19CSE303 – EMBEDDED SYSTEMS

Lab Eval 2 – 13.09.2021

Practice Lab (Arrays)

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1. **Write an ALP using ISA of ARM7 TDMI to add two 64 bit numbers and show the result in R6 (LSB 32 bits) and R7 (MSB 32 bits).**

   Write an ALP using ISA of ARM7 TDMI to do the following

   - A in R0, B in R1, X in R2, Y in R3 (A, B, X, Y are unsigned 32 bit numbers)
   - Find the difference of A and B store in R4 (R4 = A - B)
   - Find the difference of Y and X store in R5 (R5 = Y – X)
   - R6 should contain the lowest of (A-B) and (X-Y)
   - R7 should contain the highest of (A-B) and (X-Y)

   Implement the following conditions:

   - If (A-B) = (X-Y) => R8 = R0 (XOR) R1
   - If (A-B) > (X-Y) => R8 = R0 (OR) R1

   Code :

```
        AREA    add64, CODE, READONLY
ENTRY
MAIN
    LDR    R0, =A
    LDR    R1, [R0]
    LDR    R2, [R0, #4]
    LDR    R0, =Bs
    LDR    R3, [R0]
    LDR    R4, [R0, #4]
```

```
        SUB    R6, R2, R4
        SBC    R5, R1, R3

        LDR    R0, =Result

        STR    R5, [R0]
        STR    R6, [R0, #4]

        SWI    &11

A    DCD    &122AE640, &2F100123
Bs   DCD    &001019BF, &40023F51
Result   DCD    0

        END
```

```
1         AREA    add64, CODE, READONLY
2 ENTRY
3 MAIN
4         LDR     R0, =Value1
5         LDR     R1, [R0]
6         LDR     R2, [R0, #4]
7         LDR     R0, =Value2
8         LDR     R3, [R0]
9         LDR     R4, [R0, #4]
10
11        SUB     R6, R2, R4
12        SBC     R5, R1, R3
13
14        LDR     R0, =Result
15
16        STR     R5, [R0]
17        STR     R6, [R0, #4]
18
19        SWI     &11
20
21 Value1    DCD    &12A2E640, &F2100123
22 Value2    DCD    &001019BF, &40023F51
23 Result    DCD    0
24
25        END
26
27
```

```
assembling ADD_64BIT.asm...
linking...
Program Size: Code=32 RO-data=0 RW-data=0 ZI-data=0
".\alp.axf" - 0 Error(s), 0 Warning(s).
```