April James

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CS475 Parallel Programming

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Project 1: OpenMP Monte Carlo Simulation

Program Details:

For this Monte Carlo simulation, the program was ran a total of 24 times using a combination of 10, 100, 1000, 5000, 10000, 50000, and 100000 number of trials, and 1, 2, 4, and 8 threads. The simulation was ran on Oregon State’s flip server. At the time of running the program, `uptime` outputted “up 104 days, 16:13, 116 users, load average: 7.91, 7.99, 7.81”.

Estimated Probability of Hitting the Castle: **6.63%**

This value was calculated by taking the probability results from a simulation ran using 8 threads and 100,000 trials.

Calculated Parallel Fraction:

Tables and Graphs: Included on the following pages.

Table: Performance versus the Number of Monte Carlo trials

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Number of Trials** | | | | | | |
| **10** | **100** | **1000** | **5000** | **10000** | **50000** | **100000** |
| **Num Threads** | **1** | 3.79951 | 8.662 | 9.02562 | 4.86429 | 4.88039 | 4.90779 | 4.8413 |
| **2** | 2.30516 | 8.53802 | 9.77729 | 9.61438 | 9.60312 | 9.64687 | 9.56968 |
| **4** | 4.09825 | 10.5871 | 18.8627 | 19.2488 | 18.6549 | 18.4351 | 18.8284 |
| **8** | 2.7846 | 13.4318 | 34.5811 | 36.8603 | 33.175 | 37.052 | 37.0279 |

Graph: Performance versus the Number of Monte Carlo trials

Table: Performance versus the Number of OpenMP Threads

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | **Number of Threads** | | | |
| **1** | **2** | **4** | **8** |
| **Num Trials** | **10** | 3.79951 | 2.30516 | 4.09825 | 2.7846 |
| **100** | 8.662 | 8.53802 | 10.5871 | 13.4318 |
| **1000** | 9.02562 | 9.77729 | 18.8627 | 34.5811 |
| **5000** | 4.86429 | 9.61438 | 19.2488 | 36.8603 |
| **10000** | 4.88039 | 9.60312 | 18.6549 | 33.175 |
| **50000** | 4.90779 | 9.64687 | 18.4351 | 37.052 |
| **100000** | 4.8413 | 9.56968 | 18.8284 | 37.0279 |

Graph: Performance versus the Number of OpenMP Threads