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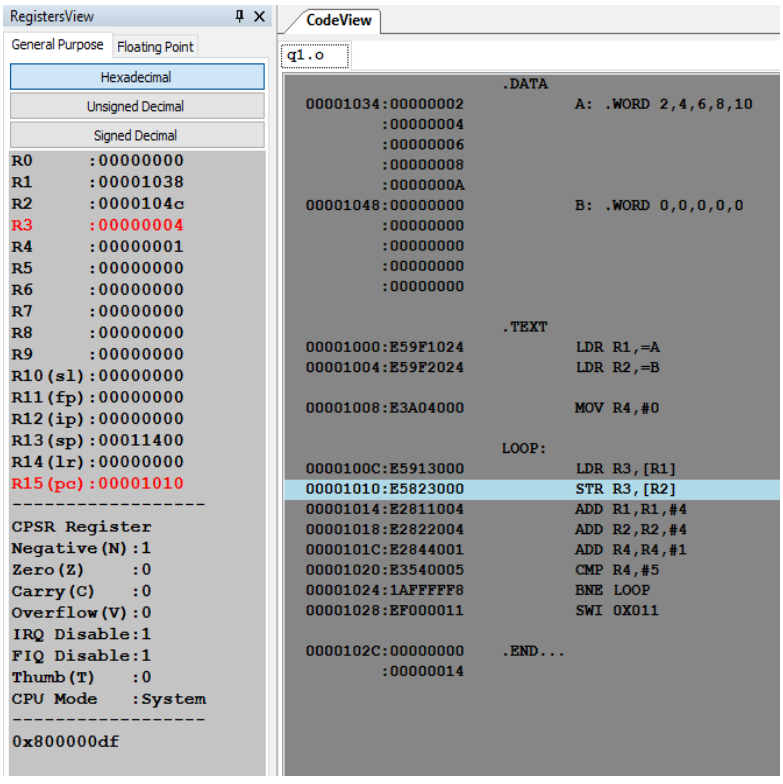
PES2UG20CS130
MPCA-Lab Week-2

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

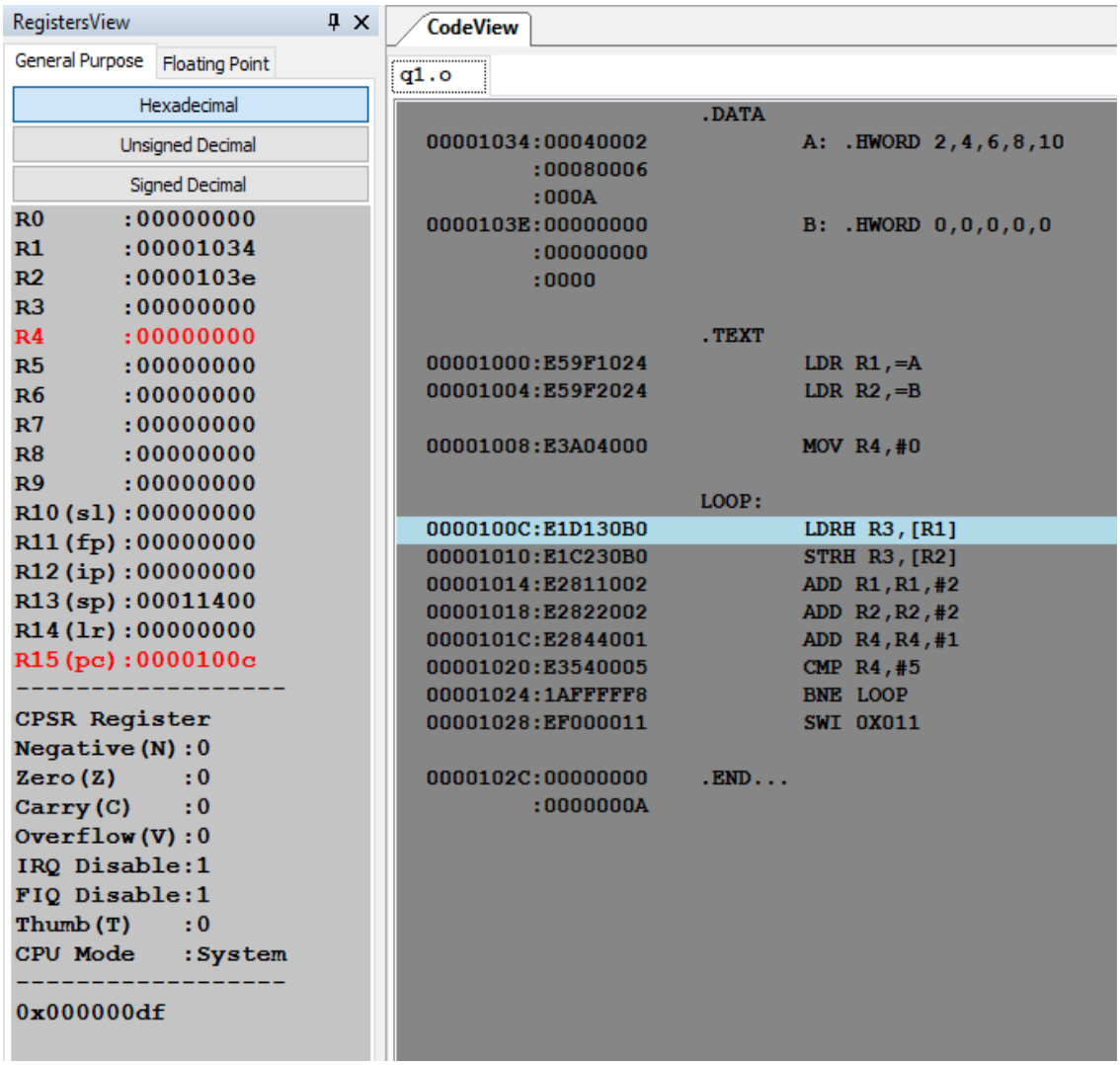
a) Full word(.word directive)

```
.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
```



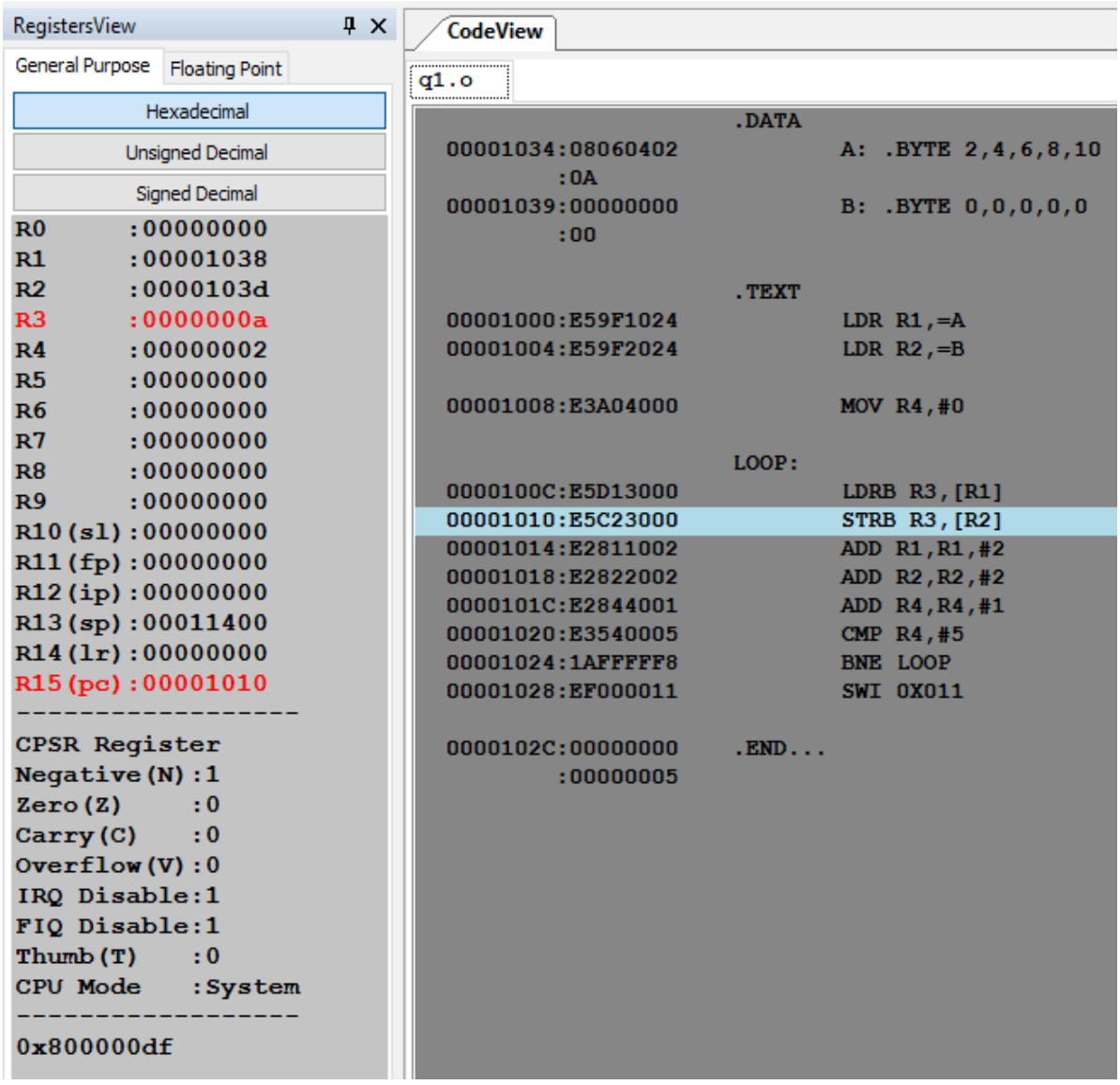
b) Half word(.Hword directive)

```
.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

.END
```



c) Byte word(.Hword directive)

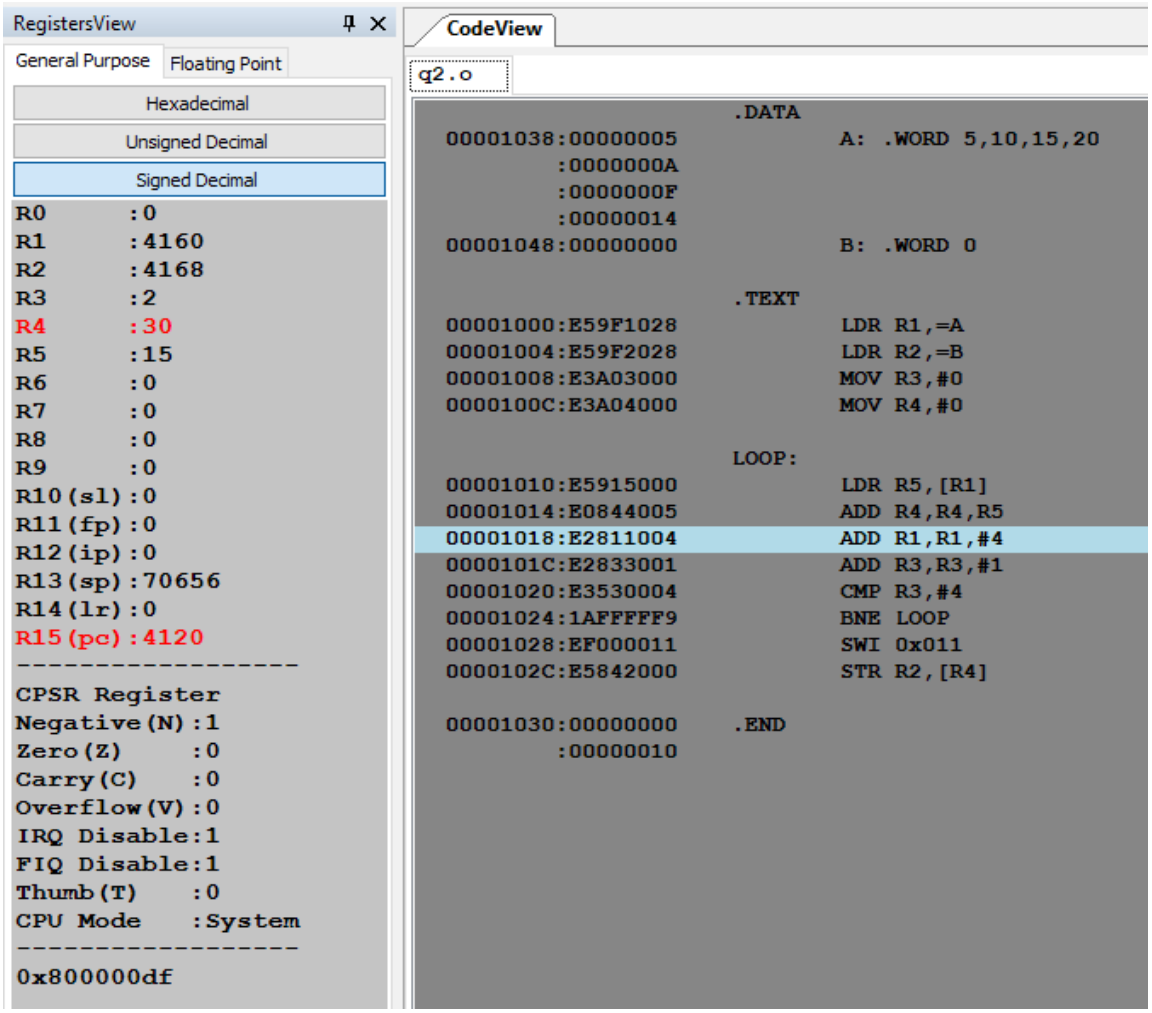
```
.DATA
      A: .BYTE 2,4,6,8,10
      B: .BYTE 0,0,0,0,0

.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

.END
```



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

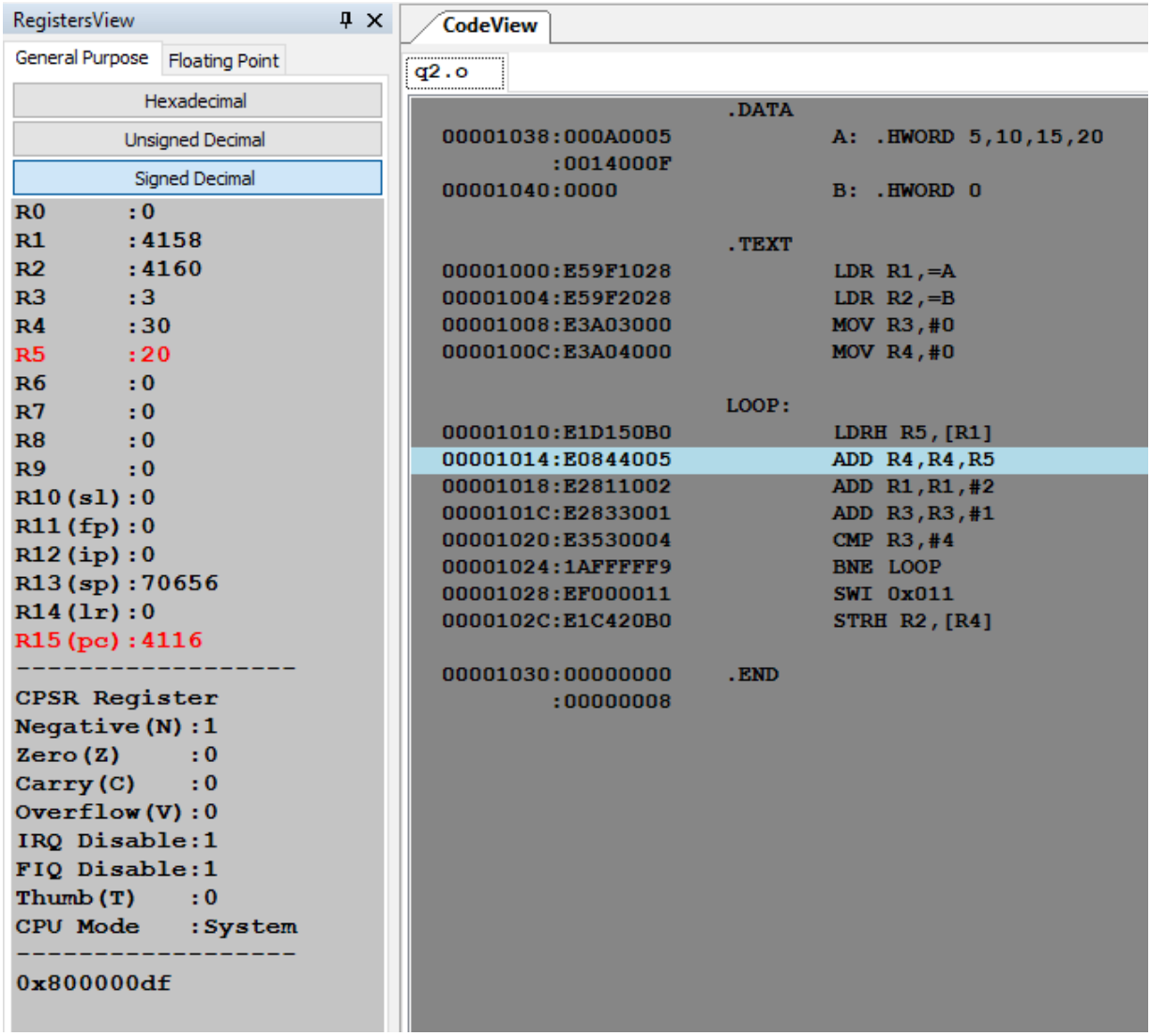
a) Full word(.word directive)

```
.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]

.END
```



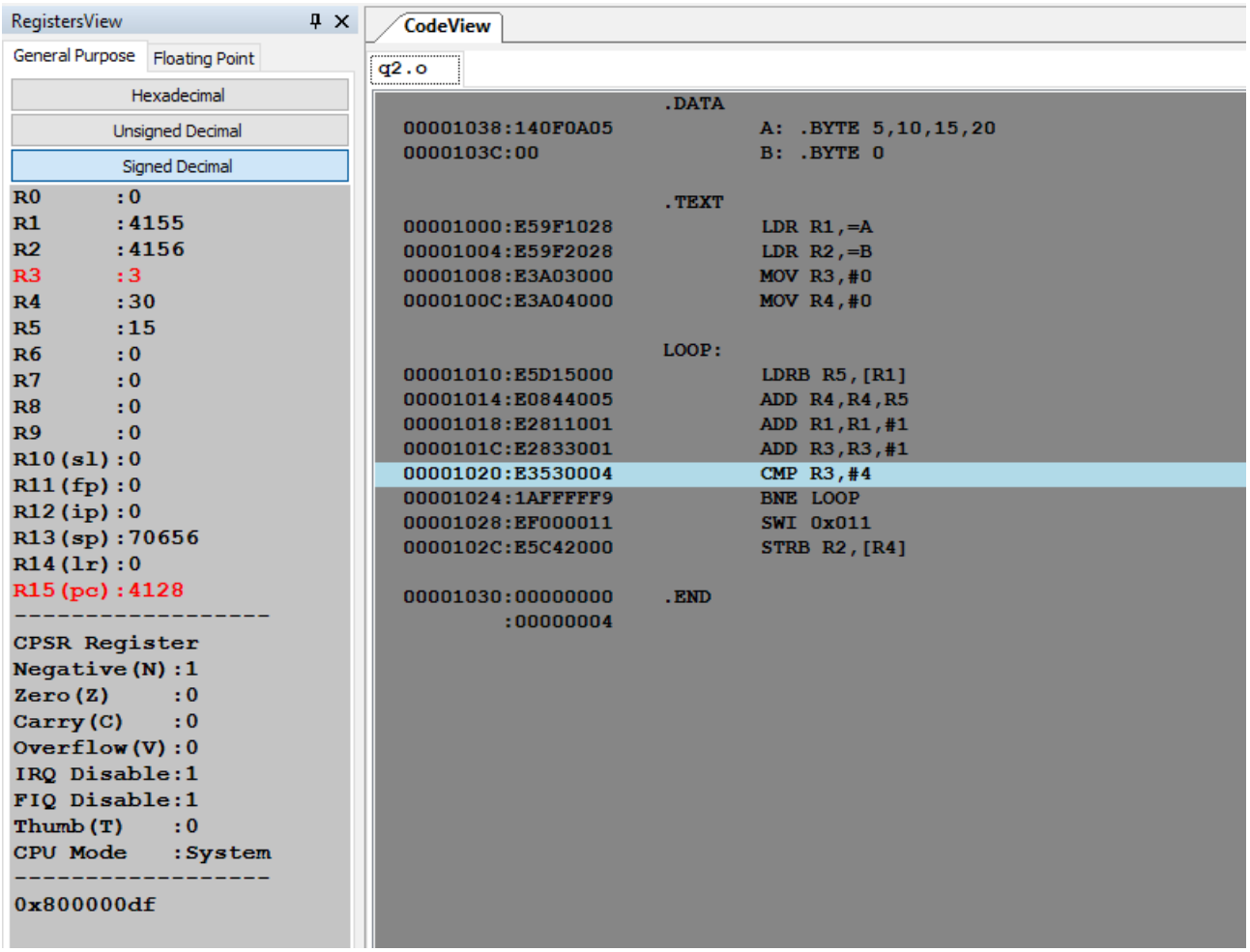
B) Half word(.Hword directive)

```
.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]

.END
```



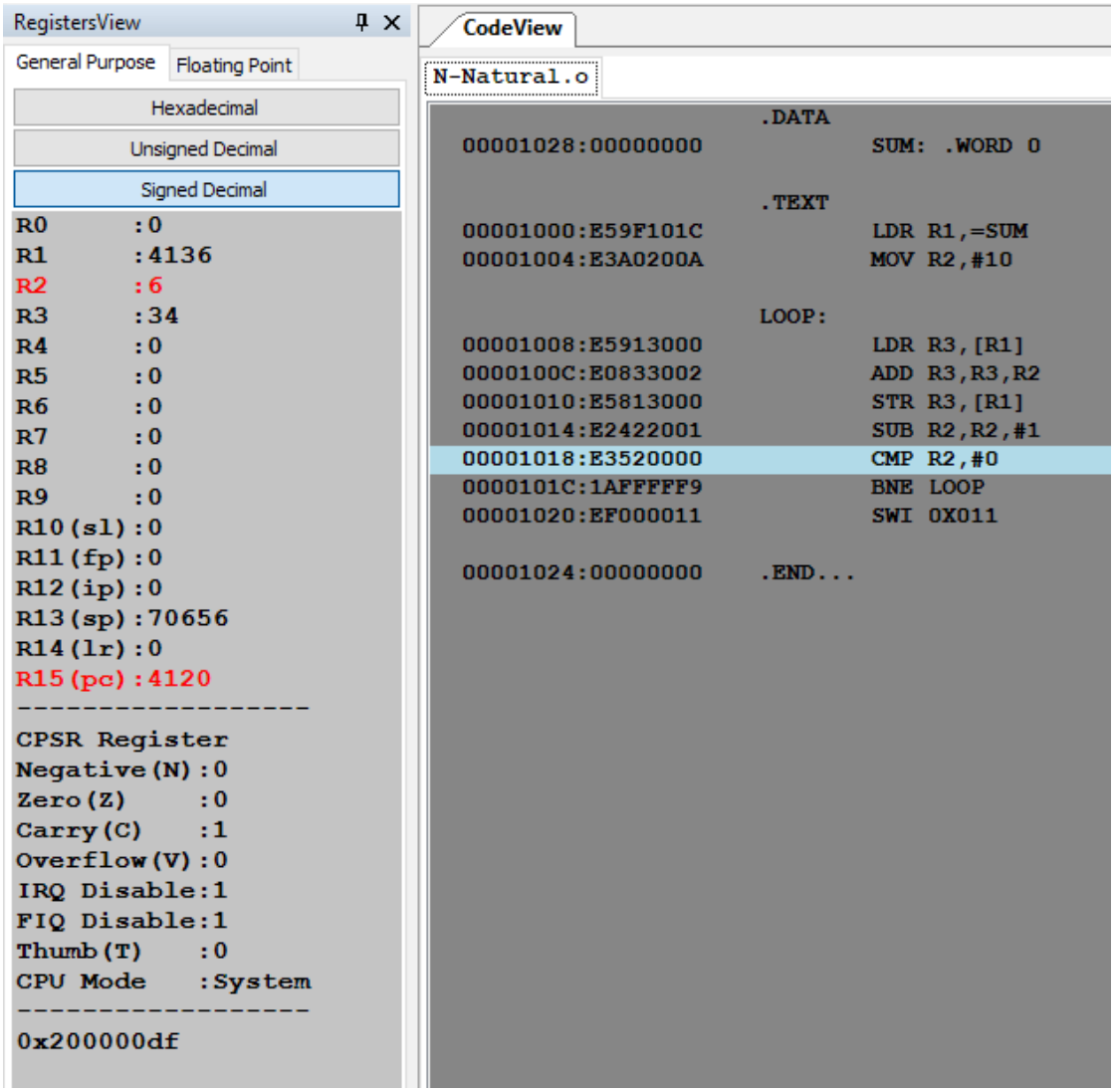
C) Byte Wise(.BYTE directive)

```
.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]

.END
```



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

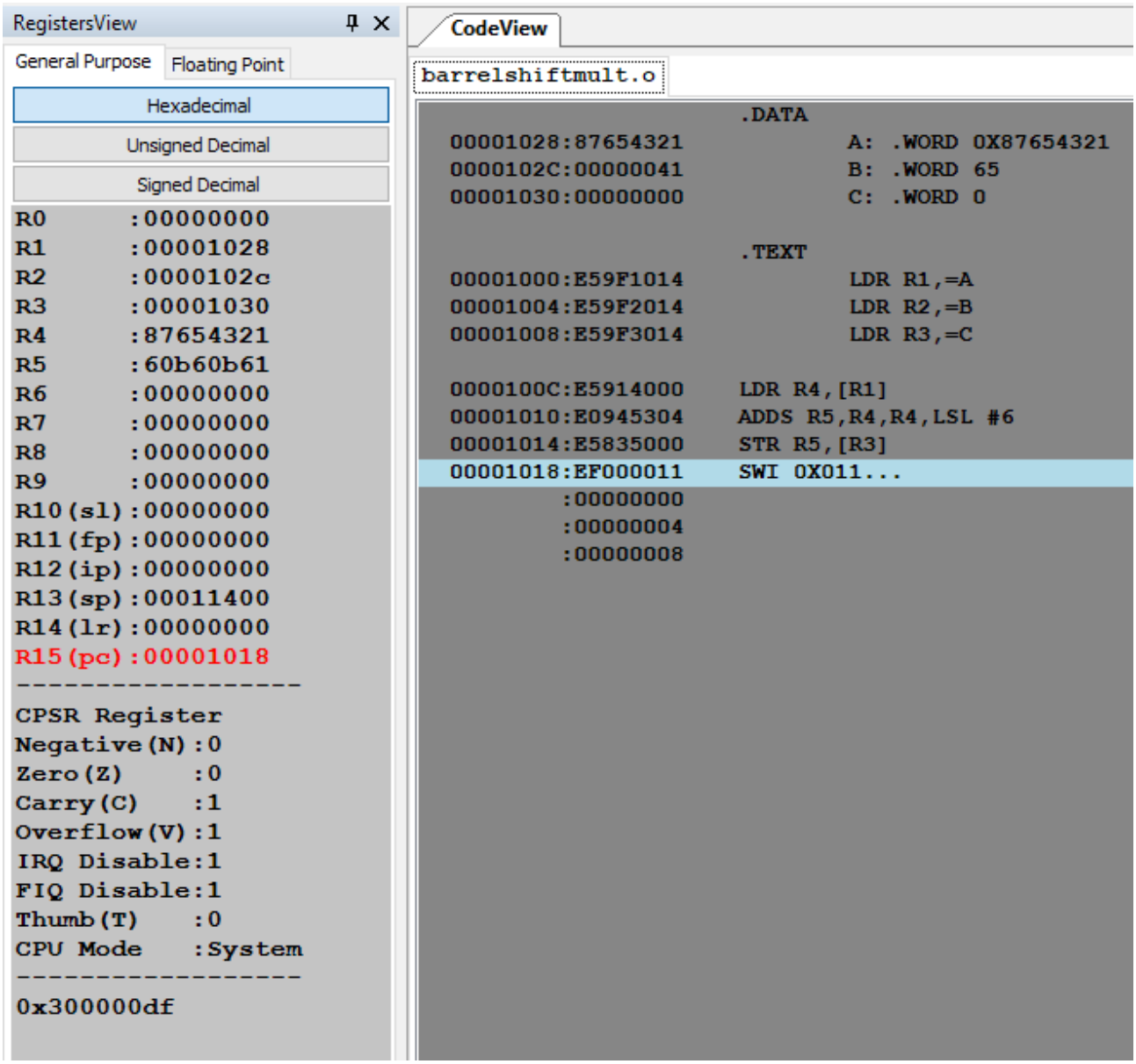
```
.DATA
      SUM: .WORD 0

.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

.END
```



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

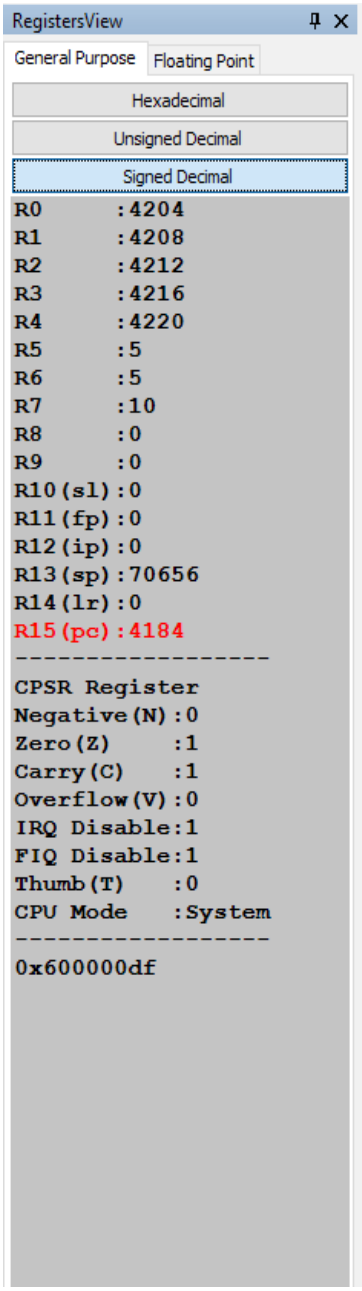
IF([A]==[B]) then C=[A]+[B]

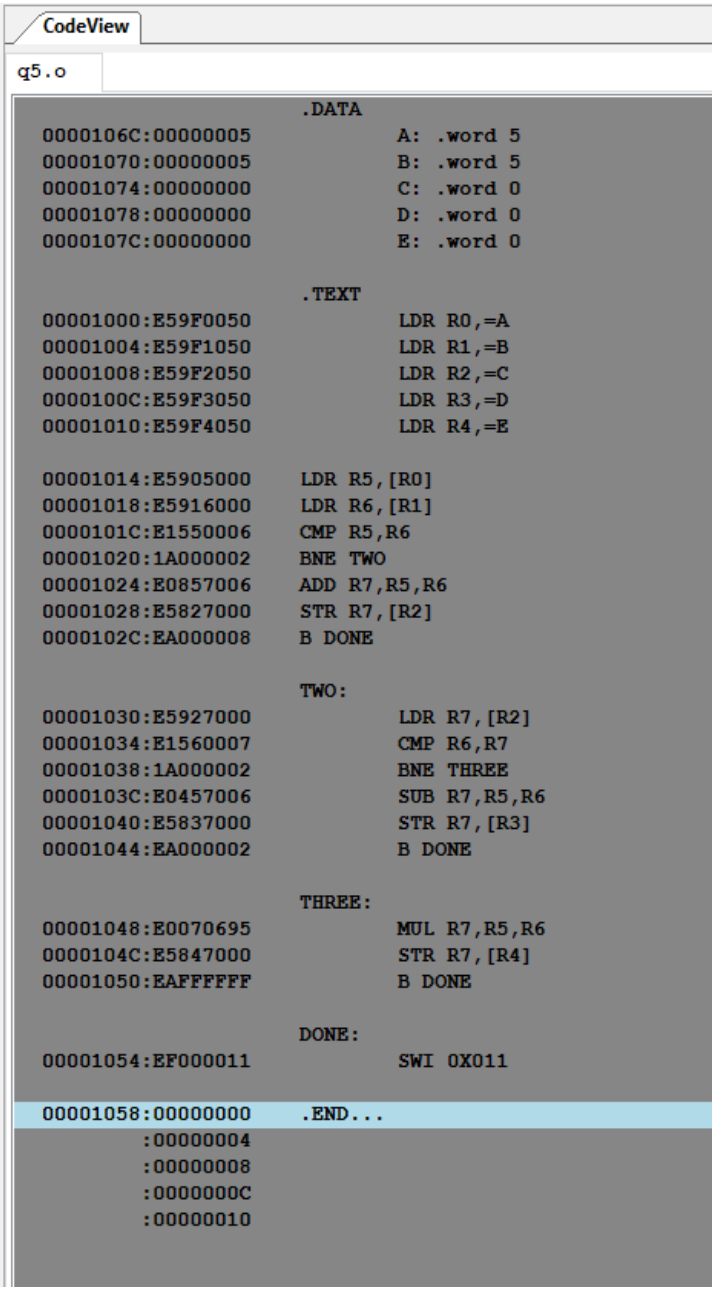
ELSE IF ([B]==[C]) D=[A]-[B]

ELSE E=[A]*[B]

Code:

```
.DATA
      A: .word 5
      B: .word 5
      C: .word 0
      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]
CMP R5,R6
BNE TWO
ADD R7,R5,R6
STR R7,[R2]
B DONE

TWO:
      LDR R7,[R2]
      CMP R6,R7
      BNE THREE
      SUB R7,R5,R6
      STR R7,[R3]
      B DONE

THREE:
      MUL R7,R5,R6
      STR R7,[R4]
      B DONE

DONE:
      SWI 0X011

.END
```





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

```
MOV r1,#5
MOV r2,#1
B fact
fact:
      MUL r2,r1,r2
      SUB r1,#1
      CMP r1,#1
      BNE fact
      SWI 0X011

.END
```