Programming Assignment 3

Scan is one of the most important operations in parallel computing. In this assignment, you'll implement the all-prefix-sums operation (i.e., exclusive scan with addition as the binary operation). For an input array $[a_0, a_1, a_2, \ldots, a_{n-1}]$, the output array should be

$[0, a_0, a_0+a_1, a_0+a_1+a_2, \ldots, (a_0+a_1+\ldots+a_{n-2})]$.

What you need to do:

All your code should be in one file named homework3_FirstName_LastName.cu. I should see no compilation errors if I do:

nvcc homework3_FirstName_LastName.cu –o homework3

The executable should 1) take a positive integer N as an argument, 2) creates an input integer array of size N, 3) populate the array with random integers from range [1,1000], 4) compute the scan output array A_cpu in sequential on the CPU, 5) compute the scan output array A_gpu on the GPU, and 6) compare A_cpu and A_gpu.

What to submit:

Send your CUDA file named homework3_FirstName_LastName.cu to our TA.

How do I grade your submission:

30%: compilation pass

70%: correctness

Bonus points: at most 10% if you submit a report on the optimizations you implement.

If your code cannot pass compilation, you get 0 points.

I may use a very large value for N.