CPE 221 Classwork 14: Floating Point Operations ARM

Student Name (as in Canvas): _____

A Number: _____

Points: 10

1 ADD Two Floating Point Arrays

Write an ARMv7 Program to add two floating point arrays declared in the `.data` section of the ARM program.

```
.global _start
_start:

@ write your code below


done: B done

@ First array
ARRAY_A: .float 1.1, 2.34, 3.141, 4.567, 5.99
@ Second array
ARRAY_B: .float 0.9, 1.66, 2.859, 3.433, 4.01
@ Result array (5 elements × 4 bytes)
RESULT_ARRAY: .space 20
@ Number of elements
ARRAY_LEN: .word 5
```

Solution

```
.global _start
_start:
    @ Initialize pointers and counter
    @ R0 = pointer to ARRAY_A
    LDR R0, =ARRAY_A
    @ R1 = pointer to ARRAY_B
    LDR R1, =ARRAY_B
    @ R2 = pointer to RESULT_ARRAY
    LDR R2, =RESULT_ARRAY
    @ R3 = element counter
    LDR R3, ARRAY_LEN
ADD_LOOP:
    @ Load elements from both arrays
    VLDR S0, [R0]
    VLDR S1, [R1]
    @ Add the floating-point numbers
    @ S2 = S0 + S1
    VADD.F32 S2, S0, S1
    @ Store the result
    VSTR S2, [R2]
    @ Increment pointers (4 bytes per float)
    @ Move to next ARRAY_A element
    ADD R0, R0, #4
    @ Move to next ARRAY_B element
    ADD R1, R1, #4
    @ Move to next RESULT_ARRAY position
    ADD R2, R2, #4
    @ Decrement counter and loop if not zero
    SUBS R3, R3, #1
    BNE ADD_LOOP

done: B done

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