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EECS 245 – Parallel Computing

Lab 01

1. Number of Devices: 1
Maximum shared memory per thread block: 49152
Maximum dimension size of a thread block: 1024 1024 64
Maximum number of registers per thread block: 65536
Global memory size: 8192 MBytes

2.1.

Thread Count	Blocks	Run1 (ms)	Run2 (ms)	Run3 (ms)	Run4 (ms)	Run5 (ms)	Avg (ms)
20	5	0.012288	0.011616	0.012288	0.01024	0.011904	0.0116672
10	10	0.012288	0.011264	0.01024	0.011264	0.01168	0.0113472
55	1000	0.03216	0.031744	0.032608	0.032768	0.031744	0.0322048
1	5000	0.068608	0.068608	0.067584	0.067584	0.067392	0.0679552
55	1	0.01024	0.011264	0.01024	0.011264	0.011264	0.0108544

2.2. Had issues with the texture memory. Could not get this to run.

2.3.

Thread Count	Blocks	Run1 (ms)	Run2 (ms)	Run3 (ms)	Run4 (ms)	Run5 (ms)	Avg (ms)
55	1	0.011264	0.011264	0.012288	0.011264	0.011264	0.0114688

2.4.1. GPU Occupancy: Best occupancy was from constant memory.
Original kernel: Theoretical:100%, Actual: 73.3%
Texture memory: Could not run texture memory
Constant memory: Theoretical:100%, Actual: 81.1%

2.4.2. DRAM utilization: Best utilization from running the programs was from constant memory because constant memory is cached. Theoretically texture memory should perform well too since it is also cached.
Original kernel: Mid(4)
Texture memory: Could not run texture memory
Constant memory: Low(3)

2.4.3. L2 cache utilization: Could not determine from running the programs, but both texture and constant memory are cached so their utilization should be better than global memory.
Original kernel: Low(1)
Texture memory: Could not run texture memory
Constant memory: Low(1)

3.

Matrix_Size	Run1(ms)	Run2(ms)	Run3(ms)	Run4(ms)	Run5(ms)	Avg(ms)
1000*1000	63.356	62.88	62.316	63.108	62.917	62.9154
100*100	0.26	0.221	0.222	0.227	0.22	0.23
50*50	0.132	0.131	0.128	0.128	0.129	0.1296
500*500	7.814	7.534	7.552	7.735	7.639	7.6548
2000*2000	544.568	545.807	543.166	536.575	534.137	540.8506