Microprocessor and Computer Architecture

UE20CS252

4th Semester, Academic Year 2021-22

Date: 31/01/2022

Name: Vishwa Mehul Mehta	SRN: PES2UG20CS389	Section: F

Week#3 Program Number: 1

Title of the Program

Write a program in ARM7TDMI-ISA to find the sum of N data items in the memory. Store the result in the memory location.

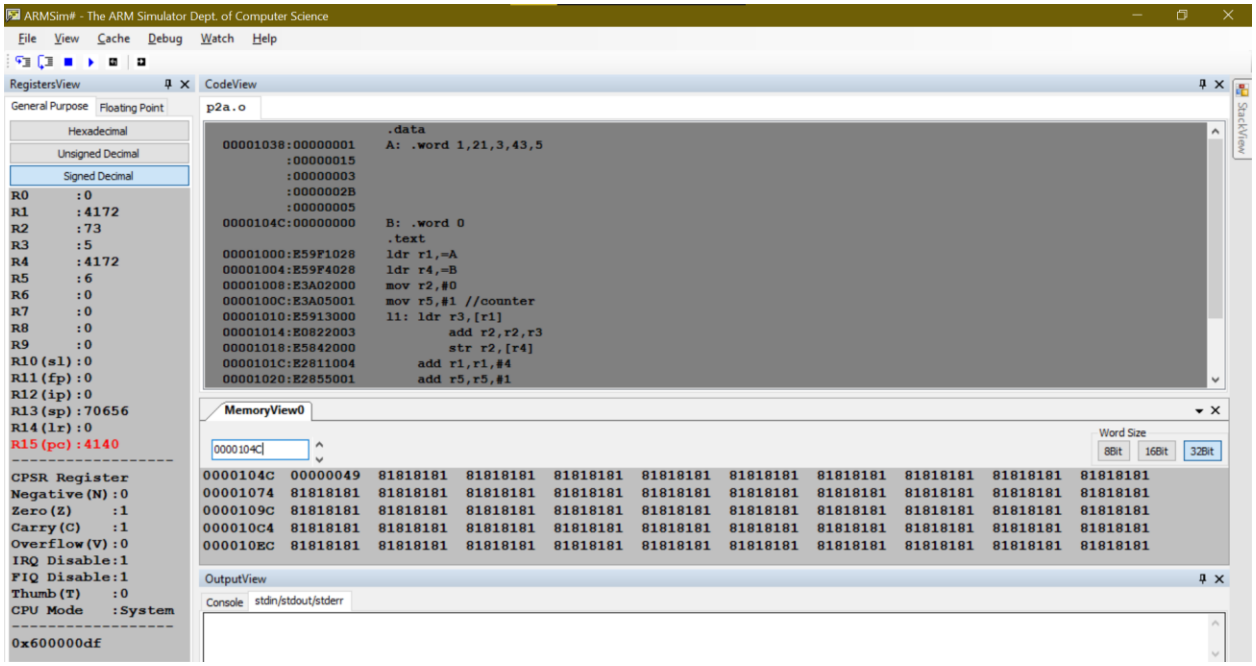
a. Use Full word (.word directive)

I. ARM Assembly Code:

vishwa@Acer-Vishwa: /mnt/c/U

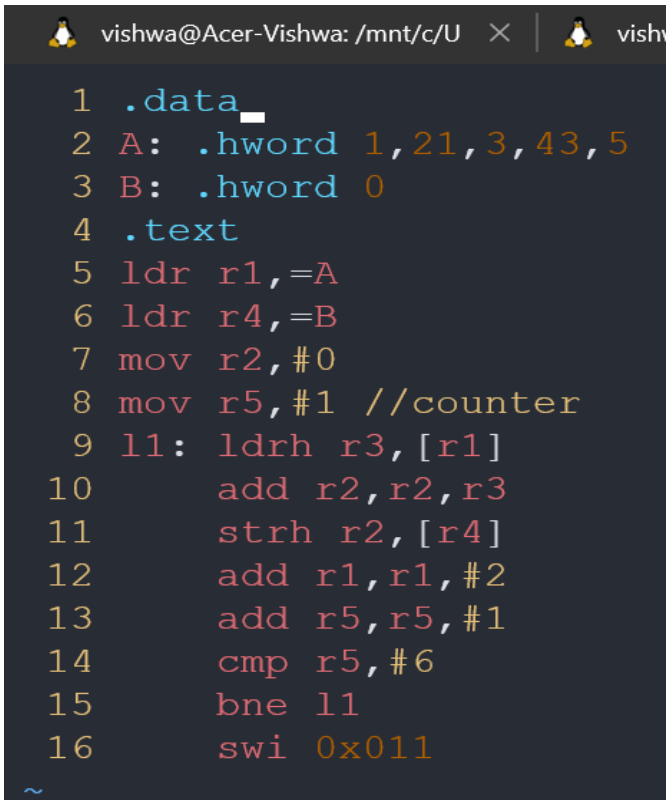
```
1  .data
2  A:  .word 1,21,3,43,5
3  B:  .word 0
4  .text
5  ldr r1,=A
6  ldr r4,=B
7  mov r2,#0
8  mov r5,#1 //counter
9  l1: ldr r3,[r1]
10     add r2,r2,r3
11     str r2,[r4]
12     add r1,r1,#4
13     add r5,r5,#1
14     cmp r5,#6
15     bne l1
16     swi 0x011
```

II. Output Screen Shot:

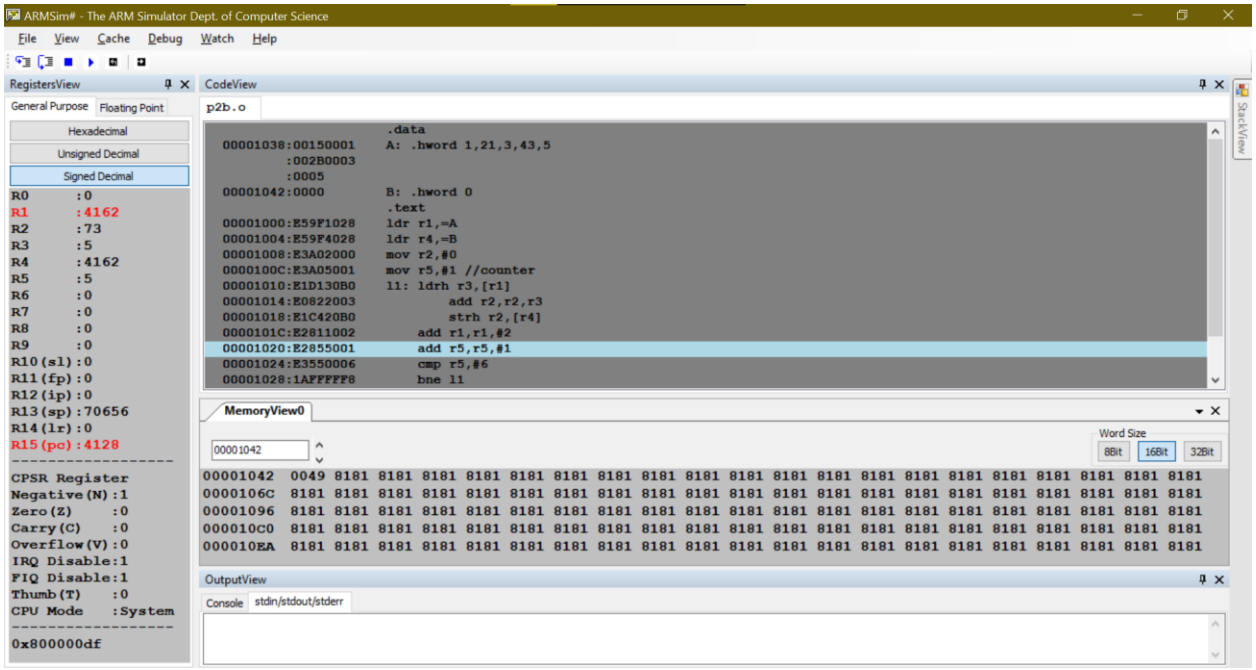


b. Use Half word(.Hword directive)

I. ARM Assembly Code:

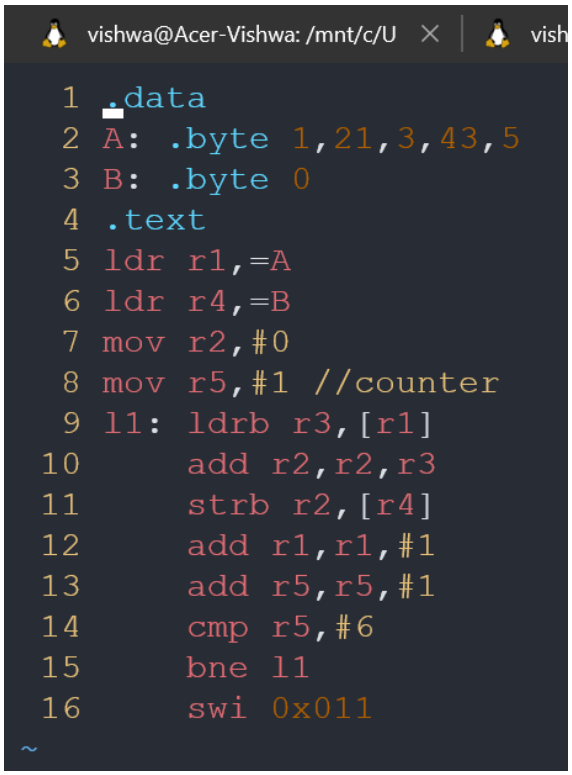


II. Output Screen Shot:

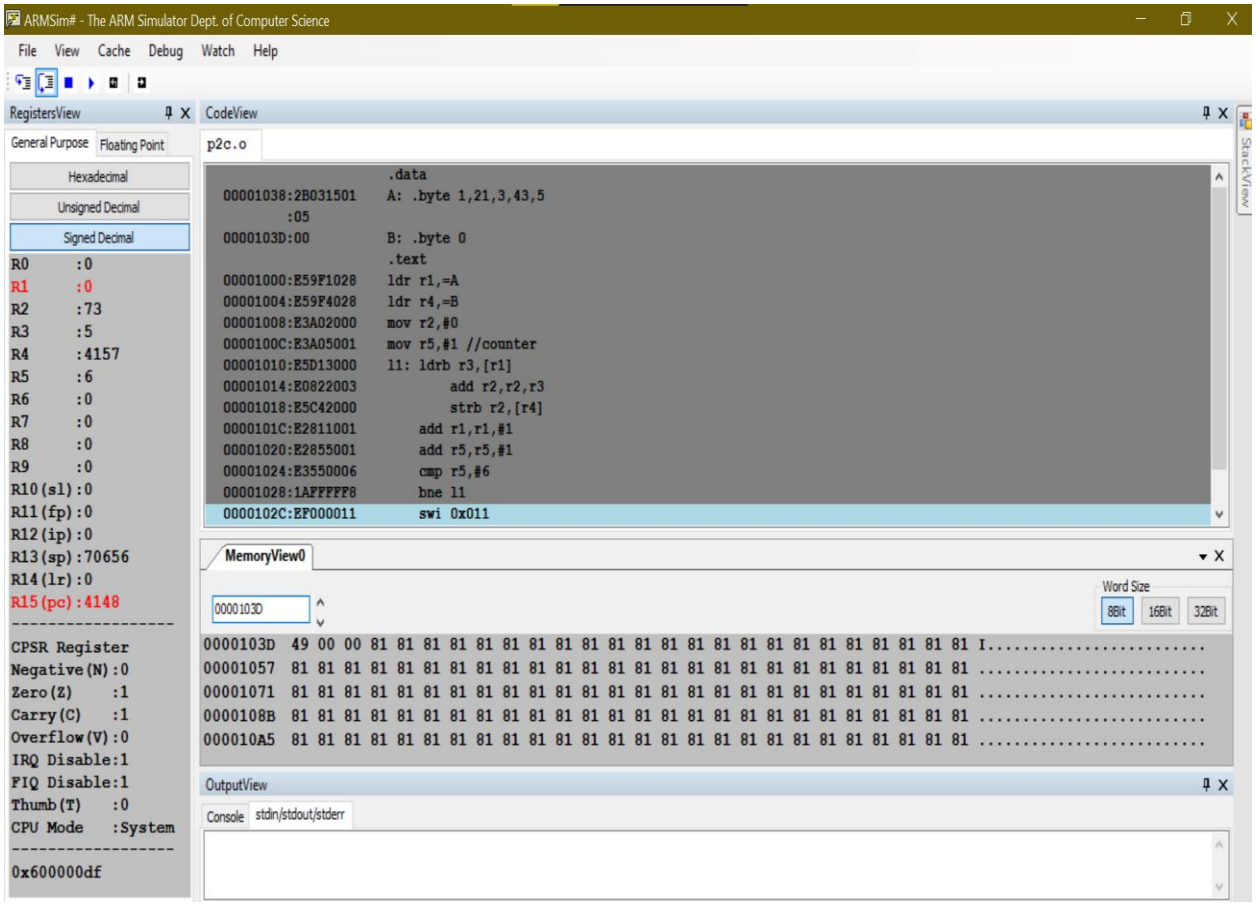


c. Use Byte wise (.Byte directive)

III. ARM Assembly Code:



IV. Output Screen Shot:



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Name: Vishwa Mehul Mehta	SRN: PES2UG20CS389	Section: F

Week#3 Program Number: 2

Title of the Program

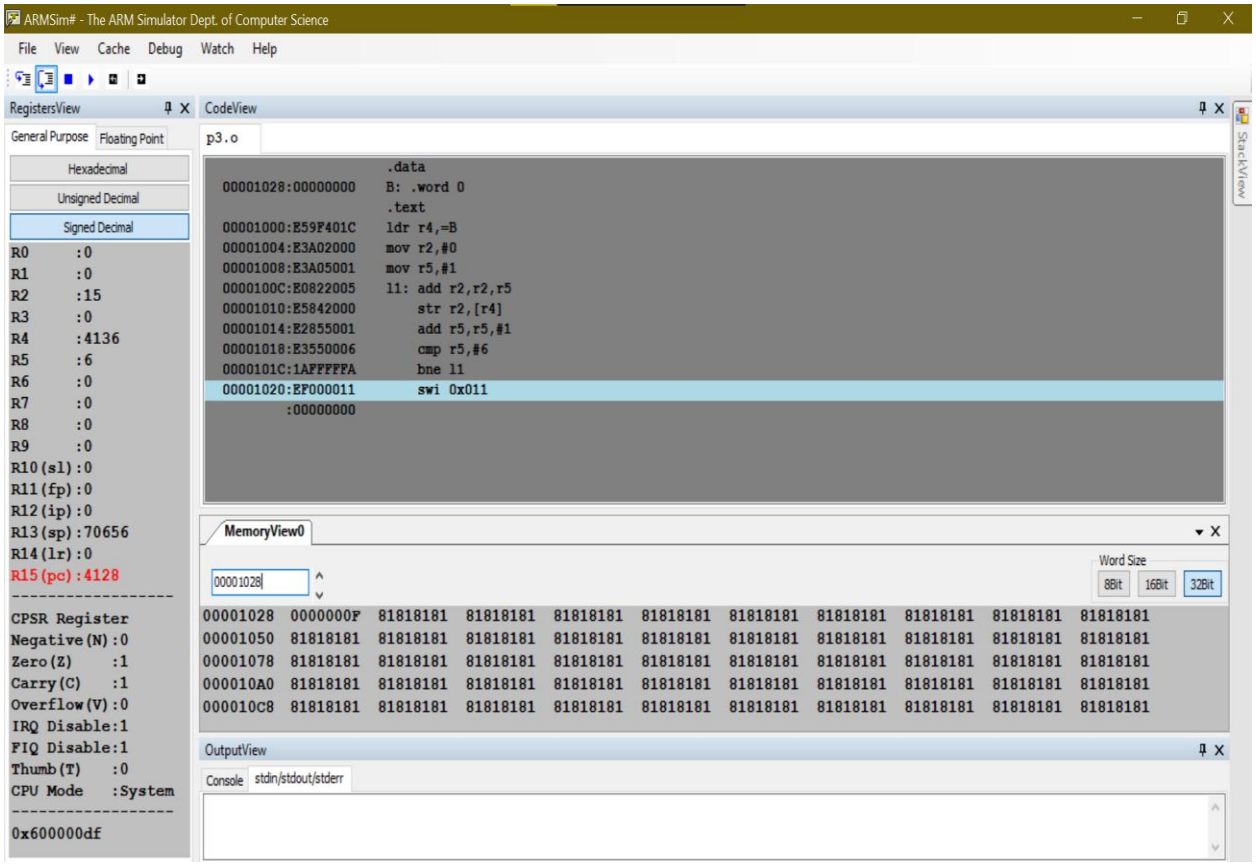
Write a program in ARM7TDMI-ISA to find the sum of N natural numbers. Store the result in the memory location.

I. ARM Assembly Code:

vishwa@Acer-Vishwa: /mnt/c/U

```
1  .data
2  B:  .word 0
3  .text
4  ldr r4,=B
5  mov r2,#0
6  mov r5,#1
7  l1: add r2,r2,r5
8      str r2,[r4]
9      add r5,r5,#1
10     cmp r5,#6
11     bne l1
12     swi 0x011
~
```

II. Output Screen Shot:



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Week#3 Program Number: 3

Title of the Program

Convert the following statement in C language into an ALP using ARM7TDMI – ISA.

IF([A]==[B]) then C=[A]+[B];

ELSE IF ([B]==[C]) D=[A]-[B];

ELSE E=[A]*[B]

Where A,B C, D & E are memory locations.

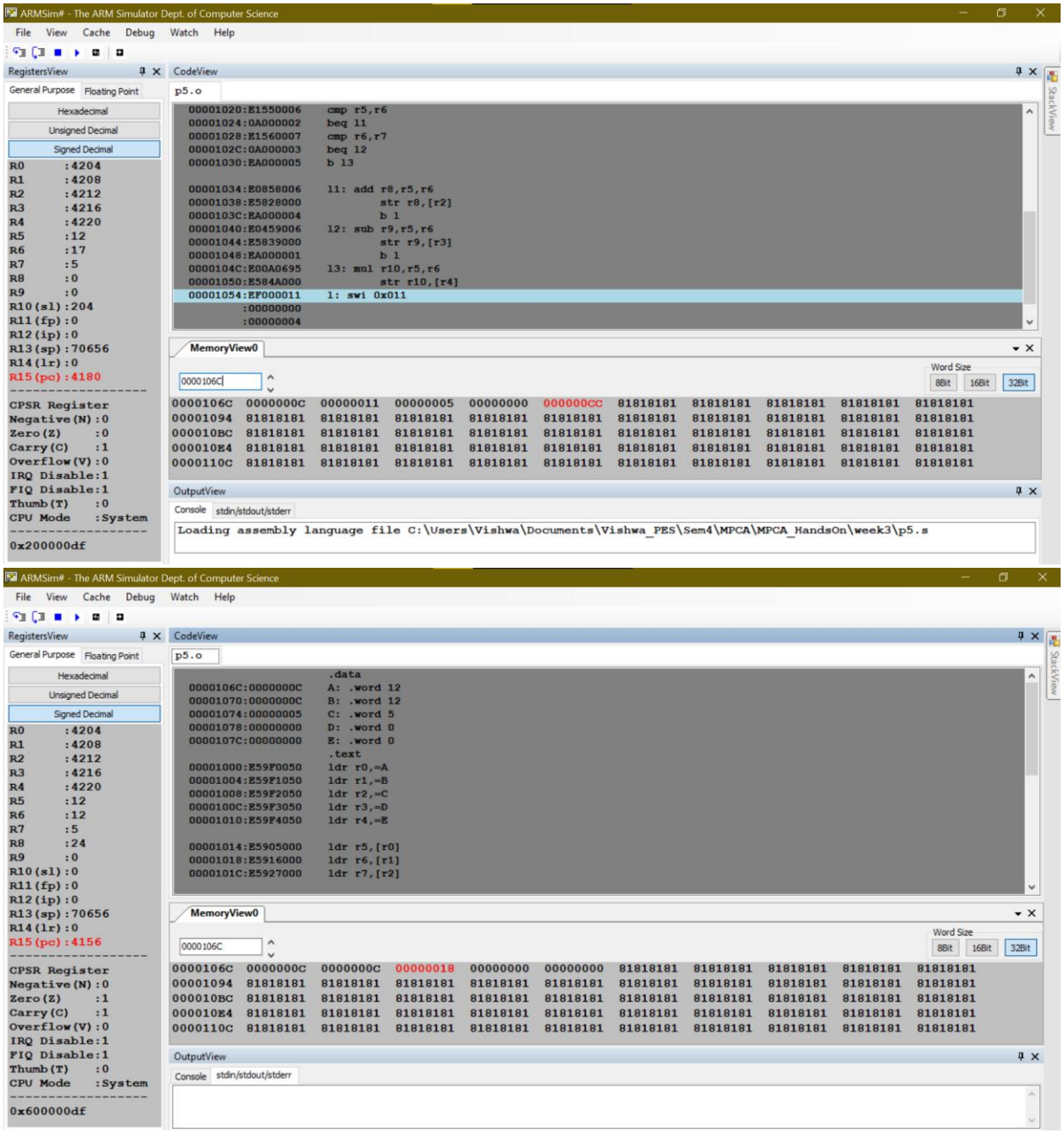
I. ARM Assembly Code:

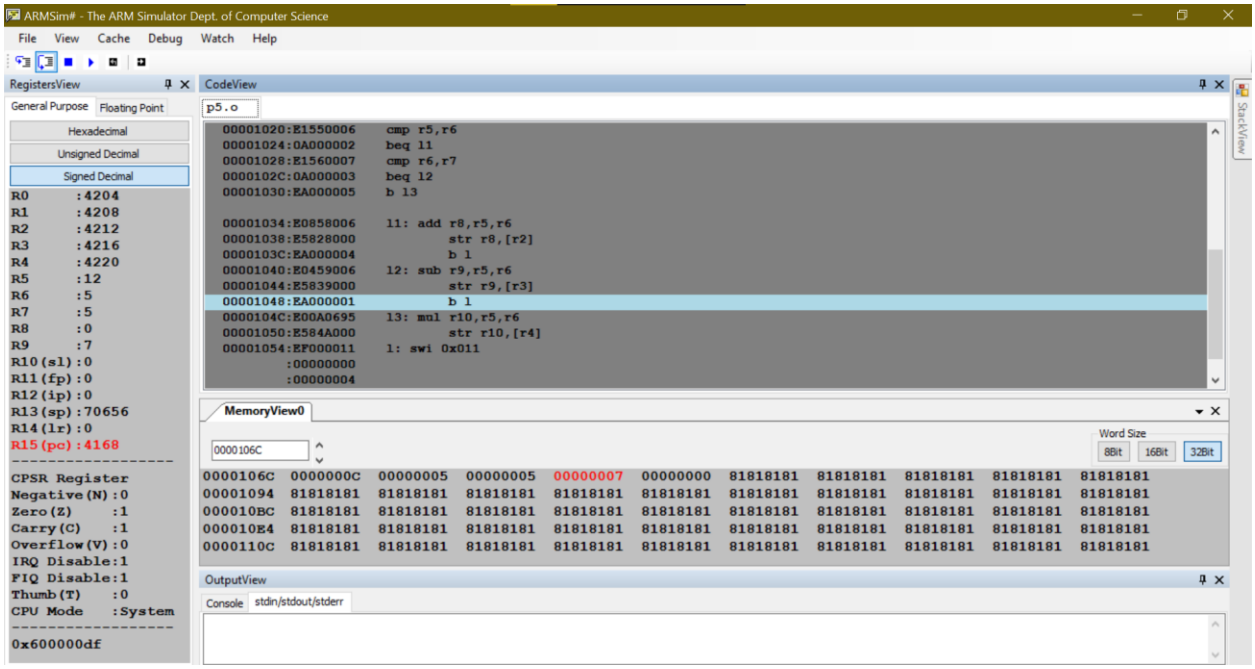
vishwa@Acer-Vishwa: /mnt/c/U

vishwa@Acer-Vishwa: /mnt/c/U

```
.data
A: .word 12
B: .word 5
C: .word 5
D: .word 0
E: .word 0
.text
ldr r0,=A
ldr r1,=B
ldr r2,=C
ldr r3,=D
ldr r4,=E

ldr r5,[r0]
ldr r6,[r1]
ldr r7,[r2]

cmp r5,r6
beq l1
cmp r6,r7
beq l2
b l3

l1: add r8,r5,r6
    str r8,[r2]
    b l
l2: sub r9,r5,r6
    str r9,[r3]
    b l
l3: mul r10,r5,r6
    str r10,[r4]
l: swi 0x011
```

II. Output Screen Shot:




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 :4204
R1 :4208
R2 :4212
R3 :4216
R4 :4220
R5 :12
R6 :5
R7 :5
R8 :0
R9 :7
R10(sl):0
R11(fp):0
R12(ip):0
R13(sp):70656
R14(lr):0
R15(pc):4168
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
p5.o
00001020:E1550006 cmp r5,r6
00001024:0A000002 beq l1
00001028:E1560007 cmp r6,r7
0000102C:0A000003 beq l2
00001030:EA000005 b l3
00001034:E0858006 l1: add r8,r5,r6
00001038:E5828000 str r8,[r2]
0000103C:EA000004 b l
00001040:E0459006 l2: sub r9,r5,r6
00001044:E5839000 str r9,[r3]
00001048:EA000001 b l
0000104C:E00A0695 l3: mul r10,r5,r6
00001050:E584A000 str r10,[r4]
00001054:EF000011 l: swi 0x011
:00000000
:00000004
MemoryView0
0000106C
Word Size
8Bit 16Bit 32Bit
0000106C 0000000C 00000005 00000005 00000007 00000000 81818181 81818181 81818181 81818181 81818181
00001094 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
000010BC 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
000010E4 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
0000110C 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181 81818181
OutputView
Console stdin/stdout/stderr
StackView

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.

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