CS_475 Project #6

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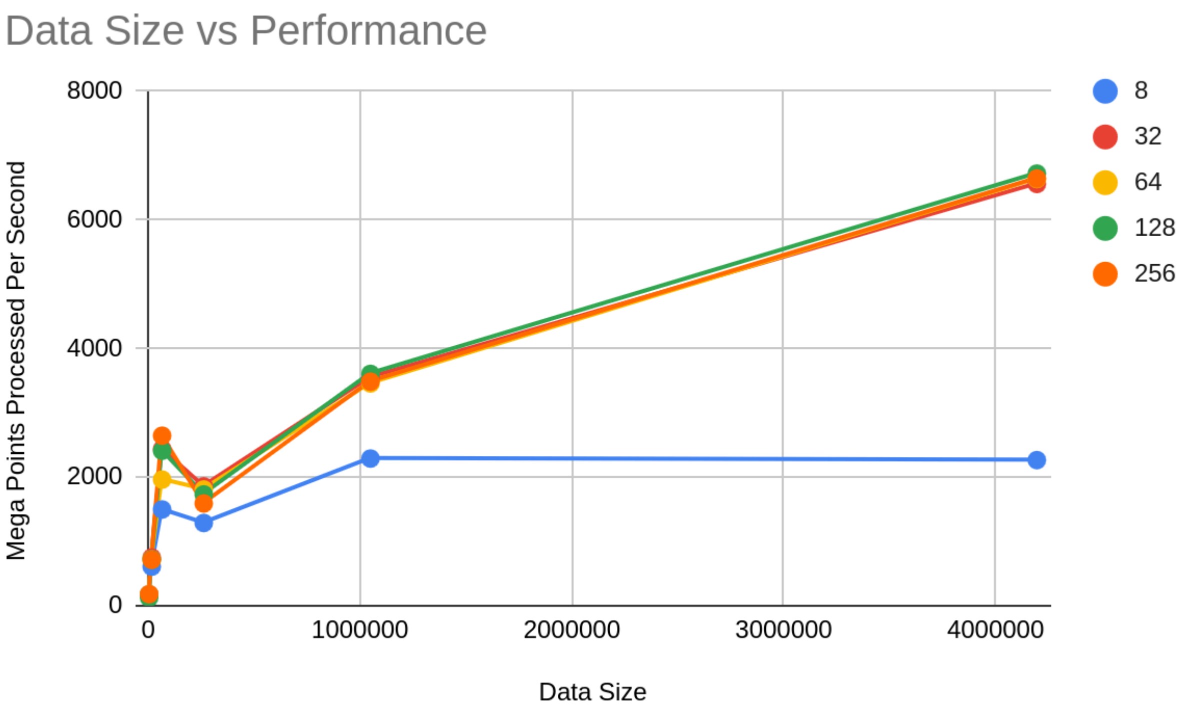
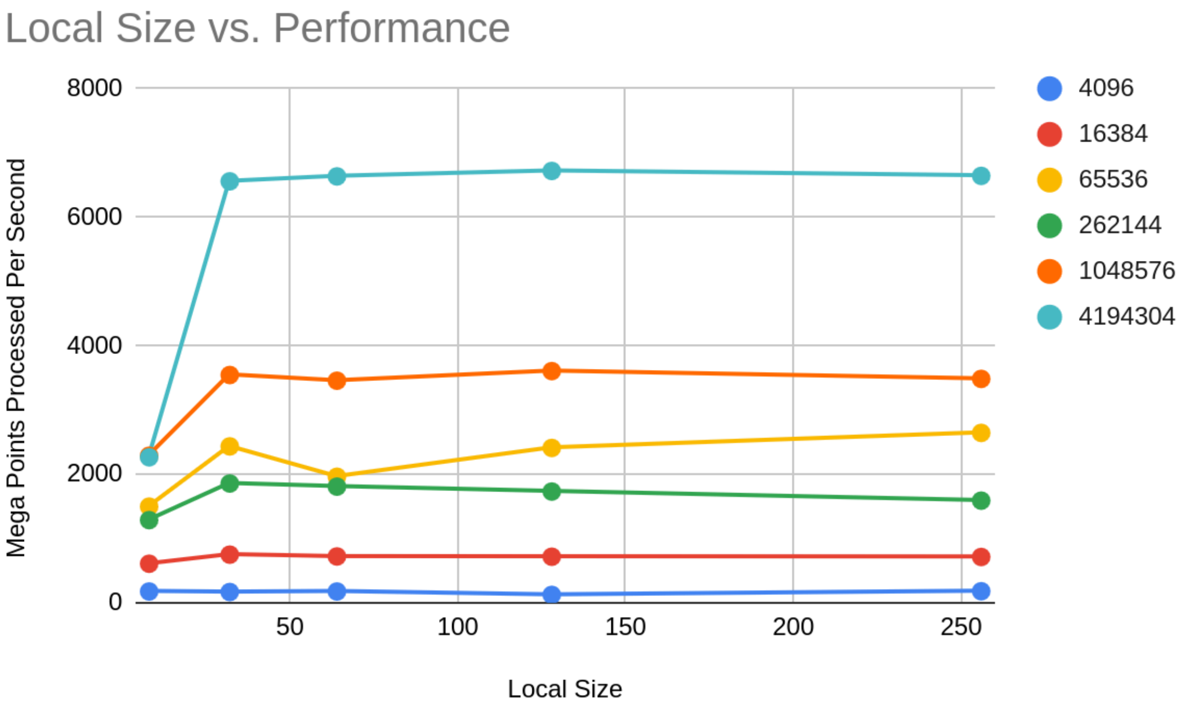
1. I ran on my personal Arch machine, which has an NVIDIA 1660ti.
2. From the result table I got it looks like the equation would be **y=5x+7**. Or, more clearly, **M = 5**, **B = 7**.
3. Performance Tables and Graphs

DATASIZE	LOCALSIZE	MegaPointsProcessedPerSec
4096	8	177.84
4096	32	166.21
4096	64	176.63
4096	128	124.56
4096	256	180.76
16384	8	607.92
16384	32	751.28
16384	64	720.37
16384	128	717.53
16384	256	715.11
65536	8	1495.67
65536	32	2433.3
65536	64	1963.74
65536	128	2410.74
65536	256	2644.5
262144	8	1286.31
262144	32	1855.72
262144	64	1808.58
262144	128	1732.93
262144	256	1589.77
1048576	8	2288.65
1048576	32	3547.05
1048576	64	3455.31
1048576	128	3605.77
1048576	256	3484.89
4194304	8	2263.67
4194304	32	6557.11
4194304	64	6635.33
4194304	128	6719.26
4194304	256	6644.38





4. Commentary
The two graphs give a very strong impression (for all work group sizes except 8) that the best performance is seen only at the highest amount of data, which makes sense. There

is certainly an amount of data where the performance stops increasing, but 4 million elements aren't enough to hit that threshold.

There are a few other interesting points to note here though, firstly the performance for 262144 is noticeably worse than 65536 for all local sizes, which I don't really understand, and that local sizes of 128 are generally around 100 mega points processed per second better than either 64 or 256, though this could just be a fluke, it's difficult to say. Regardless, the performance for all local sizes except 8 are fairly comparable.

My best guess as to why the work group size of 8 is so bad is that since I'm still using an NVIDIA gpu I'm only using a 4th of a warp, which caps out pretty quickly.

Another fun point of note is that the performance for both OpenCL and CUDA are roughly the same, meaning I don't have to fear significant performance drop offs by using non-proprietary code, and can instead write programs that run on most machines, which is something I was slightly concerned about. OpenCL code is more difficult to write however.