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Q.1 Add Nibble N4 and N0 from memory location and store results in 4000000C

PROGRAM :

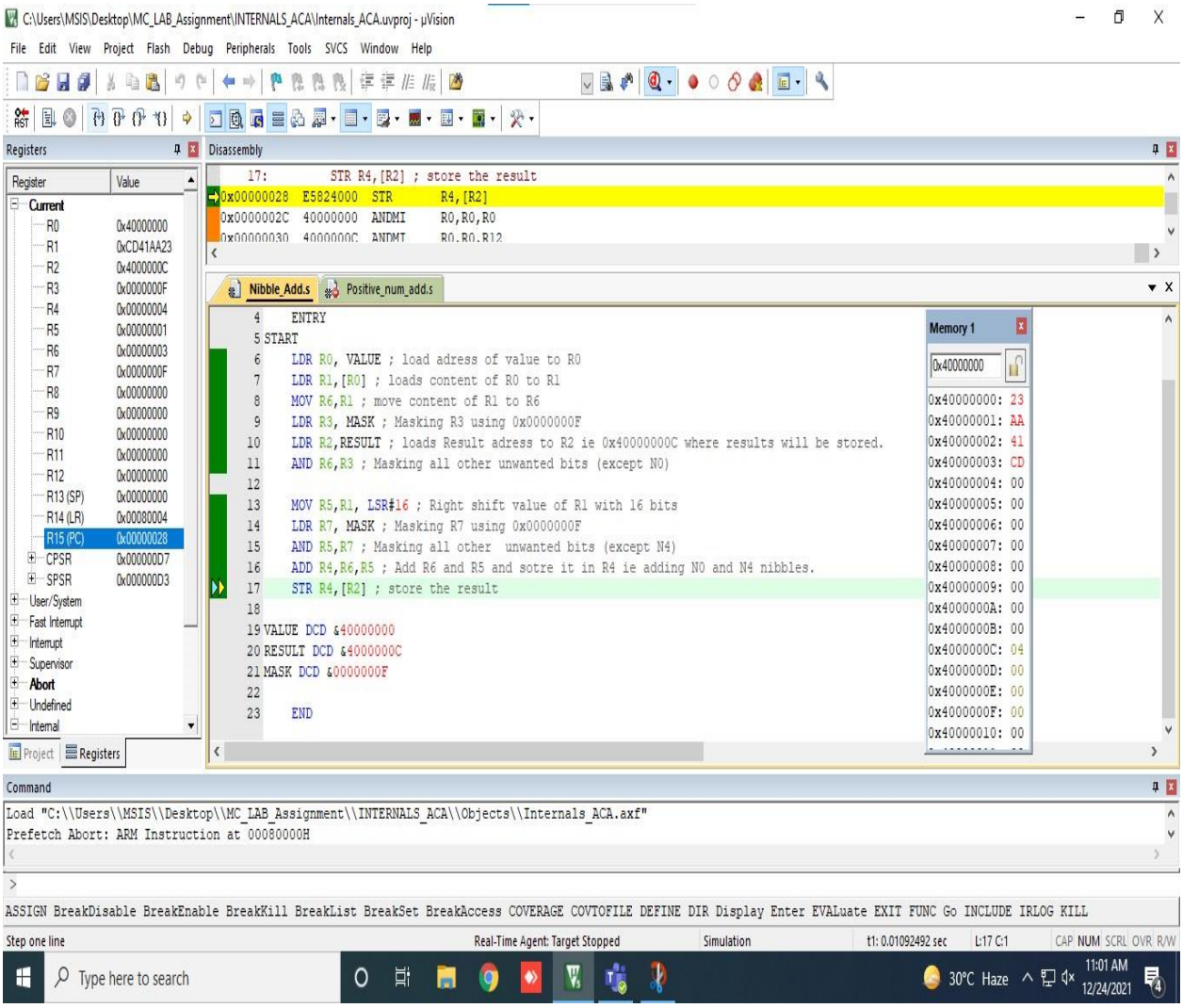
```
        AREA NIBBLE,CODE,READONLY
        ENTRY
START
        LDR R0, VALUE ; load adress of value to R0
        LDR R1,[R0] ; loads content of R0 to R1
        MOV R6,R1 ; move content of R1 to R6
        LDR R3, MASK ; Masking R3 using 0x0000000F
        LDR R2,RESULT ; loads Result adress to R2 ie 0x40000000C where results will be stored.
        AND R6,R3 ; Masking all other unwanted bits (except N0)

        MOV R5,R1, LSR#16 ; Right shift value of R1 with 16 bits
        LDR R7, MASK ; Masking R7 using 0x0000000F
        AND R5,R7 ; Masking all other  unwanted bits (except N4)
        ADD R4,R6,R5 ; Add R6 and R5 and sotre it in R4 ie adding N0 and N4 nibbles.
        STR R4,[R2] ; store the result

VALUE DCD &40000000
RESULT DCD &4000000C
MASK DCD &0000000F

        END
```

OUTPUT:


C:\Users\MSIS\Desktop\MC_LAB_Assignment\INTERNALS_ACA\Internals_ACA.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Registers
Register Value
Current
R0 0x40000000
R1 0xCD41AA23
R2 0x4000000C
R3 0x0000000F
R4 0x00000004
R5 0x00000001
R6 0x00000003
R7 0x0000000F
R8 0x00000000
R9 0x00000000
R10 0x00000000
R11 0x00000000
R12 0x00000000
R13 (SP) 0x00000000
R14 (LR) 0x00080004
R15 (PC) 0x00000028
CPSR 0x000000D7
SPSR 0x000000D3
User/System
Fast Interrupt
Interrupt
Supervisor
Abort
Undefined
Internal
Project Registers
Disassembly
17: STR R4,[R2] ; store the result
0x00000028 E5824000 STR R4,[R2]
0x0000002C 40000000 ANDMI R0,R0,R0
Nibble_Add.s Positive_num_add.s
4 ENTRY
5 START
6 LDR R0, VALUE ; load adress of value to R0
7 LDR R1,[R0] ; loads content of R0 to R1
8 MOV R6,R1 ; move content of R1 to R6
9 LDR R3, MASK ; Masking R3 using 0x0000000F
10 LDR R2,RESULT ; loads Result adress to R2 ie 0x40000000C where results will be stored.
11 AND R6,R3 ; Masking all other unwanted bits (except N0)
12
13 MOV R5,R1, LSR#16 ; Right shift value of R1 with 16 bits
14 LDR R7, MASK ; Masking R7 using 0x0000000F
15 AND R5,R7 ; Masking all other unwanted bits (except N4)
16 ADD R4,R6,R5 ; Add R6 and R5 and sotre it in R4 ie adding N0 and N4 nibbles.
17 STR R4,[R2] ; store the result
18
19 VALUE DCD &40000000
20 RESULT DCD &4000000C
21 MASK DCD &0000000F
22
23 END
Memory 1
0x40000000
0x40000000: 23
0x40000001: AA
0x40000002: 41
0x40000003: CD
0x40000004: 00
0x40000005: 00
0x40000006: 00
0x40000007: 00
0x40000008: 00
0x40000009: 00
0x4000000A: 00
0x4000000B: 00
0x4000000C: 04
0x4000000D: 00
0x4000000E: 00
0x4000000F: 00
0x40000010: 00
Command
Load "C:\\Users\\MSIS\\Desktop\\MC_LAB_Assignment\\INTERNALS_ACA\\Objects\\Internals_ACA.axf"
Prefetch Abort: ARM Instruction at 00080000H
ASSIGN BreakDisable BreakEnable BreakKill BreakList BreakSet BreakAccess COVERAGE COVTOFILE DEFINE DIR Display Enter EVALuate EXIT FUNC Go INCLUDE IRLOG KILL
Step one line
Real-Time Agent: Target Stopped
Simulation
t1: 0.01092492 sec
L:17 C:1
CAP NUM SCRL OVR R/W
Type here to search
30°C Haze
11:01 AM
12/24/2021

Q.2 Implement ASM program to add array of numbers present at 4000 0004H only if it is positive, and store it in 4000 002CH

PROGRAM :

```
        AREA PROGRAM, CODE, READONLY
        ENTRY
MAIN
        LDR R0,VALUE ;loads adress of the value to R0
        LDR R3,COUNT ;loads adress of the count into R3
        LDR R4,[R3] ;loads count into R4
LOOP
        LDR R1,[R0] ;loads the content of address of R0 into R1
        CMP R1,#0 ;comparing content of R1 to 0 to check for negative number
        BMI JUMP ;if the number in R1 is negative then it goes to jump
        ADD R2,R1 ;else add R2 and R1 and stores in R2
        ADD R0,#4 ;incrementing the address in R0 to fetch next element of array
        ADD R4,#-1 ;decrementing counter
        CMP R4,#0 ;checks if R4 that is counter is 0 or not
        BEQ DONE ;if counter is 0 goto done
        B LOOP ;else go to loop
JUMP
        ADD R0,#4 ;incrementing address
        ADD R4,#-1 ;decrementing counter
        B LOOP ;go to loop

DONE
        LDR R3,RESULT ;laoding address to store result
        STR R2,[R3] ;storing result
```

STOP B STOP;

VALUE DCD 0X40000004;

COUNT DCD 0X40000000;

RESULT DCD 0X4000002C;

END

OUTPUT :