

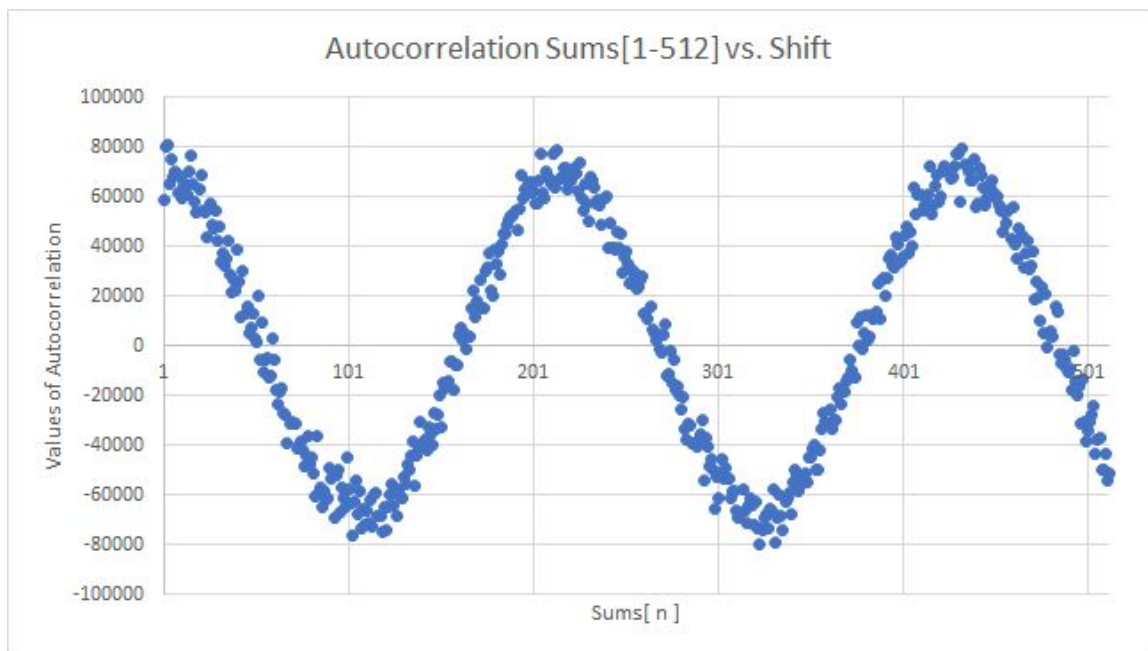
Brian Laccone

CS 475

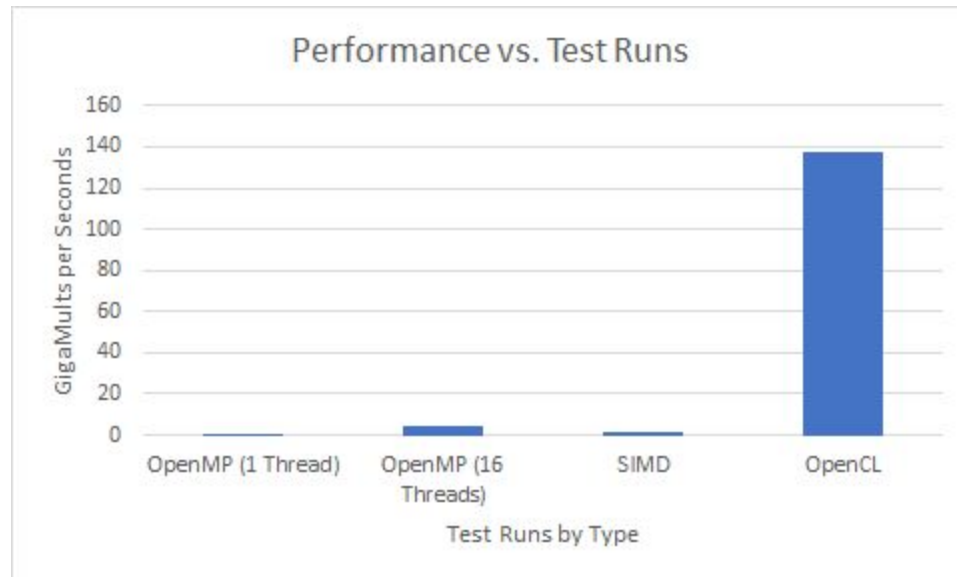
6/9/2019

## Project 7B

1. I ran the OpenMP (1 thread), OpenMP (16 threads), and SIMD programs on Rabbit but I ran the OpenCL program on my own computer. I have a NVIDIA GeForce GTX 1080.
2. Show Graph:



3. From looking at the graph and table I can confirm that the maximas in the graph are at Sums[3] (81153.78125), Sums[214] (78757.179688), Sums[433] (79488.6875). Based off those numbers, the interval is around 211 to 219 apart from each other.
4. Show graph:



The bar chart comparing the performance of the four tests that were ran is amazing. Obviously, the GPU OpenCL test run absolutely destroyed the CPU test runs at 137 GigaMults/sec. The CPU test runs were a little closer together with the next highest performance being OpenMP (16 threads) at 4.29 GigaMults/sec followed by SIMD at 1.78 GigaMults/sec and OpenMP (1 thread) in last at 0.33 GigaMults/sec. Anybody that observes this chart will absolutely say that this was not a fair fight.

5. The OpenCL beat out the CPU tests because GPUs have a lot of cores that can divide work up to overwhelm a problem with strength in numbers. I was surprised by how much it out performed. It really shows how powerful GPUs have become and how much brute force can be thrown at easy tasks such as multiplying and adding. The results may have been different if I used Rabbit's GPU instead of my own but I still believe that it would have crushed the other test runs. The next closest run was by the OpenMP (16 threads) followed by the SIMD run and then the OpenMP (1 thread) run. The last three runs were a little closer in performance but they ended up being what I expected them to be. OpenMP (16 threads) is out performing SIMD because it is doing sixteen floats at a time where as SIMD is only doing four floats at a time. OpenMP (1 thread) is the worst performing run because it is only using 1 thread at a time thus not being able to split up work efficiently.