

Assignment 7 - Odd-Even Transposition Sort using CUDA
CS4823/CS6643 Parallel Computing

Collaborative submission with another student allowed. 3rd question is required for graduate student, bonus for undergrads.

Given an array $A[0..n-1]$, write the following versions of CUDA odd-even transposition sort programs with and without using shared memory.

1. (20 points) Each thread compares and exchanges two items in each iteration, but using only global memory.
 - (a) Use only one block of threads.
 - (b) Use multiple blocks.Experiment to get best performances.
2. (10 points) Each thread compares and exchanges two items in each iterations, but use shared memory and multiple blocks. Experiment to get best performances.
3. (10 points) Each thread merges and splits two subarrays of size n/p in each iterations. Use shared memory and multiple blocks. Experiment to get best performances.

Submit (i) the speedup plot, and (ii) the source code file, adequately documented. Vary n as 2^{10} , 2^{15} , and 2^{20} (or more if desired, and possible). Use p , the number of threads at maximum number you can employ (up to $n/2$). Experiment to get best performances. Obtain the speedup relative to the sequential timings on CPU without any printing overheads. Produce a speedup plot with n on x-axis and S_p on y-axis. 1(a), 1(b), 2, and 3 will yield separate curves.