

CS 575 --- Parallel Programming

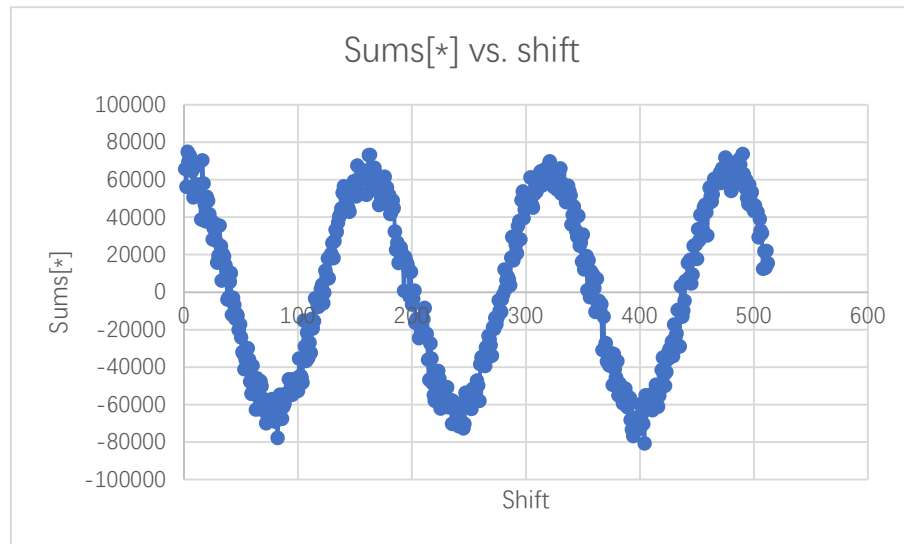
Project 7 (B) --- Autocorrelation using CPU OpenMP, CPU SIMD, and GPU {OpenCL

or CUDA}

Haotian Jia

jiahao@oregonstate.edu

1. I ran this project on Rabbit.
2. Graph:



Graph 1. Sums[*] vs. shift

3. The sine-wave period is about 163.
4. Performances of 4 tests:

(1) 1-thread OpenMP: 344

(2) 4-thread OpenMP: 1256

(3) SIMD: 1790.19

(4) OpenCL: 50022.31

From Graph 1 and four tests, I found that the OpenCL was faster than 1-thread of OpenMP.

However, since I chose 4-thread of OpenMP, I found that 4-thread of OpenMP was faster than 1-thread of OpenMP, slower than OpenCL.

5. Since OpenCL uses GPU to accelerate, so OpenCL is the fastest in the four tests. Besides, OpenMP has different threads to choose, therefore 4-thread of OpenMP is faster than 1-thread of OpenMP.

If I choose OpenMP with more threads, I believe that the performance of OpenMP with more threads will exceed the performance of SIMD. However, since I chose 4-thread OpenMP this time, its performance is lower than SIMD.

For SIMD, due to SIMD is equivalent to having four processors, which optimizes its performance, so the performance of SIMD in my project exceeds the performance of four-thread OpenMP.