Microprocessor and Computer Architecture

UE20CS252

4th Semester, Academic Year 2021-22

Date:07-02-2022

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Week#____4_____ Program Number: ____1___

Title of the Program

Write a program in ARM7TDMI-ISA to find GCD of two numbers.

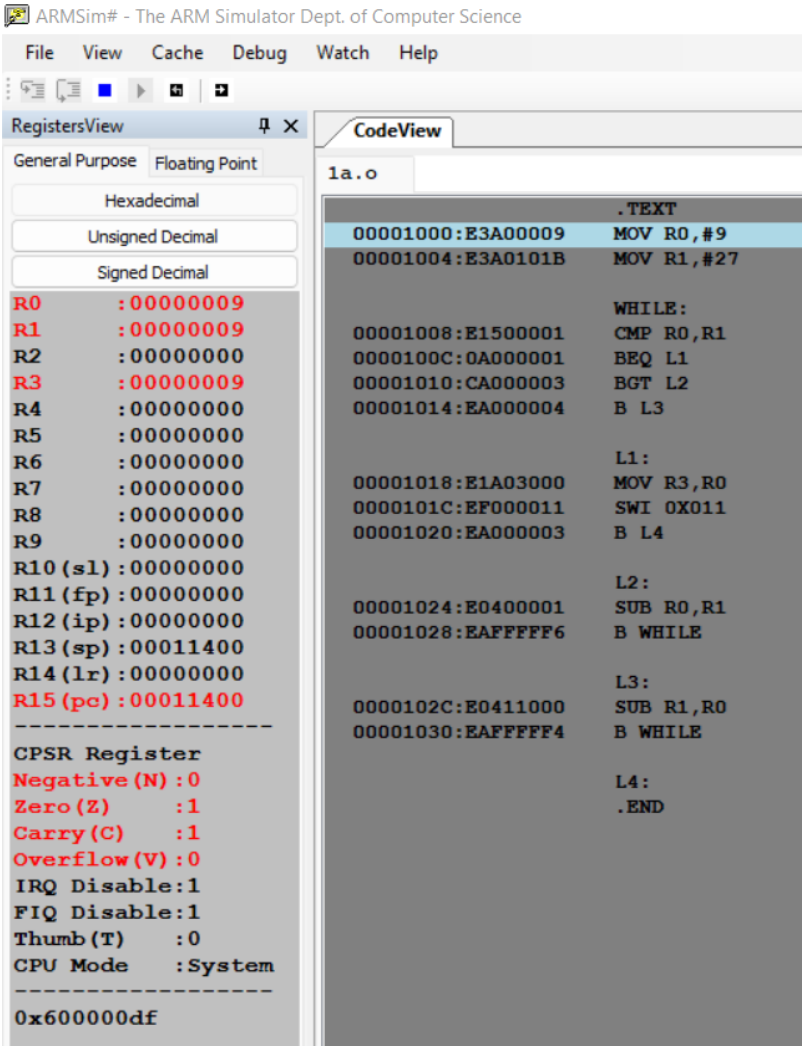
a. Assume operands to be in the CPU registers

1. ARM Assembly Code(1)

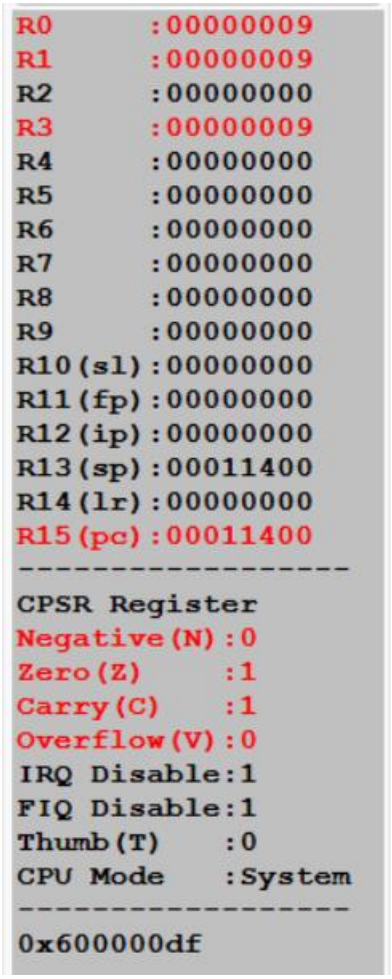
```
.TEXT
MOV R0,#9
MOV R1,#27

WHILE:
CMP R0,R1
BEQ L1
BGT L2
B L3
```

```
L1:
MOV R3,R0
SWI 0X011
B L4

L2:
SUB R0,R1
B WHILE

L3:
SUB R1,R0
B WHILE

L4:
.END
```

2. Output Screen Shot (1)


ARMSim# - The ARM Simulator Dept. of Computer Science
File View Cache Debug Watch Help
RegistersView
General Purpose Floating Point
Hexadecimal
Unsigned Decimal
Signed Decimal
R0 :00000009
R1 :00000009
R2 :00000000
R3 :00000009
R4 :00000000
R5 :00000000
R6 :00000000
R7 :00000000
R8 :00000000
R9 :00000000
R10(sl):00000000
R11(fp):00000000
R12(ip):00000000
R13(sp):00011400
R14(lr):00000000
R15(pc):00011400
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 :System
0x600000df
CodeView
1a.o
.TEXT
00001000:E3A00009 MOV R0,#9
00001004:E3A0101B MOV R1,#27
WHILE:
00001008:E1500001 CMP R0,R1
0000100C:0A000001 BEQ L1
00001010:CA000003 BGT L2
00001014:EA000004 B L3
L1:
00001018:E1A03000 MOV R3,R0
0000101C:EF000011 SWI 0X011
00001020:EA000003 B L4
L2:
00001024:E0400001 SUB R0,R1
00001028:EAFFFFF6 B WHILE
L3:
0000102C:E0411000 SUB R1,R0
00001030:EAFFFFF4 B WHILE
L4:
.END

3. Output Table (1)



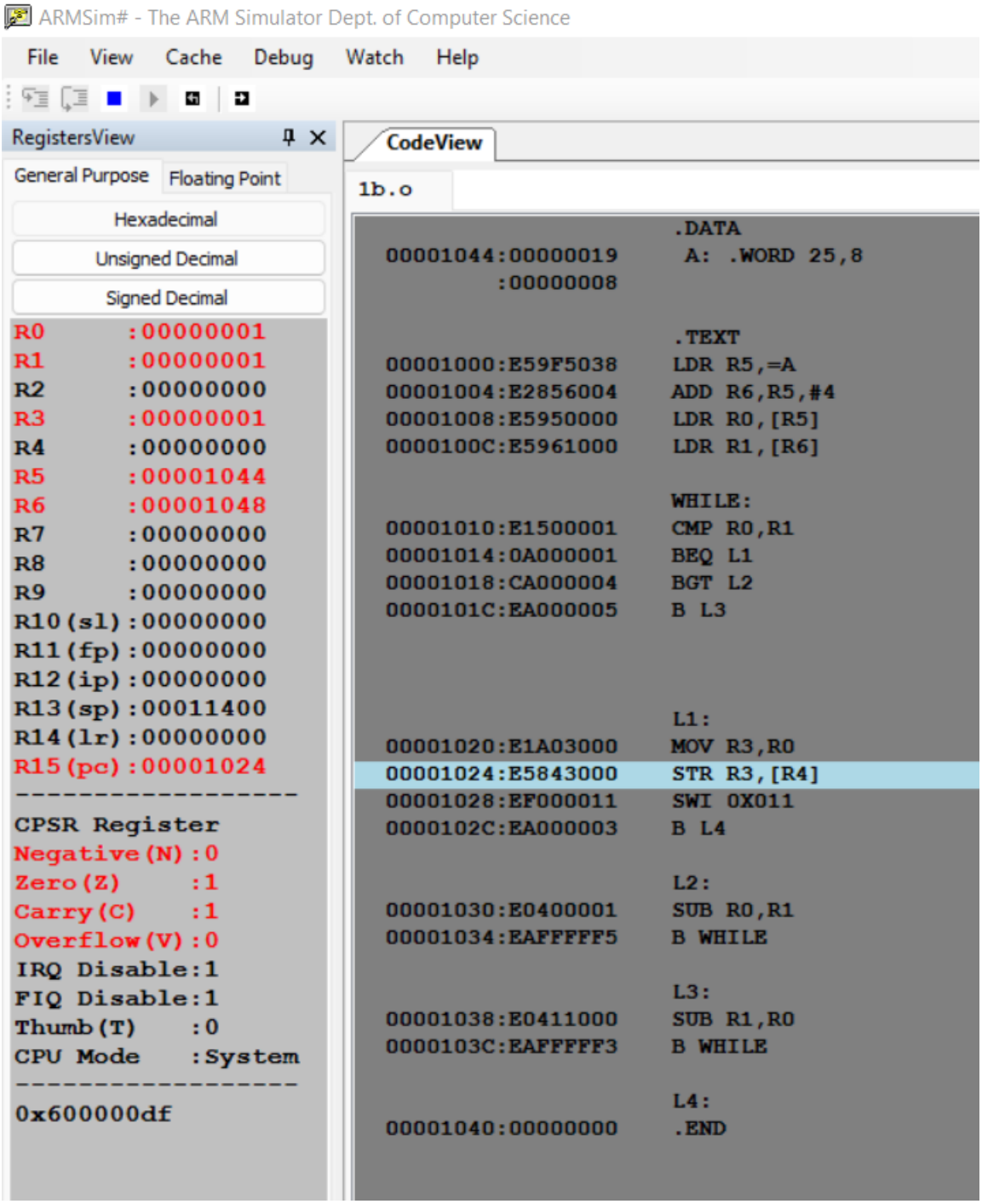
b. Assume operands in the memory locations.

1. ARM Assembly Code(1)

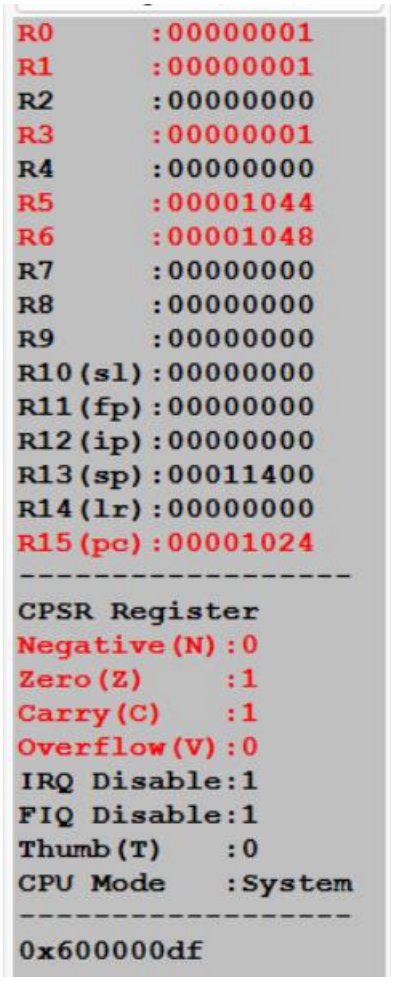
```
.DATA
 A: .WORD 25,8

.TEXT
LDR R5,=A
ADD R6,R5,#4
LDR R0,[R5]
```

```
LDR R1,[R6]

WHILE:
CMP R0,R1
BEQ L1
BGT L2
B L3



L1:
MOV R3,R0
STR R3,[R4]
SWI 0X011
B L4

L2:
SUB R0,R1
B WHILE

L3:
SUB R1,R0
B WHILE

L4:
.END
```

2. Output Screen Shot (1)



3. Output Table (1)



Microprocessor and Computer Architecture

UE20CS252

4th Semester, Academic Year 2021-22

Date:

Name: Mihir Jayaprakash	SRN: PES2UG20CS196	Section: D

Week#____4_____ Program Number: ____2___

Title of the Program

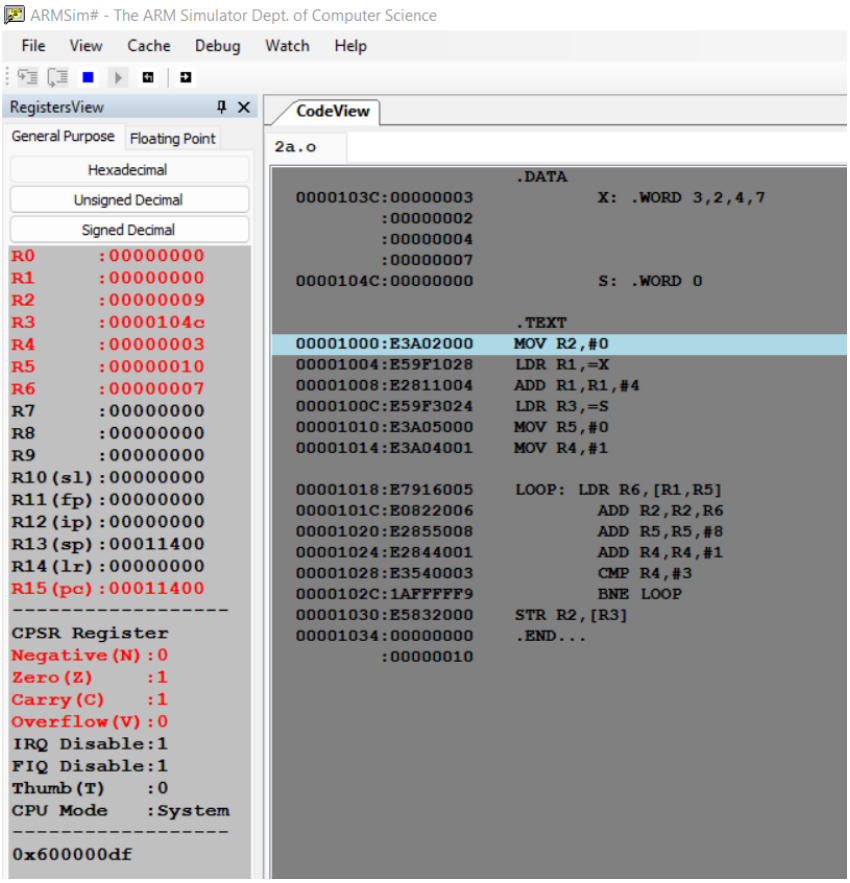
Write a program in ARM7TDMI-ISA to find the sum of N data items at alternate [odd or even positions] locations in the memory. Store the result in the memory location.

a. **Use Pre-indexing addressing mode**
   1. **ARM Assembly Code(1)**

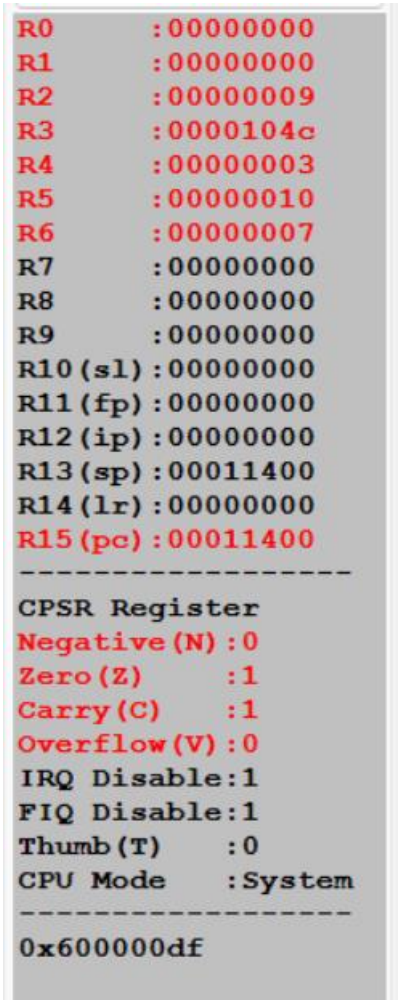
```
.DATA
X: .WORD 3,2,4,7
S: .WORD 0

.TEXT
MOV R2,#0
LDR R1,=X
ADD R1,R1,#4
```

```
LDR R3,=S
MOV R5,#0
MOV R4,#1

LOOP: LDR R6,[R1,R5]
ADD R2,R2,R6
ADD R5,R5,#8
ADD R4,R4,#1
CMP R4,#3
BNE LOOP
STR R2,[R3]
.END
```

2. Output Screen Shot (1)



3. Output Table (1)



```
R0      :00000000
R1      :00000000
R2      :00000009
R3      :0000104c
R4      :00000003
R5      :00000010
R6      :00000007
R7      :00000000
R8      :00000000
R9      :00000000
R10(sl):00000000
R11(fp):00000000
R12(ip):00000000
R13(sp):00011400
R14(lr):00000000
R15(pc):00011400
------------------
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   :System
------------------
0x600000df
```

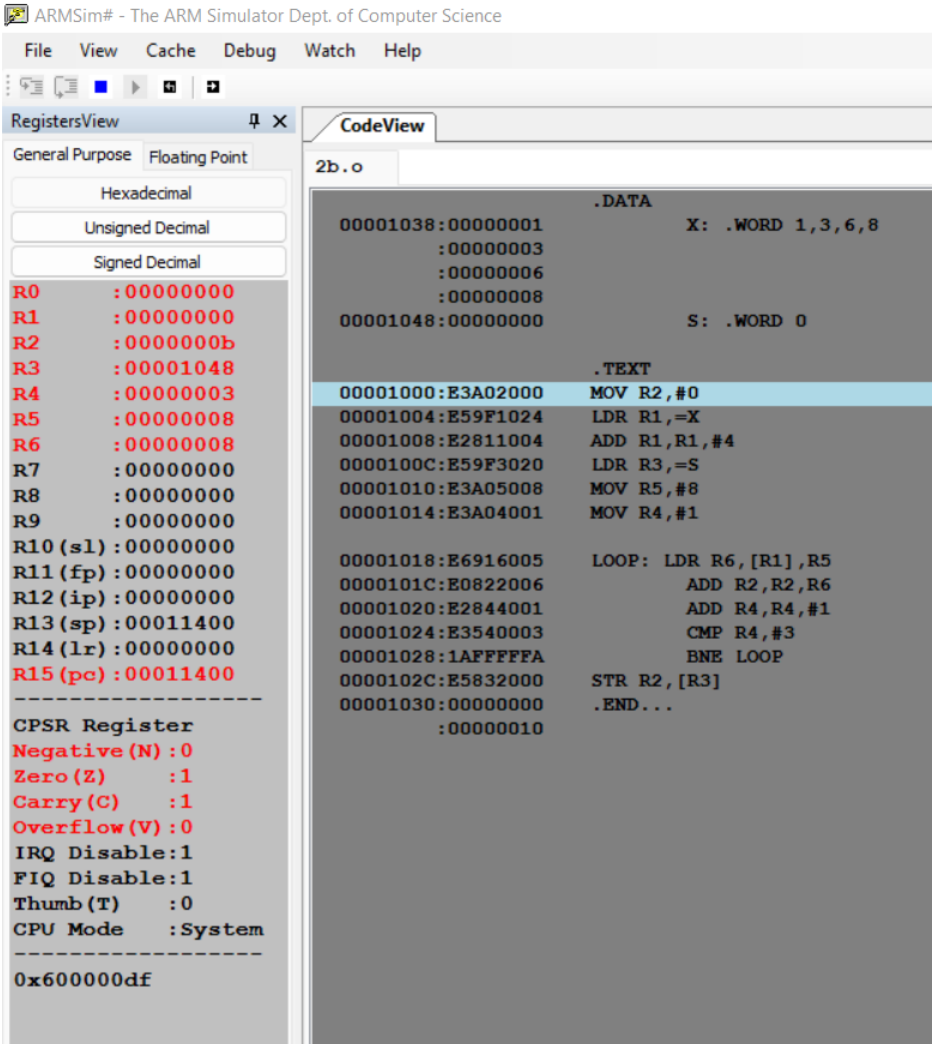
b. Use Post- Indexing addressing mode

1. ARM Assembly Code(1)

```
.DATA
X: .WORD 1,3,6,8
S: .WORD 0
```

```
.TEXT
MOV R2,#0
LDR R1,=X
ADD R1,R1,#4
LDR R3,=S
MOV R5,#8
MOV R4,#1

LOOP: LDR R6,[R1],R5
      ADD R2,R2,R6
      ADD R4,R4,#1
      CMP R4,#3
      BNE LOOP
STR R2,[R3]
.END
```

2. Output Screen Shot (1)



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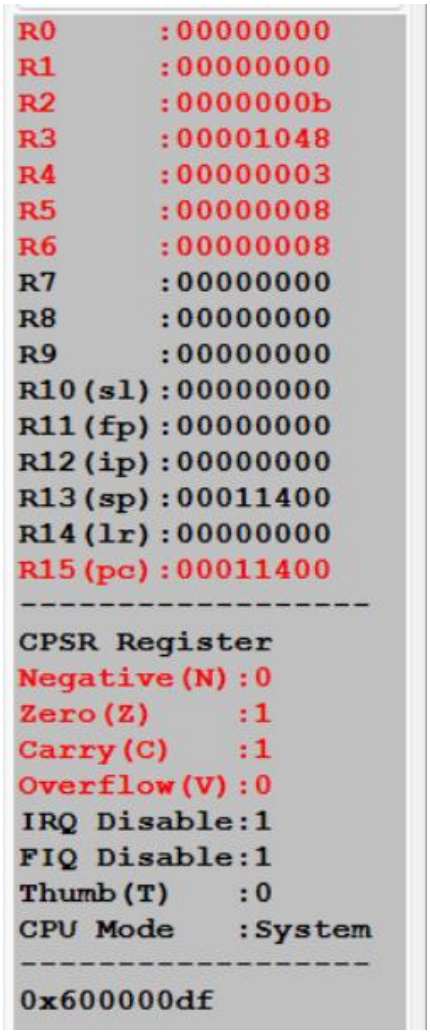

Disclaimer:

- 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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Section: D
Date: 07-02-2022