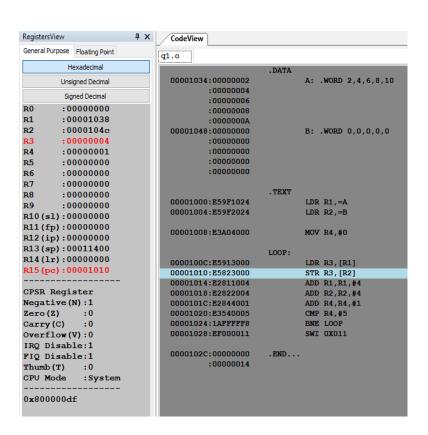
H M Mythreya PES2UG20CS130 MPCA-Lab Week-2

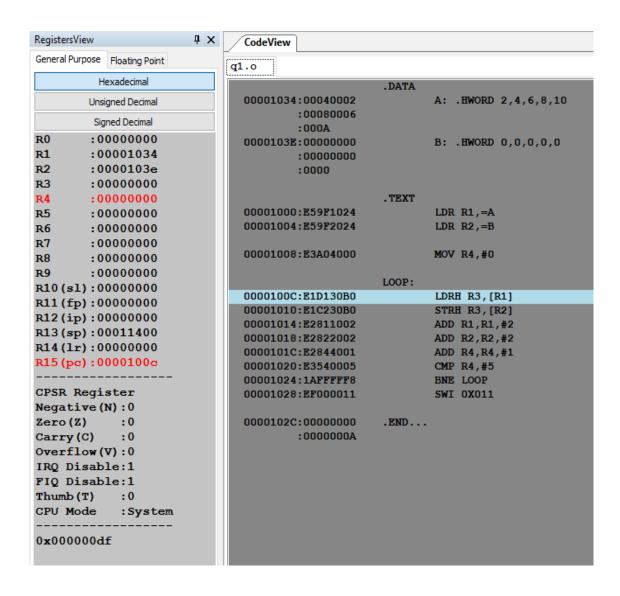
Task 1: Write a program to copy a block of N data items from location A to B.

```
a) Full word(.word directive)
.DATA
      A: .WORD 2,4,6,8,10
      B: .WORD 0,0,0,0,0
.TEXT
      LDR R1,=A
      LDR R2,=B
      MOV R4,#0
LOOP:
      LDR R3, [R1]
      STR R3, [R2]
      ADD R1, R1, #4
      ADD R2, R2, #4
      ADD R4, R4, #1
      CMP R4,#5
      BNE LOOP
      SWI 0X011
```

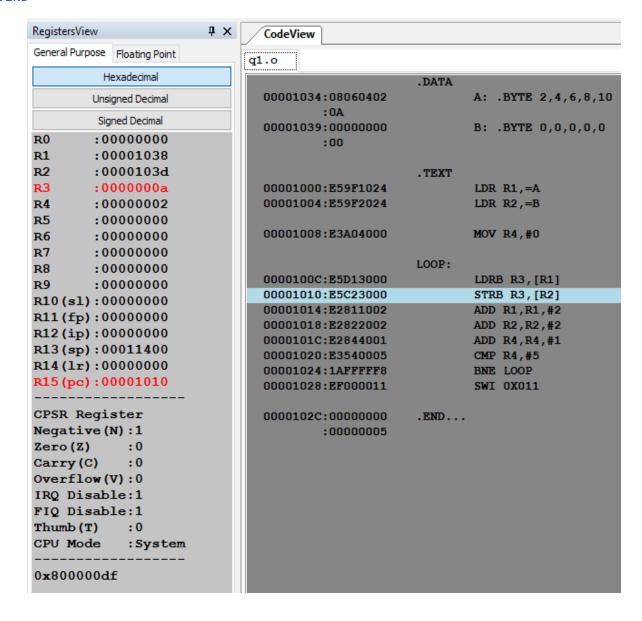
. END



b) Half word(.Hword directive) .DATA A: .HWORD 2,4,6,8,10 B: .HWORD 0,0,0,0,0 .TEXT LDR R1,=A LDR R2,=B MOV R4,#0 LOOP: LDRH R3, [R1] **STRH R3, [R2]** ADD R1,R1,#2 ADD R2, R2, #2 ADD R4,R4,#1 CMP R4,#5 BNE LOOP SWI 0X011

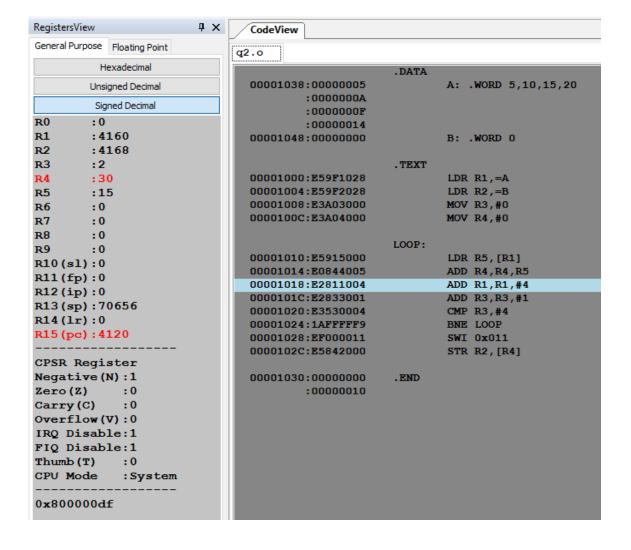


```
c) Byte word(.Hword directive)
.DATA
      A: .BYTE 2,4,6,8,10
      B: .BYTE 0,0,0,0,0
.TEXT
      LDR R1,=A
      LDR R2,=B
      MOV R4,#0
LOOP:
      LDRB R3, [R1]
      STRB R3, [R2]
      ADD R1,R1,#2
      ADD R2, R2, #2
      ADD R4,R4,#1
      CMP R4,#5
      BNE LOOP
      SWI 0X011
```

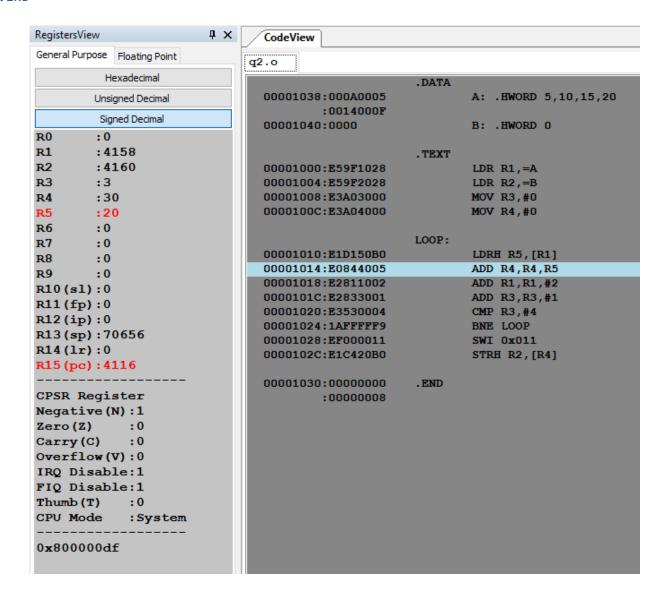


2) Write a program to find the sum of N data items in memory. Store the result in a memory location.

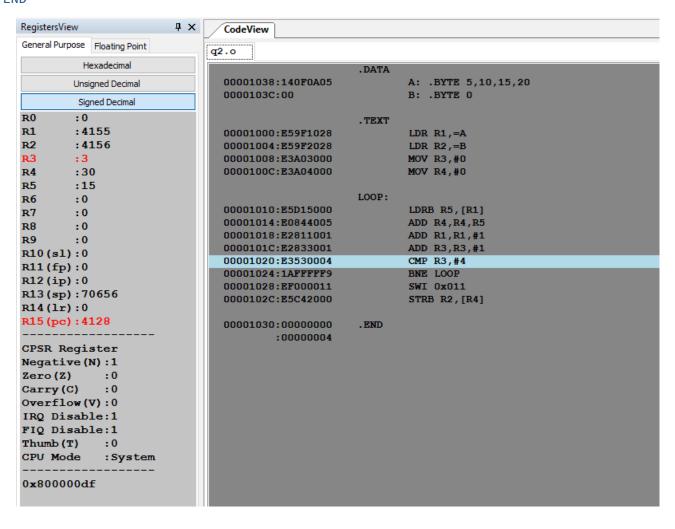
```
a) Full word(.word directive)
.DATA
      A: .WORD 5,10,15,20
      B: .WORD 0
.TEXT
      LDR R1,=A
      LDR R2,=B
      MOV R3,#0
      MOV R4,#0
LOOP:
      LDR R5, [R1]
      ADD R4, R4, R5
      ADD R1, R1, #4
      ADD R3, R3, #1
      CMP R3,#4
      BNE LOOP
      SWI 0x011
      STR R2, [R4]
```



B) Half word(.Hword directive) .DATA A: .HWORD 5,10,15,20 B: .HWORD 0 .TEXT LDR R1,=A LDR R2,=B MOV R3,#0 MOV R4,#0 LOOP: LDRH R5, [R1] ADD R4, R4, R5 ADD R1,R1,#2 ADD R3, R3, #1 CMP R3,#4 BNE LOOP SWI 0x011 STRH R2, [R4]



```
C) Byte Wise(.BYTE directive)
.DATA
      A: .BYTE 5,10,15,20
      B: .BYTE 0
.TEXT
      LDR R1,=A
      LDR R2,=B
      MOV R3,#0
      MOV R4,#0
LOOP:
      LDRB R5, [R1]
      ADD R4, R4, R5
      ADD R1,R1,#2
      ADD R3, R3, #1
      CMP R3,#4
      BNE LOOP
      SWI 0x011
      STRB R2, [R4]
```



3) Write a program to find the sum of N natural numbers. Store the result in a memory location.

.DATA SUI

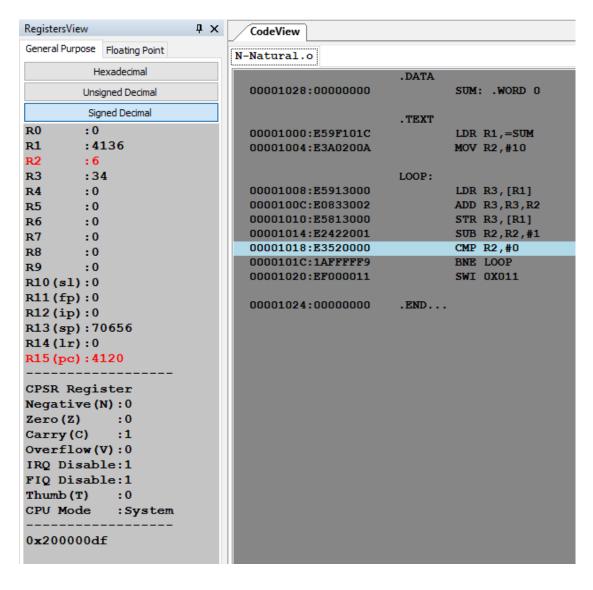
SUM: .WORD 0

.TEXT

LDR R1,=SUM MOV R2,#10

LOOP:

LDR R3,[R1]
ADD R3,R3,R2
STR R3,[R1]
SUB R2,R2,#1
CMP R2,#0
BNE LOOP
SWI 0X011



4) Write a program to find the product of two 32-bit numbers using a barrel shifter.

Code:

.DATA

A: .WORD 0X87654321

B: .WORD 65
C: .WORD 0

.TEXT

LDR R1,=A LDR R2,=B

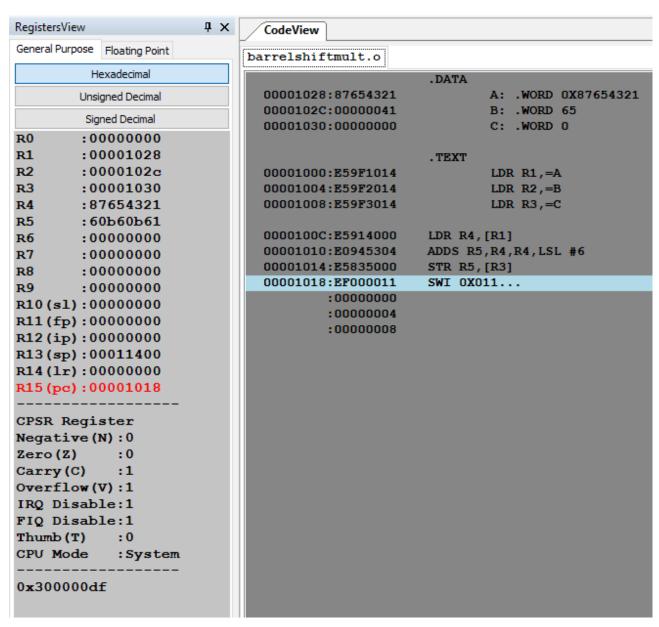
LDR R3,=C

LDR R4, [R1]

ADDS R5,R4,R4,LSL #6

STR R5,[R3]

SWI 0X011



```
5) Convert the following statement in C Language into an ALP
IF([A]==[B]) then C=[A]+[B]
ELSE IF ([B] == [C]) D = [A] - [B]
ELSE E=[A]*[B]
Code:
.DATA
                            RegistersView
                                                    ŢΧ
                                                            CodeView
       A: .word 5
                             General Purpose Floating Point
                                                          q5.o
       B: .word 5
                                      Hexadecimal
                                                                                .DATA
       C: .word 0
                                                            0000106C:00000005
                                                                                        A: .word 5
                                     Unsigned Decimal
       D: .word 0
                                                            00001070:00000005
                                                                                        B: .word 5
                                     Signed Decimal
       E: .word 0
                                                            00001074:00000000
                                                                                        C: .word 0
                                     :4204
                             R<sub>0</sub>
                                                            00001078:00000000
                                                                                        D: .word 0
                             R1
                                     :4208
                                                                                        E: .word 0
                                                            0000107C:00000000
.TEXT
                             R2
                                     :4212
       LDR R0,=A
                             R3
                                     :4216
                                                                                . TEXT
       LDR R1,=B
                                                            00001000:E59F0050
                                                                                        LDR RO,=A
                             R4
                                     :4220
                                                                                        LDR R1,=B
                                                            00001004:E59F1050
                             R5
       LDR R2,=C
                                     : 5
                                                                                        LDR R2,=C
                                                            00001008:E59F2050
                             R6
                                     :5
       LDR R3,=D
                                                                                        LDR R3,=D
                                                            0000100C:E59F3050
                             R7
                                     :10
       LDR R4,=E
                                                            00001010:E59F4050
                                                                                        LDR R4,=E
                             R8
                                     : 0
                             R9
                                     :0
                                                            00001014:E5905000
                                                                                LDR R5, [R0]
LDR R5, [R0]
                             R10(s1):0
                                                            00001018:E5916000
                                                                                LDR R6, [R1]
                             R11(fp):0
LDR R6, [R1]
                                                            0000101C:E1550006
                                                                                CMP R5,R6
                             R12(ip):0
CMP R5,R6
                                                            00001020:1A000002
                                                                                BNE TWO
                             R13(sp):70656
                                                            00001024:E0857006
                                                                                ADD R7, R5, R6
BNE TWO
                             R14(lr):0
                                                            00001028:E5827000
                                                                                STR R7, [R2]
ADD R7, R5, R6
                             R15 (pc):4184
                                                            0000102C:EA000008
                                                                                B DONE
STR R7, [R2]
B DONE
                             CPSR Register
                                                                                TWO:
                             Negative (N):0
                                                            00001030:E5927000
                                                                                        LDR R7, [R2]
                             Zero(Z)
                                         :1
                                                            00001034:E1560007
                                                                                        CMP R6,R7
TWO:
                                                            00001038:1A000002
                                                                                        BNE THREE
                             Carry (C)
                                         :1
       LDR R7, [R2]
                                                            0000103C:E0457006
                                                                                        SUB R7, R5, R6
                             Overflow(V):0
       CMP R6,R7
                                                            00001040:E5837000
                                                                                        STR R7, [R3]
                             IRQ Disable:1
                                                            00001044:EA000002
                                                                                        B DONE
       BNE THREE
                             FIQ Disable:1
                             Thumb (T)
                                         : 0
       SUB R7, R5, R6
                                                                                THREE:
                             CPU Mode
                                         :System
       STR R7, [R3]
                                                            00001048:E0070695
                                                                                        MUL R7, R5, R6
       B DONE
                                                            0000104C:E5847000
                                                                                        STR R7, [R4]
                             0x600000df
                                                            00001050:EAFFFFF
THREE:
                                                                                DONE:
       MUL R7, R5, R6
                                                            00001054:EF000011
                                                                                        SWI 0X011
       STR R7, [R4]
                                                            00001058:00000000
                                                                                .END...
       B DONE
                                                                    :00000004
                                                                    :00000008
DONE:
                                                                    :0000000C
                                                                    :00000010
       SWI 0X011
```

6) Write a program to find the factorial of a number. Code:

