Microprocessor and Computer Architecture UE22CS251B
4th Semester, Academic Year 2023-2024

Date:

Name: Ankith Gowda B S	SRN: PES2UG22CS077	Section B

Week#____1_____ Program Number: ____1___

Title of the Program

Write an ALP to add if the numbers are equal, otherwise subtract them.

I.ARM Assembly Code SOLUTION:

```
@NOTEQUAL  CODE
.text
MOV R0,#20
MOV R1,#30
CMP R0,R1
BEQ L1
SUB R2,R0,R1
B L2

L1:ADD R2,R0,R1
```

```
L2:SWI 0X11
.end
```

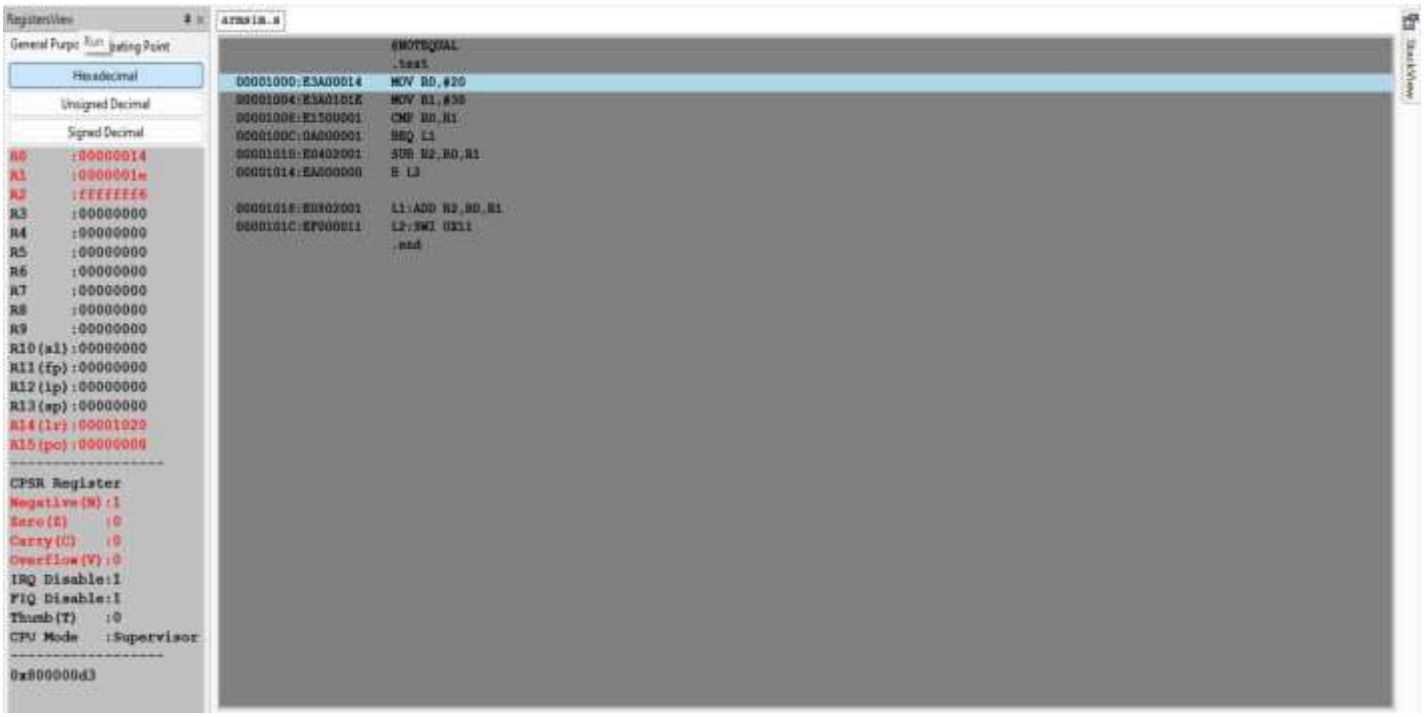
```
@EQUAL  CODE
.text
MOV R0,#30
MOV R1,#30
CMP R0,R1
BEQ L1
SUB R2,R0,R1
B L2

L1:ADD R2,R0,R1
L2:SWI 0X11
.end
```

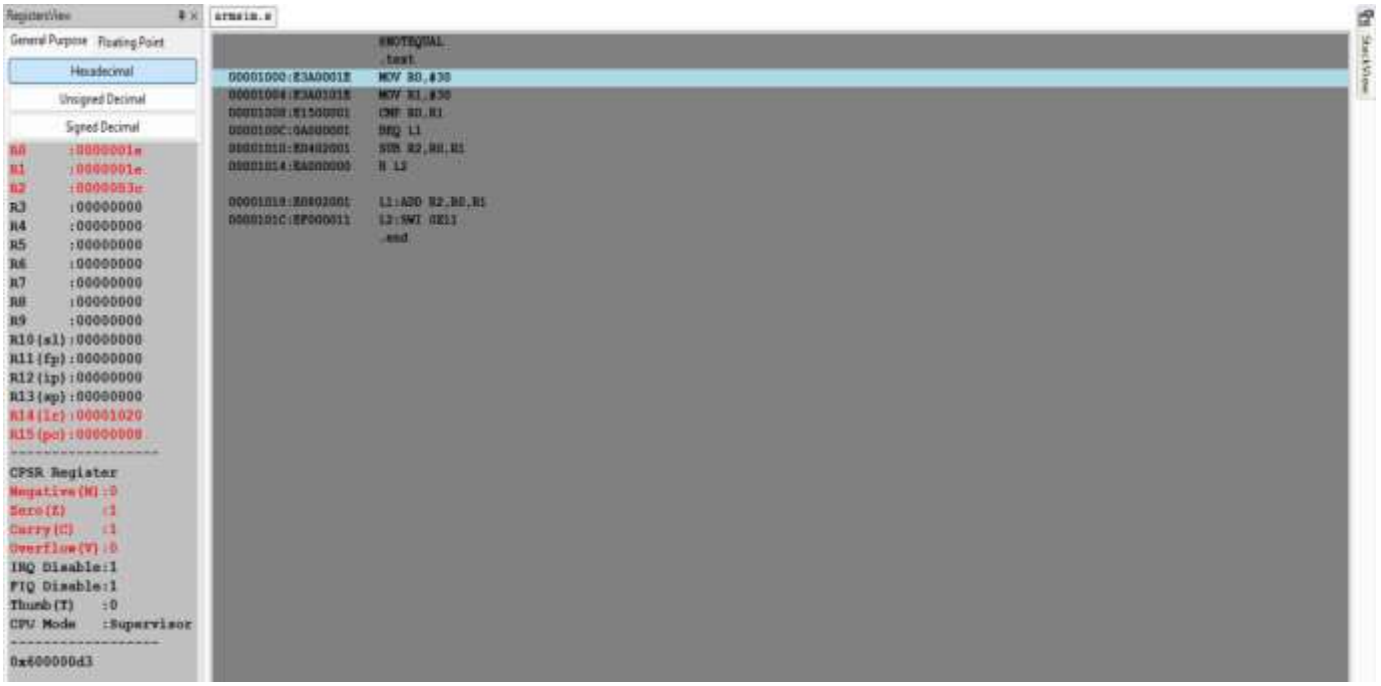
II. Output Screen Shot (Two)

The output should be verified for both equal and nor equal values SOLUTION:

NOT EQUAL


RegisterView
General Purpose
Floating Point
Hexadecimal
Unsigned Decimal
Signed Decimal
R0 :00000014
R1 :0000001e
R2 :fffffff6
R3 :00000000
R4 :00000000
R5 :00000000
R6 :00000000
R7 :00000000
R8 :00000000
R9 :00000000
R10(sl):00000000
R11(fp):00000000
R12(ip):00000000
R13(sp):00000000
R14(lr):00001020
R15(pc):00000008
CPSR Register
Negative(N):1
Zero(Z) :0
Carry(C) :0
Overflow(V):0
IRQ Disable:1
FIQ Disable:1
Thumb(T) :0
CPU Mode :Supervisor
0x800000d3
armsim.s
@NOTEQUAL
.text
00001000:E3A00014 MOV R0,#20
00001004:E3A0101E MOV R1,#30
00001008:E1500001 CMP R0,R1
0000100C:0A000001 BEQ L1
00001010:E0402001 SUB R2,R0,R1
00001014:EA000000 B L2
00001018:E0802001 L1:ADD R2,R0,R1
0000101C:EF000011 L2:SWI 0X11
.end
StackView

EQUAL:


RegisterView
General Purpose
Floating Point
Hexadecimal
Unsigned Decimal
Signed Decimal
R0 :0000001e
R1 :0000001e
R2 :0000003c
R3 :00000000
R4 :00000000
R5 :00000000
R6 :00000000
R7 :00000000
R8 :00000000
R9 :00000000
R10(sl):00000000
R11(fp):00000000
R12(ip):00000000
R13(sp):00000000
R14(lr):00001020
R15(pc):00000008
CPSR Register
Negative(N):0
Zero(Z) :1
Carry(C) :1
Overflow(V):0
IRQ Disable:1
FIQ Disable:1
Thumb(T) :0
CPU Mode :Supervisor
0x600000d3
armsim.s
@NOTEQUAL
.text
00001000:E3A0001E MOV R0,#30
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00001008:E1500001 CMP R0,R1
0000100C:0A000001 BEQ L1
00001010:E0402001 SUB R2,R0,R1
00001014:EA000000 B L2
00001018:E0802001 L1:ADD R2,R0,R1
0000101C:EF000011 L2:SWI 0X11
.end
StackView

Microprocessor and Computer Architecture UE22CS251B
4th Semester, Academic Year 2023-2024

Date:

Name: Ankith Gowda B S	SRN: PES2UG22CS077	Section B

Week#____1_____ Program Number: ____2___

Title of the Program

Write an ALP using ARM instruction set to check if a number stored in a register is even or odd. If even, store 00 in R0, else store FF in R0

I. ARM Assembly Code SOLUTION:

```
@FOR EVEN
.text
MOV R0,#8
AND R1,R0,#1 @AND OPERATION OF R0 AND 1 IN R1 TO
CHECK IF IT IS EVEN OR ODD
CMP R1,#0
BEQ EVEN
MOV R2,#1

B L2

EVEN:MOV R2,#0
L2:SWI 0X11
```

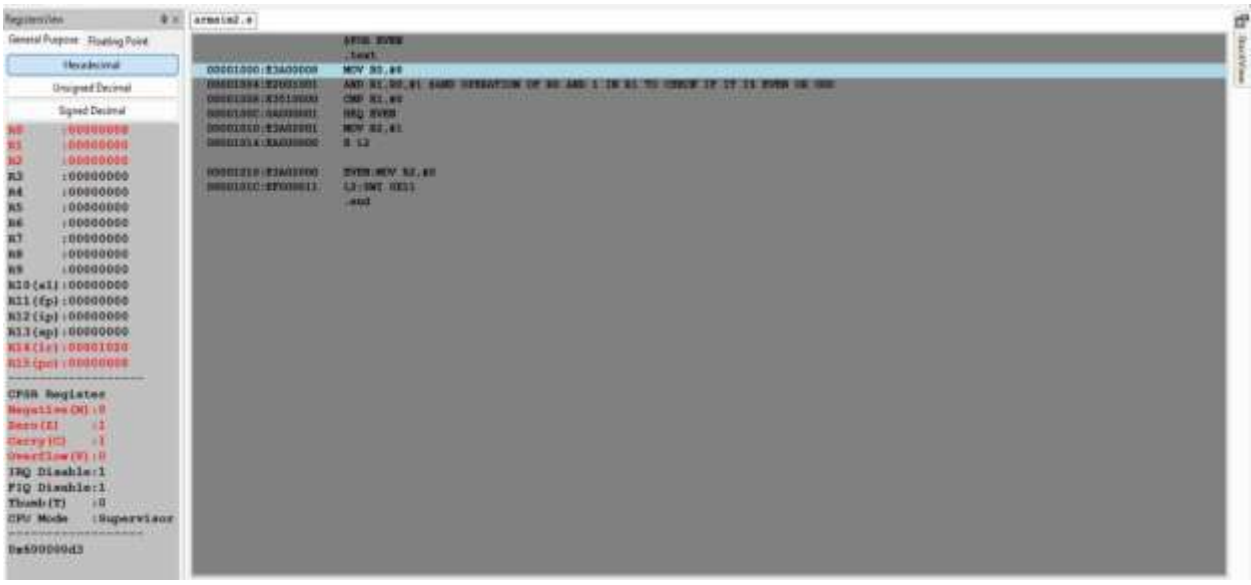
```
.end

@FOR ODD
.text
MOV R0,#9
AND R1,R0,#1 @AND OPERATION OF R0 AND 1 IN R1 TO
CHECK IF IT IS EVEN OR ODD
CMP R1,#0
BEQ EVEN
MOV R2,#1
B L2

EVEN:MOV R2,#0
L2:SWI 0X11
.end
```

II. Output Screen Shot (Two)

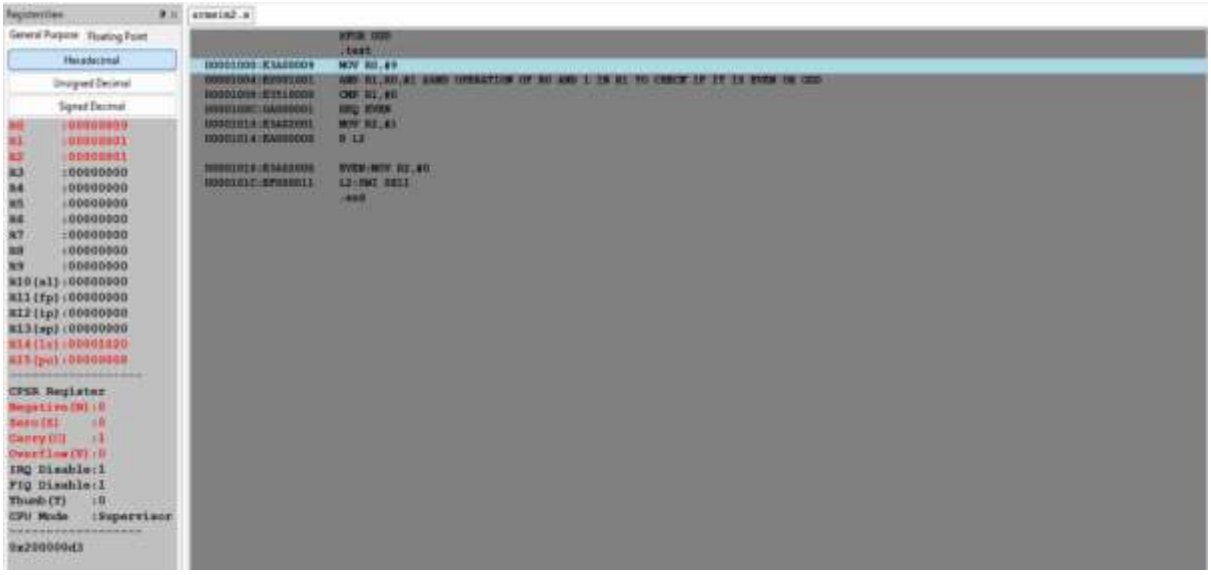
The output should be verified for both even and odd numbers.

SOLUTION:

FOR EVEN:



FOR ODD:



Microprocessor and Computer Architecture UE22CS251B 4th Semester, Academic Year 2023-2024

Date:

Name: Ankith Gowda B S	SRN: PES2UG22CS077	Section B

Week#____1_____ Program Number: ____3___

Title of the Program

Write a program to find the factorial of a given number.

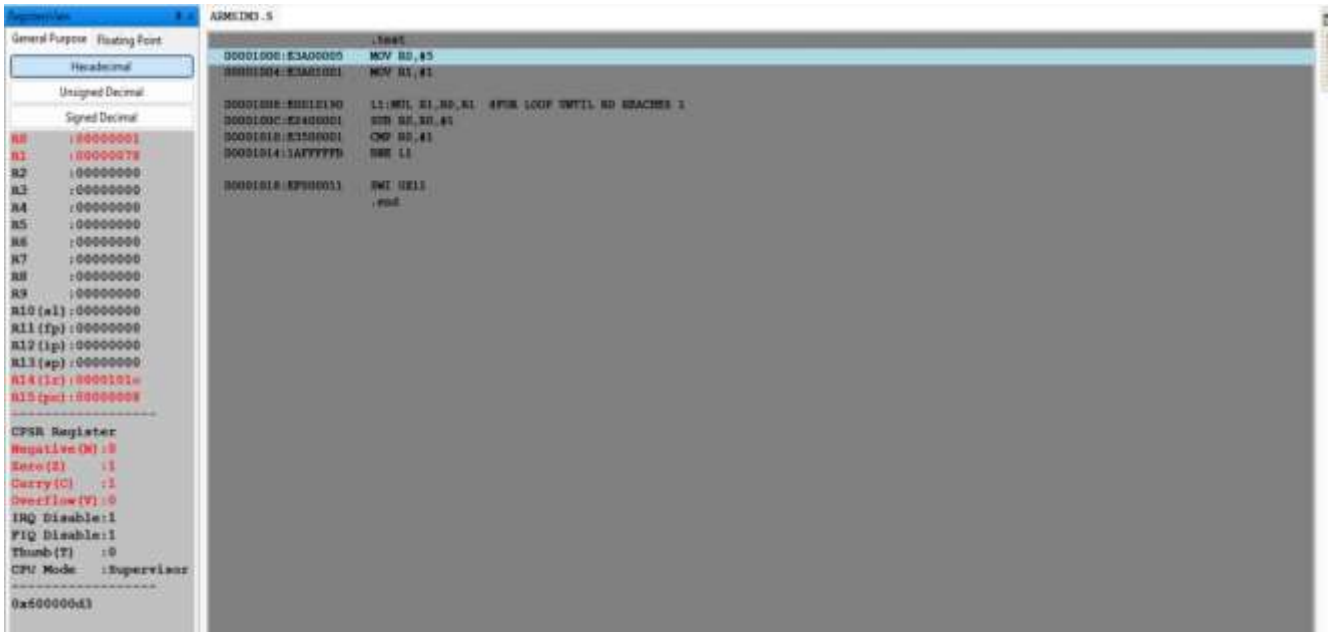
I.ARM Assembly Code SOLUTION:

```
.text
MOV R0,#5
MOV R1,#1
L1:MUL R1,R0,R1  @FOR LOOP UNTIL R0 REACHES 1
SUB R0,R0,#1
CMP R0,#1
BNE L1
SWI 0X11
.end
```

II. Output Screen Shot (One)

The output should be verified for one number

SOLUTION:



Microprocessor and Computer Architecture UE22CS251B 4th Semester, Academic Year 2023-2024

Date: 19 – 01 -2024

Name: Ankith Gowda B S	SRN: PES2UG22CS077	Section B

Week#____1_____ Program Number: ____4__

Title of the Program

Write a program to find GCD of two numbers.

I.ARM Assembly Code SOLUTION:

```
.text
MOV R0, #15 @15,15
MOV R1, #15 @10,20
GCD:CMP R0, R1
   BEQ GCD_EQ
   BGT GCD_G
   BLT GCD_L

GCD_G: SUB R0, R0,R1
      CMP R0, #1
      BLT L2
      B GCD

GCD_L: SUB R1, R1, R0
```

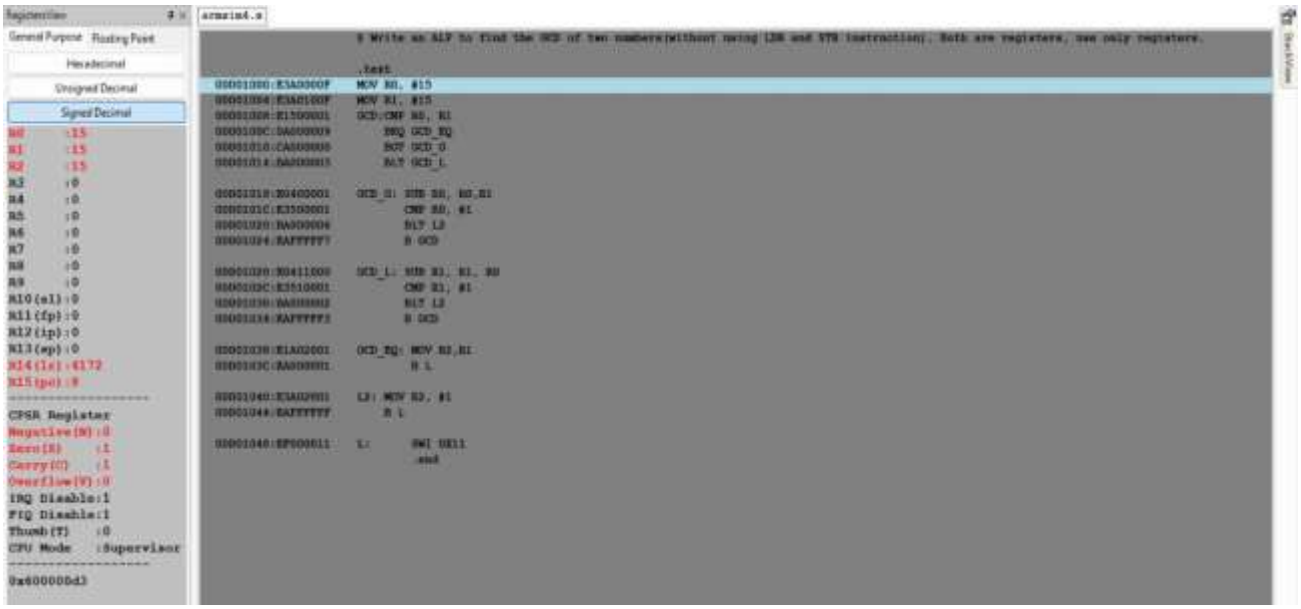
```
        CMP R1, #1
        BLT L2
        B GCD

GCD_EQ: MOV R2,R1
        B L

L2: MOV R2, #1
    B L

L:   SWI 0X11
        .end
```

II. Output Screen Shot (Three)

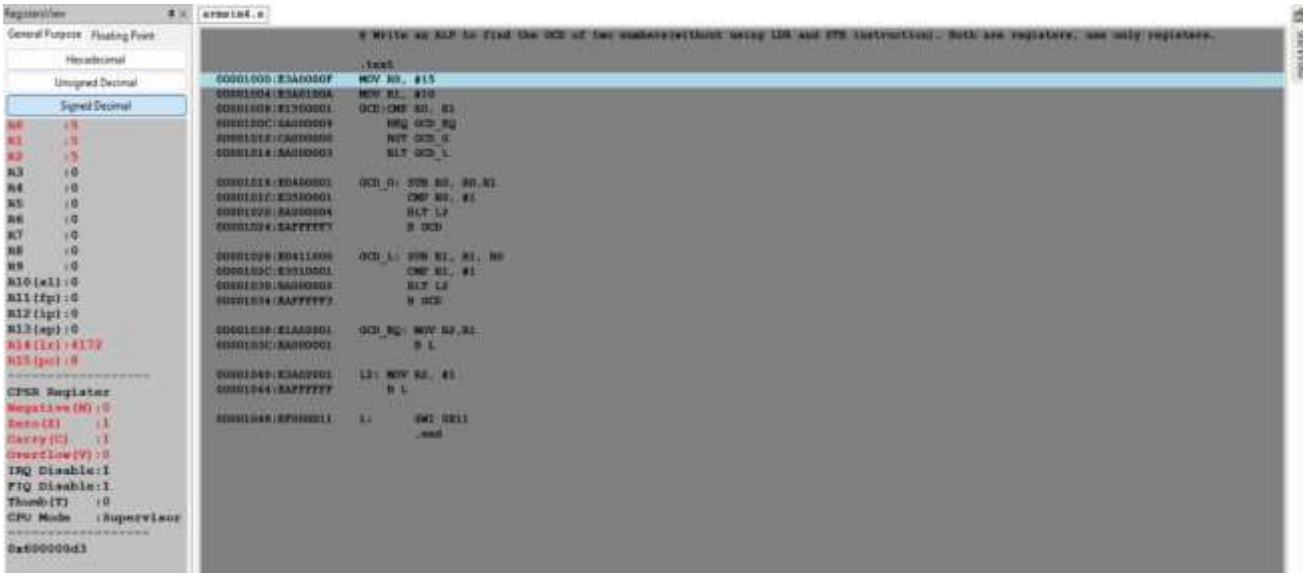
The output should be verified for three cases

SOLUTION:

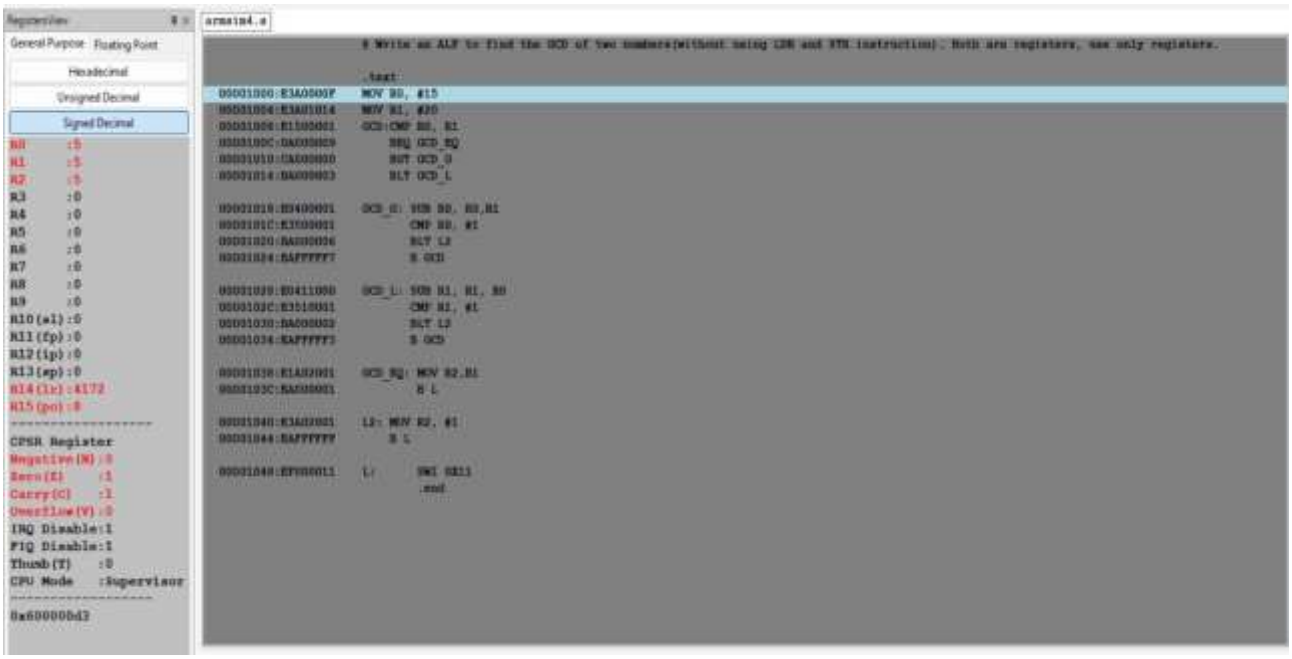
(1^{st} Number== 2nd Number)



(1st Number > 2nd Number)



(1st Number < 2nd Number)



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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SRN: PES2UG22CS077
Section: B
Date: 19-01-2024