**CS 475/575 -- Spring Quarter 2021**

**Project #5**

**CUDA Monte Carlo**

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1. **Tell what machine you ran this on**

Machine: **DGX**

Number of Trials = **1048576**

MegaTrials/Second = **13785.4**

Probability = **10.058%**

1. **Show the table and the two graphs**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| BLOCKSIZE  NUMTRIALS | 16 | 32 | 64 | 128 | 256 | 512 |
| 2048 | 62.5 | 64.5161 | 64.5161 | 54.0541 | 60.6061 | 64.5161 |
| 4096 | 125 | 125 | 125 | 125 | 125 | 129.032 |
| 8192 | 250 | 250 | 250 | 258.065 | 228.571 | 258.065 |
| 16384 | 484.848 | 500 | 372.093 | 516.129 | 500 | 500 |
| 32768 | 877.464 | 955.224 | 969.697 | 798.752 | 1018.91 | 988.417 |
| 65536 | 1600 | 1732.66 | 1833.48 | 1921.2 | 1954.2 | 1937.56 |
| 131072 | 2801.64 | 3282.05 | 3506.85 | 3615.18 | 3564.84 | 3690.09 |
| 262144 | 4201.03 | 5357.75 | 6380.06 | 6081.66 | 6622.47 | 6501.59 |
| 524288 | 5587.99 | 7839.23 | 9240.83 | 9564.51 | 8636.79 | 9272.21 |
| 1048576 | 7034.78 | 11134.2 | 13653.3 | 13991.5 | 12790 | 13785.4 |

BLOCKSIZE

NUMTRIALS

1. **Commentary**

Based on the result, one thing can be found that BLOCKSIZE of 16 is much worse than the others since every 32 threads constitute a ”Warp”. Each thread in a Warp simultaneously executes the same instruction on different pieces of data. However, it is likely that a Warp’ execution has to stop at some point to wait for a memory access. This would make the execution go idle. The patterns of performance in each graph stably rise because of the increment of BLOCKSIZE and NUMTRIALS. The performance is much better than the project1 since there are more threads being used to computed in every grid. In this project, the mean for the proper use of GPU parallel computing is setting suitable and reasonable BLOCKSIZE and NUMTRIALS.