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EC527 Assignment 8

Using bme-compsim-55 (3.6 GHz)

Part 1: Tutorial

Code compiled and run successfully.

Part 2: A simplified SOR

2.

Most of the values are different in the matrices. For a matrix with 4,000,000 elements, the two SOR versions produce a different output on 3,992,003 of those values. This occurs due to the nature of SOR. SOR uses the concept that previous calculations will affect current calculations since the results are written back to the matrix. This means the order of calculations performed affects the result. Thus, when dealing with a GPU, which can execute different blocks at different times, the order of calculations will be different, leading to different results. This indicates that performing SOR on the GPU is not an easy task to accomplish.

3.

The GPU code takes 220884.812500 (msec) and the CPU code takes 261326.421875(msec). This speed up becomes even more drastic on larger datasets.

Part 3: Multiple Blocks

3.

Since there is no way to control the sequence of execution of different blocks, I tried to use a slightly different version of SOR which did not depend on the modified values in the span of an iteration. Unfortunately, the desired effect was not achieved, and there was still significant error when compared to the sequential version.