Adam Wright

wrighada@oregonstate.edu

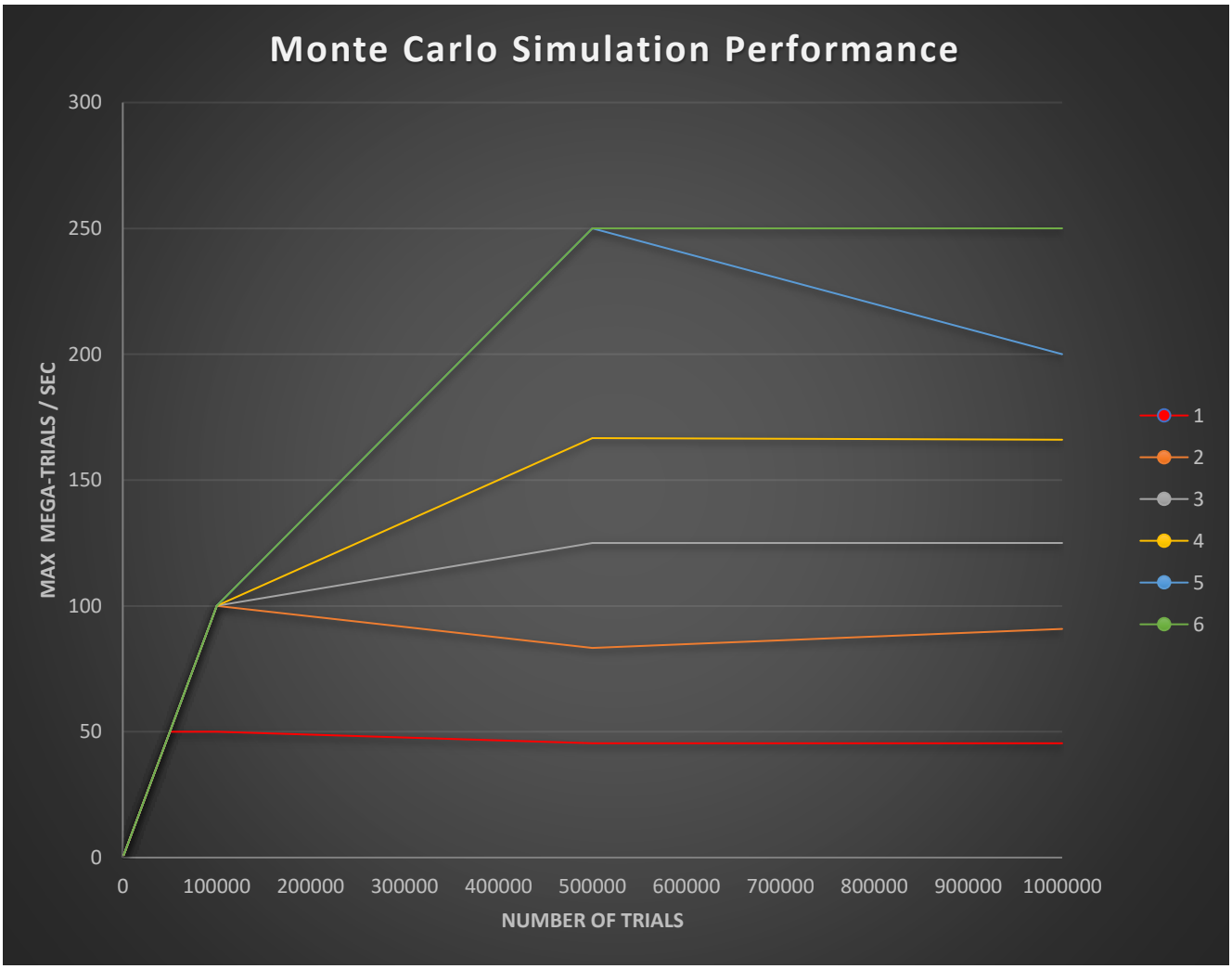
CS-475 - Project 1

Written commentary

1. Close estimate of the actual probability

The probability of case D where the lazer hits the infinite x axis plate converged on 13%. Simulations with fewer trials gave results which diverged down to 0.116 or up to 0.152. All of the iterations above 10,000 gave results of 0.13 with the remaining digits converging to give a result of 0.131 == 13.1%.

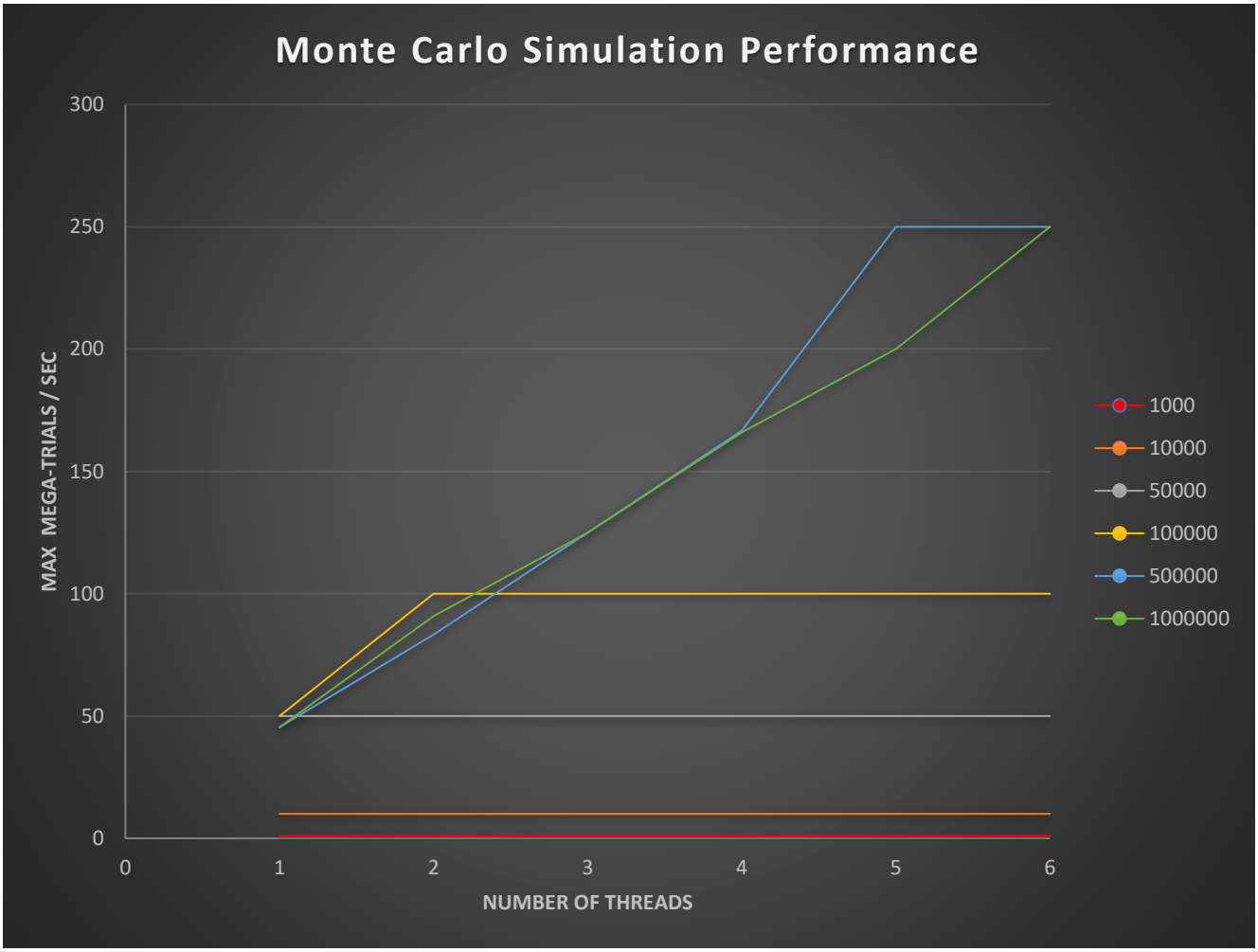
2. Performance vs Number of Trials



This test of performance vs. the number of trials was done on my local machine, which has a 6 core/12 thread 3.33GHz Xeon cpu. The results on thread counts above 6 threads were unreliable, so this test was was limited to 1-6 threads allowing each to be on a physical core.

The performance vs. trials test scales as one would expect, other than 1,000,000 trial 5 core result being lower than it's 500,000 trial test. This result held over several runs of 10 tries each.

3. Performance vs. Number of Threads



This test of performance vs. the number of cores used the same system as the previous simulation.

The performance vs. threads test scales as one would expect, other than 1,000,000 trial 5 core result being lower than it's 500,000 trial test. This result held over several runs of 10 tries each.

4. Computation of the parallel fraction

- 1 thread = 45 MegaTrials / sec

- 6 threads = 250 MegaTrials / sec

- The 6-core speed-up result = 250 / 45 = 5.55

- The efficiency result = 5.55 / 6 = 0.9259. This means that this implementation of a Monte Carlo simulation has a 93% effenciency of parallelization as it goes from 1 to 6 cores.

- Entering the speedup into Amdahl's parallel fraction equation we get:

$$\frac{6}{6-1}\left(1-\frac{1}{5.55}\right) = 1.2 * (1-0.18) = 1.2 * (0.82) = 0.984$$

This result of 98% parallizable is very near to 1, which makes it very close to a perfect result. The high parallelizable fraction result shows that only 1.6% of the instructions are inherently sequential.