

HW8.1. SIMD

You have an array of 16384 32-bit integers, and want to double them element-wise ($A[i] += A[i]$). You have access to **256**-bit AVX instructions, including addition. How many vector adds must you do to complete this task?

Hint: How many ints can we fit in the 256-bit vector?

Q1.1:

?

Complete the following code:

```
#include <stdio.h>
#include <stdbool.h>
#include <stdlib.h>
#include <emmintrin.h>
#define N 19

/*Return the first n values in the sequence defined by the recursive
definition A[n] = 7A[n-4]-A[n-8]*/
/*For the initial values of this recursive sequence, see the array used for
n<8*/
int* fib(unsigned int n)
{
    int* result = malloc(sizeof(int)*n);
    /*Base cases; if we want fewer than 8 inputs, just fill out the array
manually*/
    if(n < 8)
    {
        int vals[8] = {0,1,1,2,3,5,8,13};
        for(int i = 0; i < n; i++) result[i]=vals[i];
        return result;
    }
    __m128i low = _mm_set_epi32(INPUT A); /*See the vals array for the intended
initial values. Make sure you check the Intrinsics guide for the expected
order of the inputs!*/
    __m128i high = _mm_set_epi32(INPUT B);
    _mm_storeu_si128((__m128i*)result, low);
    _mm_storeu_si128((__m128i*)(result+4), high);
    int i;
    int j = INPUT C;
    for(i = 8; i < j; i+=4)
    {
        /*Note that 7x-y is the same as (x<<3)-(x+y)
        __m128i temp = _mm_sub_epi32(_mm_slli_epi32(INPUT
D,3),_mm_add_epi32(INPUT E));
        _mm_storeu_si128((__m128i*)(INPUT F), temp);
        low = high;
        high = temp;
    }
    /*Tail case, in case n isn't a multiple of 4.*/
    for(INPUT G) result[i] = 7*result[i-4]-result[i-8];
    return result;
}

int main(int argc, char** argv)
{
    int* data = fib(N);
    for(int i = 0; i < N; i++)
        printf("%d\n", data[i]);
    free(data);
    return 0;
}
```

Q2.1: INPUT A:

▼

Q2.2: INPUT B:

▼

Q2.3: INPUT C:

▼

Q2.4: INPUT D:

▼

Homework 8

Assessment
overview

Total points:	0/100
Score:	0%

Question

Value: 20

History:

Awarded points: 0/20

Report an error in this question

Previous question

Next question

Attached files

No attached files

Attach a file

Attach text

Q2.5: INPUT E:

Q2.6: INPUT F:

Q2.7: INPUT G:

Save & Grade 20 attempts left

Save only

Additional attempts available with new variants ?