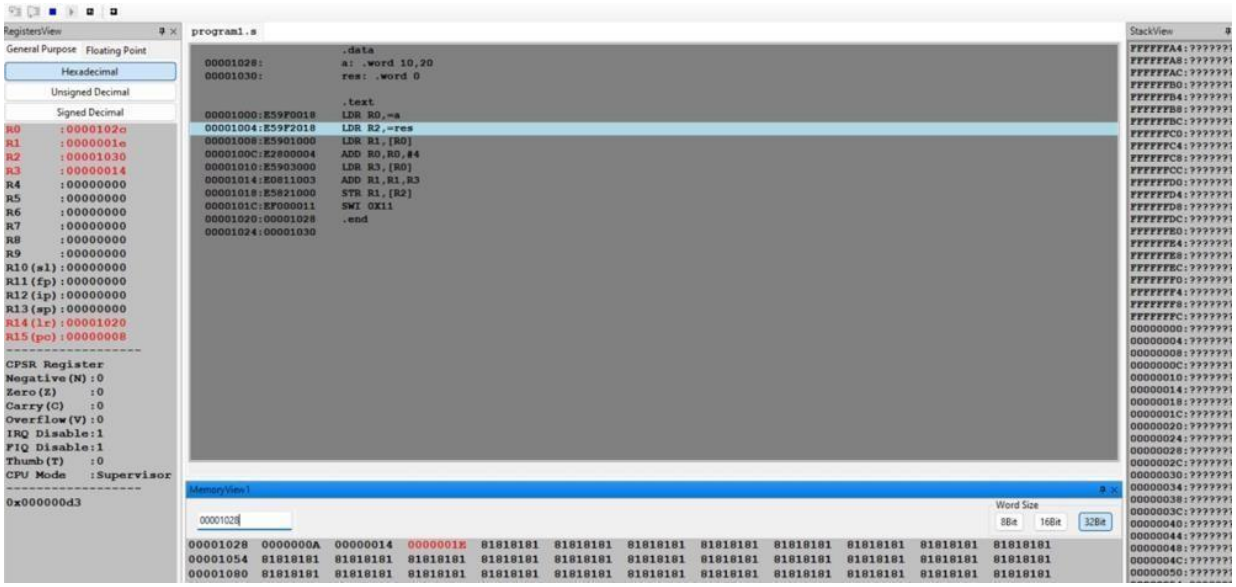
I. ARM Assembly Code :

```
.data
a: .word 10,20
res: .word 0

.text
LDR R0,=a
LDR R2,=res
LDR R1,[R0]
ADD R0,R0, #4
LDR R3,[R0]
ADD R1,R1,R3
STR R1,[R2]
SWI 0X11
.end
```

II. Output Screen Shots

(One Screenshot including Register Window, Memory Window and Code Window)



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LAB #____2_____ Program Number: ____2___

Title of the Program

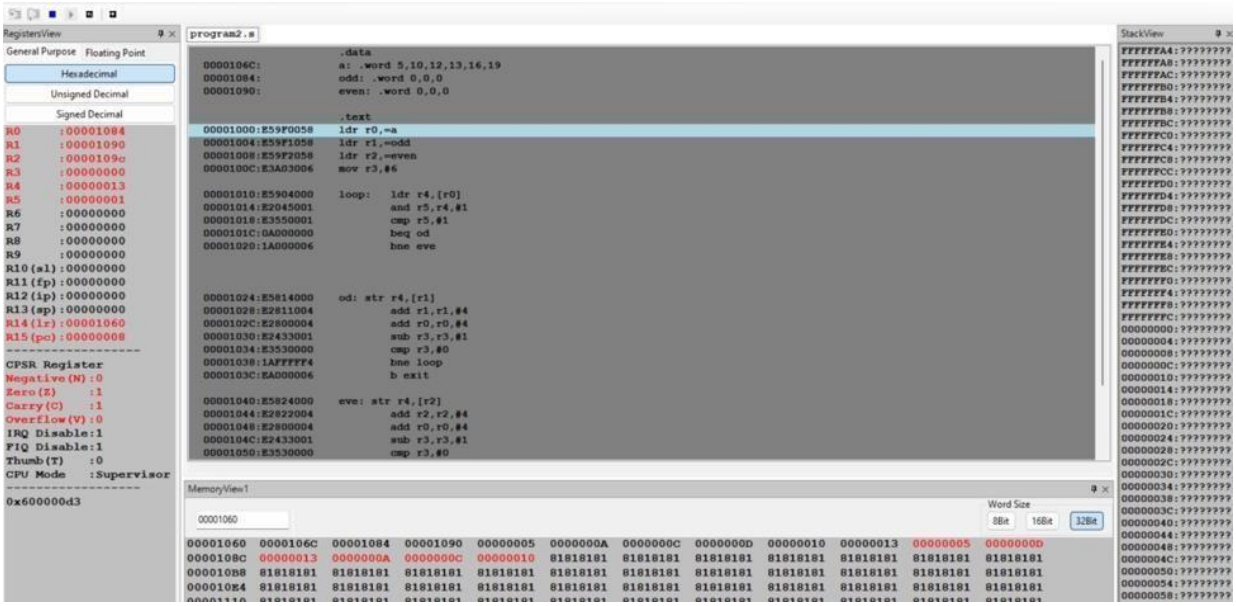
Write a program to Check if a given set of numbers are even or odd . Then store even and odd numbers in two different memory locations

I. ARM Assembly Code

```
.data
a: .word 5,10,12,13,16,19
odd: .word 0,0,0,0
even: .word 0,0,0,0

.text
LDR R0,=a
LDR R1,=odd
LDR R2,=even
MOV  R3,#6

loop:LDR R4,[R0]
     AND R5,R4,#1
     CMP R5,#1
     beq od
     bne eve

od: str r4,[r1]
     add r1,r1,#4
     add r0,r0,#4
     sub r3,r3,#1
     cmp r3,#0
     bne loop
     b exit

eve:str r4,[r2]
     add r2,r2,#4
     add r0,r0,#4
     sub r3,r3,#1
     cmp r3,#0
     bne loop
     b exit

exit:
     SWI 0X11
     .end
```

II. Output Screen Shots

(One Screenshot including Register Window, Memory Window and Code Window)



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LAB #____2_____ Program Number: ____3___

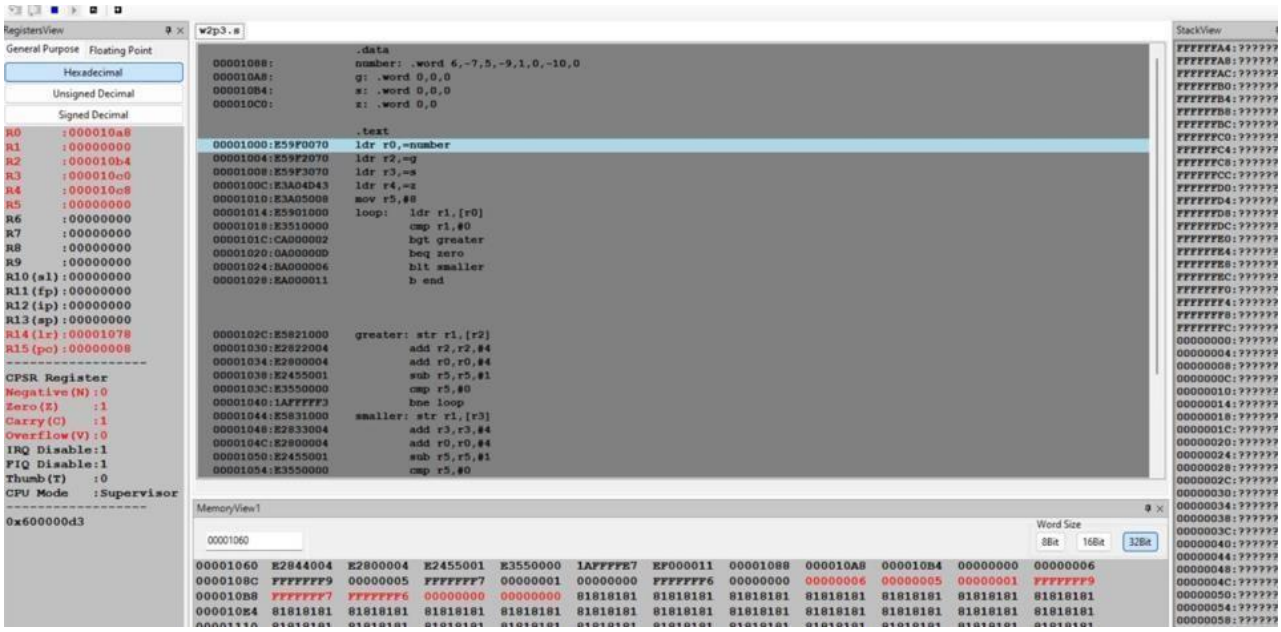
Title of the Program

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

I. ARM Assembly Code

```
.data
number: .word 6,-7,5,-9,1,0,-10,0
g: .word 0,0,0
s: .word 0,0,0
z: .word 0,0
.text
ldr r0,=number
ldr r2,=g
ldr r3,=s
ldr r4,=z
mov r5,#8
loop:   ldr r1,[r0]
        cmp r1,#0
        bgt greater
        beq zero
        blt smaller
        b end
greater: str r1,[r2]
        add r2,r2,#4
        add r0,r0,#4
        sub r5,r5,#1
        cmp r5,#0
        bne loop
smaller: str r1,[r3]
        add r3,r3,#4
        add r0,r0,#4
        sub r5,r5,#1
        cmp r5,#0
        bne loop
zero: str r1,[r4]
        add r4,r4,#4
        add r0,r0,#4
        sub r5,r5,#1
        cmp r5,#0
        bne loop
end: SWI 0X11
        .end
```

II. Output Screen Shots ***(One Screenshot including Register Window ,Memory Window and Code Window)***



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LAB #____2_____ Program Number: ____4___

Title of the Program

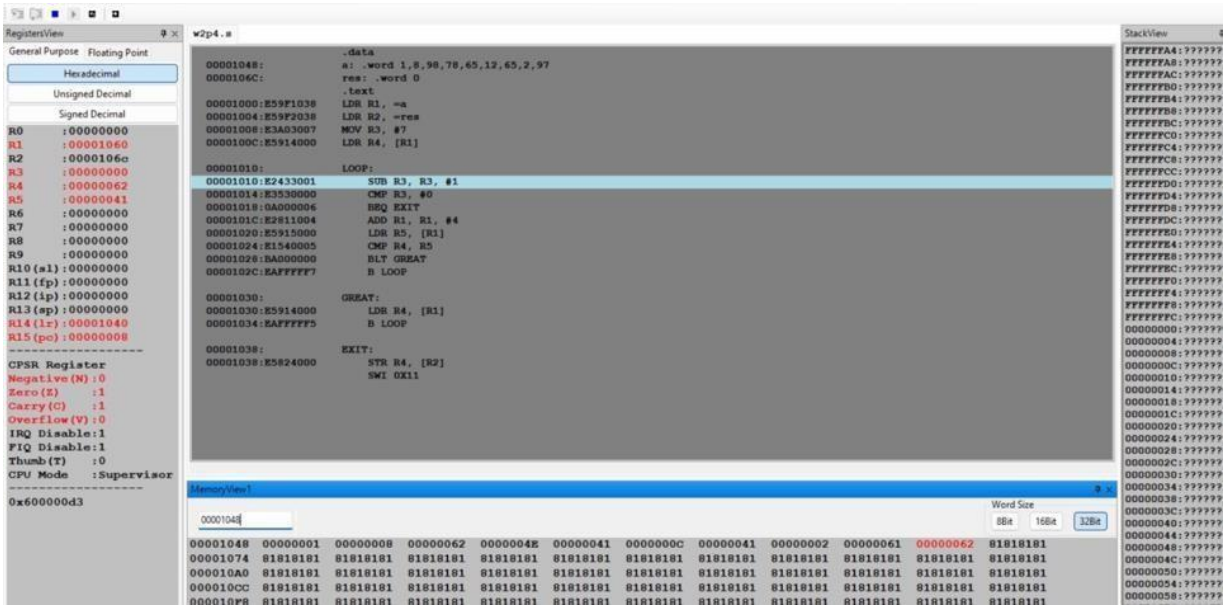
Write a program to find the largest number from a given set of numbers. (Unsorted Array)

I. ARM Assembly Code

```
.data
a: .word 1,8,98,78,65,12,65,2,97
res: .word 0
.text
LDR R1, =a
LDR R2, =res
MOV R3, #7
LDR R4, [R1]

LOOP:
    SUB R3, R3, #1
    CMP R3, #0
    BEQ EXIT
    ADD R1, R1, #4
    LDR R5, [R1]
    CMP R4, R5
    BLT GREAT
    B LOOP

GREAT:
    LDR R4, [R1]
    B LOOP

EXIT:
    STR R4, [R2]
    SWI 0X11
```

II. Output Screen Shots

(One Screenshot including Register Window, Memory Window and Code Window)



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LAB #____2_____ Assignment Question 1

Title of the Program

Write a program to add array of ten 8-bit numbers taking data from memory location stored as byte data

(Hint: use .byte to store the data instead of .word

Use LDRB instruction for data transfer, Increment the index register by 1 to go to next element of array)

I. ARM Assembly Code

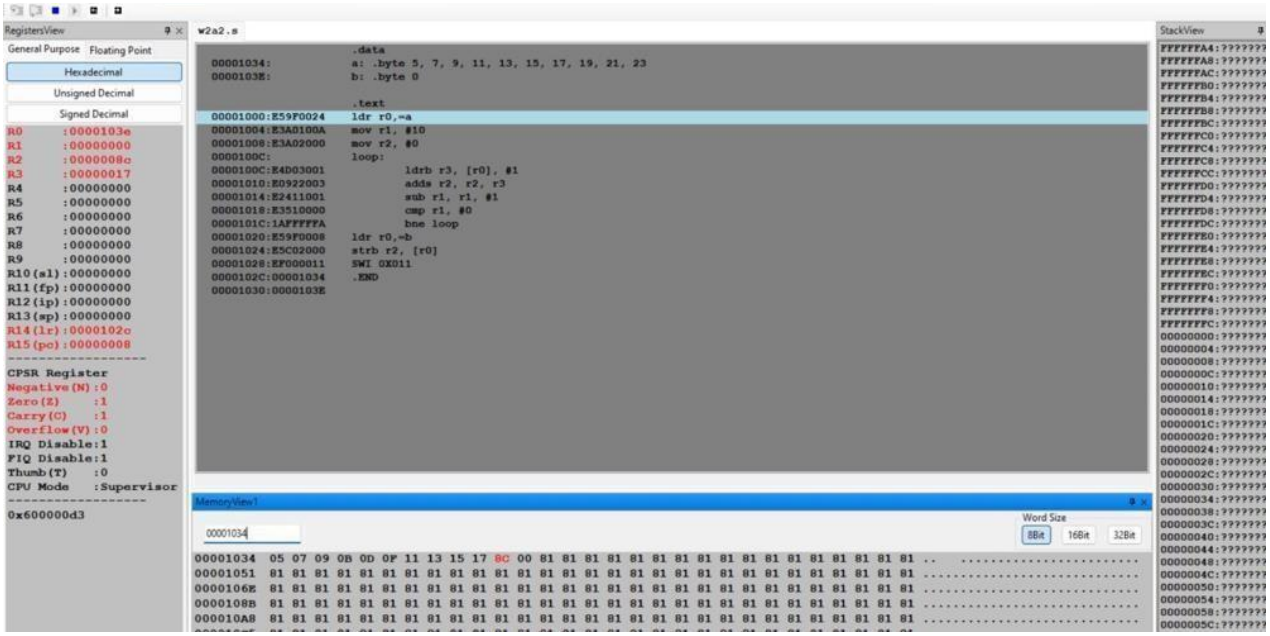
```
.data
a: .byte 5, 7, 9, 11, 13, 15, 17, 19, 21, 23
b: .byte 0

.text
ldr r0,=a
mov r1, #10
mov r2, #0
loop:
        ldrb r3, [r0], #1
        adds r2, r2, r3
        sub r1, r1, #1
        cmp r1, #0
        bne loop

ldr r0,=b
strb r2, [r0]
SWI 0X011
.END
```

II. Output Screen Shots

(One Screenshot including Register Window, Memory Window and Code Window)



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LAB #____2_____ Assignment Question 2

Title of the Program

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

I. ARM Assembly Code

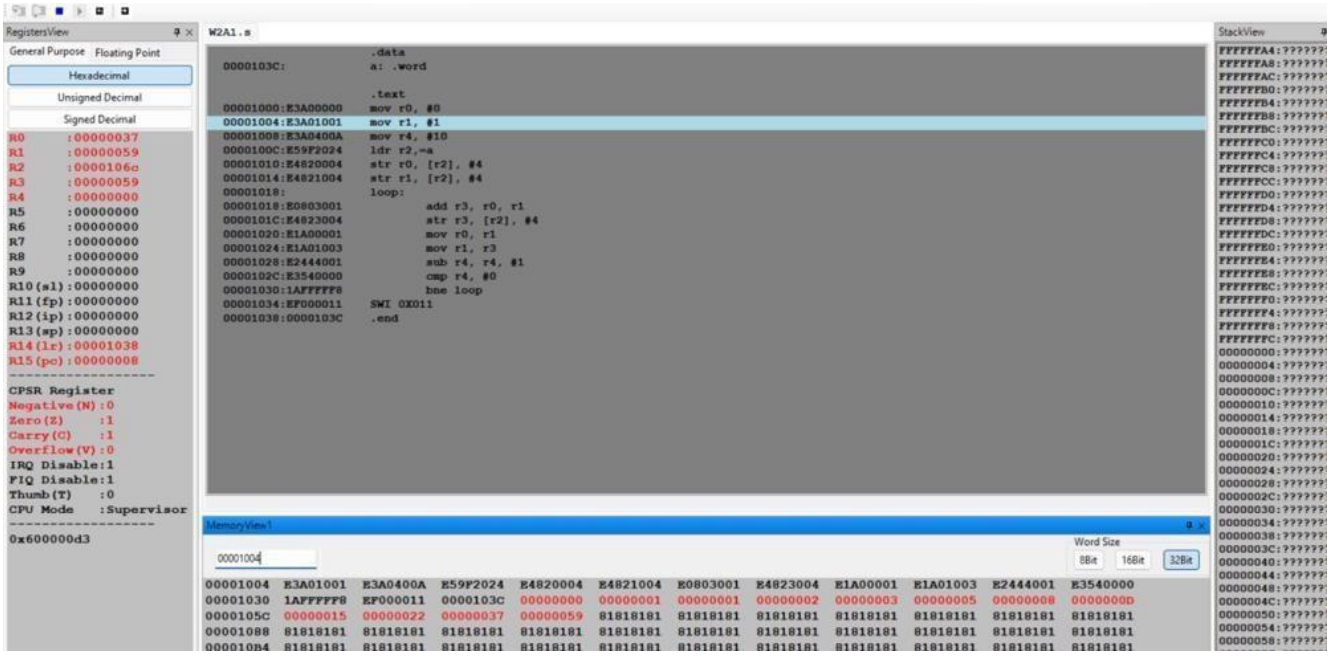
```
.data
a: .word

.text
MOV R0,#0
MOV R1,#1
MOV R4,#10
LDR R2,=a
STR R0,[R2],#4
STR R1,[R2],#4
loop:
    ADD R3,R0,R1
    STR R3,[R2],#4
    MOV R0,R1
    MOV R1,R3
    SUB R4,R4,#1
    CMP R4,#0
    bne loop
SWI 0X011
.end
```

II. Output Screen Shots

(One Screenshot including Register Window, Memory Window and

Code Window)



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:
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