Bryce Graves

Professor Mike Bailey

CS 475

2020 5 17 (ISO 8601)

# Project: 5

Bryce Graves

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**Hardware**: Ran this on the DGX server

- 24 core Intel Xeon 8168 Platinum 2.7 GHz

- 1.5 TB DDR4-2666 Memory

**Thoughts:**

- **Learning a specific framework for a specific company or product**

I found this dive into hyper specific software development very interesting. I can really feel the tradeoff between having an API that was built for something specific like Nvidia chipsets and an API that's built for any graphics hardware. Even though I found the process of using CUDA much more enjoyable than OpenGL I can feel the itch that learning a language like that would limit a project or job search possibilities.

- **The speedup when using the GPU compared to CPU**

Looking back at the **MegaTrialsPerSecond** from my CPU only tests I was surprised how much faster the GPU was over the CPU. It's one thing to know that there is a lot of speedup to be had. It's another to see how fast the GPU can really churn through calculations. The fastest form the first project was **72** while for this project the highest was **4141**. The speed floors me.

## Data & Graphs:

| Blocksize | Number of Trials | Mega Trials Per Second | |
|---|---|---|---|
| 16 | 16384 | 533.3333 | |
| 16 | 32768 | 986.5125 | |
| 16 | 65536 | 1858.4392 | |
| 16 | 131072 | 3002.9325 | |
| 32 | 16384 | 571.4286 | |
| 32 | 32768 | 947.2711 | |
| 32 | 65536 | 1941.2322 | |
| 32 | 131072 | 3631.2058 | |
| 64 | 16384 | 571.4286 | |
| 64 | 32768 | 1084.7457 | |
| 64 | 65536 | 2151.2606 | |
| 64 | 131072 | 3953.6681 | |
| 128 | 16384 | 615.3846 | |
| 128 | 32768 | 1135.255 | |
| 128 | 65536 | 2160.3376 | |
| 128 | 131072 | 4141.5573 | |

| | 16384 | 32768 | 65536 | 131072 |
|---|---|---|---|---|
| 16 | 533.3333 | 986.5125 | 1858.4392 | 3002.9325 |
| 32 | 571.4286 | 947.2711 | 1941.2322 | 3631.2058 |
| 64 | 571.4286 | 1084.7457 | 2151.2606 | 3953.6681 |
| 128 | 615.3846 | 1135.255 | 2160.3376 | 4141.5573 |

| | 16 | 32 | 64 | 128 |
|---|---|---|---|---|
| 16384 | 533.3333 | 571.4286 | 571.4286 | 615.3846 |
| 32768 | 986.5125 | 947.2711 | 1084.7457 | 1135.255 |
| 65536 | 1858.4392 | 1941.2322 | 2151.2606 | 2160.3376 |
| 131072 | 3002.9325 | 3631.2058 | 3953.6681 | 4141.5573 |



Performance vs. BLOCKSIZE



Performance vs. NUMTRIALS