

Jung-Che Chang

Project #1

OpenMP: Monte Carlo Simulation

[changju@oregonstate.edu](mailto:changju@oregonstate.edu)

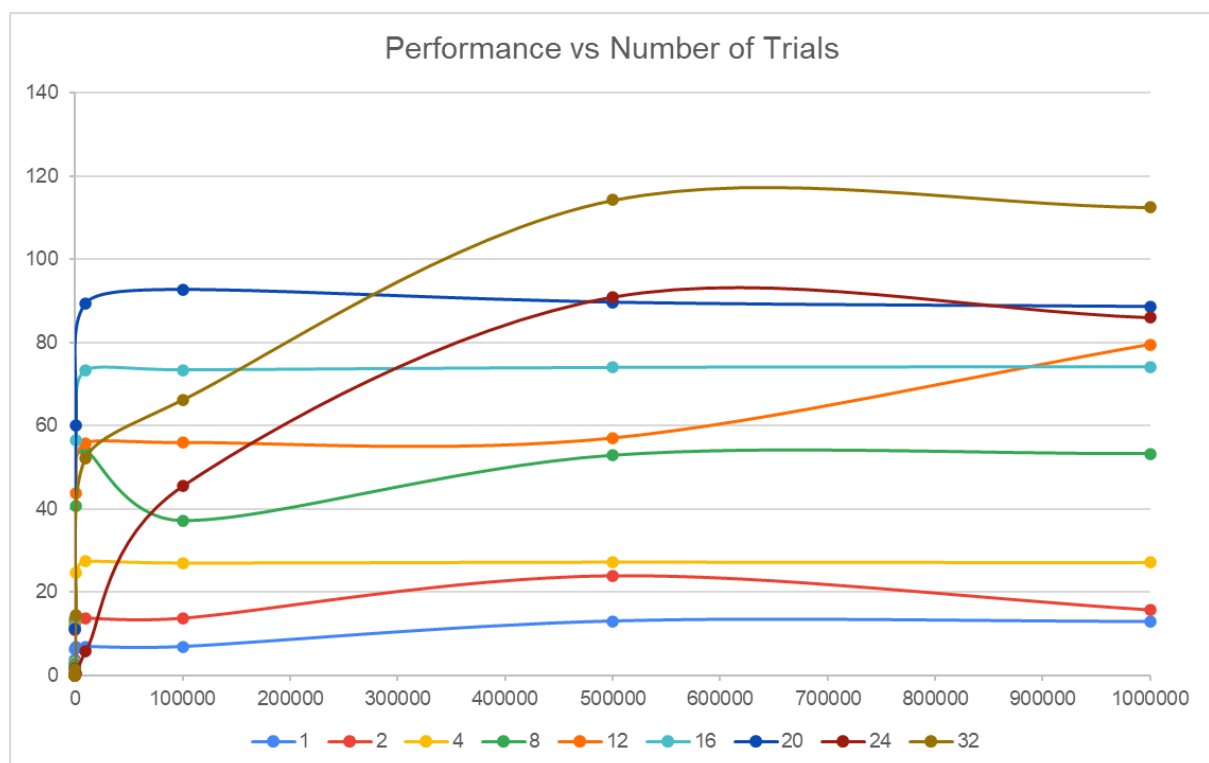
**The results of the execution of the program are as follows:**

1	1	0	0.74
1	10	30	3.89
1	100	25	6.4
1	1000	26.1	6.92
1	10000	26.7	6.9
1	100000	26.51	6.88
1	500000	26.79	13.01
1	1000000	26.84	12.91
2	1	0	0.44
2	10	0	2.75
2	100	27	10.81
2	1000	27.7	13.31
2	10000	26.74	13.76
2	100000	26.77	13.77
2	500000	26.82	23.87
2	1000000	26.93	15.73
4	1	100	0.36
4	10	20	2.9
4	100	27	12.91
4	1000	26.4	24.78
4	10000	26.87	27.4
4	100000	26.76	27.02
4	500000	26.87	27.23
4	1000000	26.88	27.1

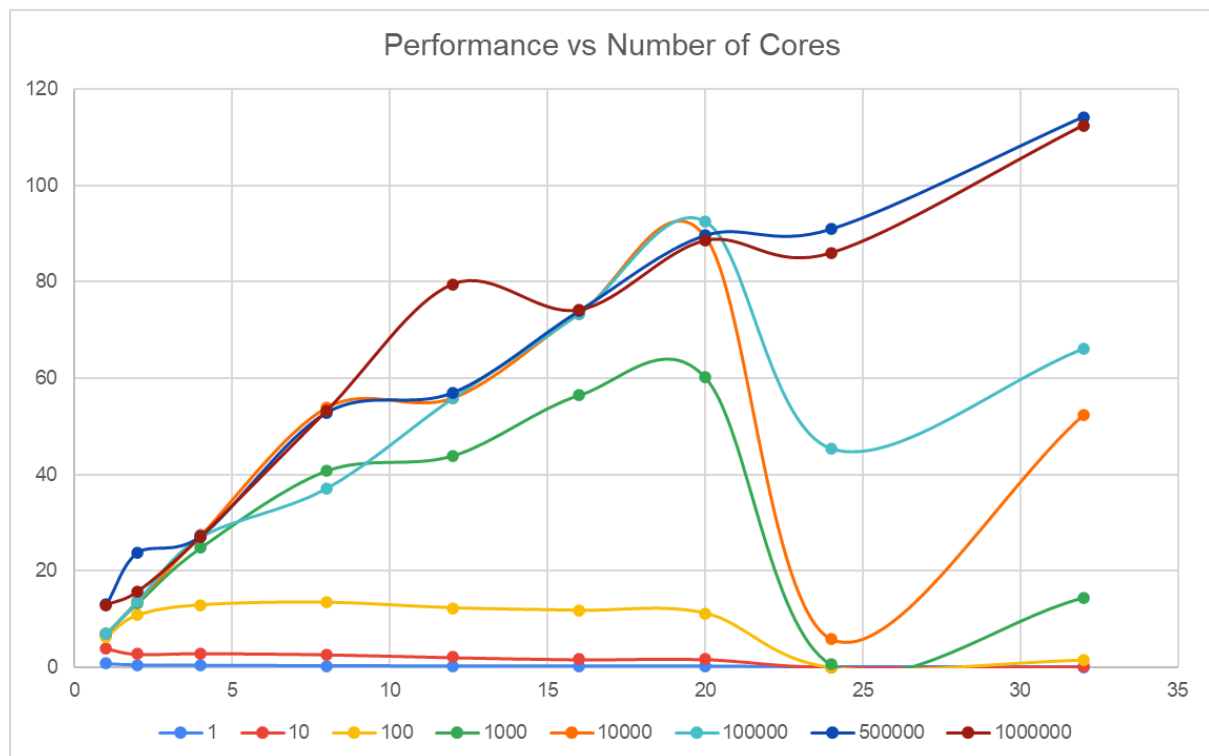
8	1	0	0.26
8	10	20	2.67
8	100	25	13.43
8	1000	26	40.75
8	10000	26.51	53.89
8	100000	27.13	37.18
8	500000	26.96	52.9
8	1000000	26.85	53.29
12	1	0	0.22
12	10	30	2.07
12	100	27	12.29
12	1000	25.9	43.88
12	10000	26.58	55.86
12	100000	26.65	55.92
12	500000	26.75	57.01
12	1000000	26.78	79.53
16	1	0	0.18
16	10	30	1.64
16	100	25	11.79
16	1000	25.7	56.41
16	10000	26.67	73.34
16	100000	26.92	73.38
16	500000	26.84	73.96
16	1000000	26.91	74.14
20	1	0	0.17
20	10	30	1.67
20	100	30	11.21
20	1000	28.2	60.16
20	10000	27.25	89.37
20	100000	26.81	92.64
20	500000	26.8	89.6
20	1000000	26.79	88.55
24	1	0	0
24	10	10	0.01
24	100	26	0.03
24	1000	27.4	0.52
24	10000	27.59	5.9

24	100000	26.91	45.45
24	500000	26.85	90.93
24	1000000	26.87	85.99
32	1	100	0.02
32	10	50	0.11
32	100	28	1.55
32	1000	28	14.43
32	10000	26.83	52.28
32	100000	27.06	66.18
32	500000	26.92	114.2
32	1000000	26.8	112.47

## Graph for Performance vs Number of Trials:



## Graph for Performance vs Number of Cores:



## Probability:

12	1	0	0.22
12	10	30	2.07
12	100	27	12.29
12	1000	25.9	43.88
12	10000	26.58	55.86
12	100000	26.65	55.92
12	500000	26.75	57.01
12	1000000	26.78	79.53

We can see in the above example that the probability got stagnated at around 26.8 after performing a higher number of Trials. Therefore, the highest probability is approximately 26.8.

## Parallel Fraction:

Speedup(S) = Performance with 32 threads / Performance with 1 thread

Speedup(S) = 112.47 / 12.91 = 8.71

**$Fp(n,S) = n(1 - 1 / S) / (n - 1) = 32(1 - 1 / 8.71) / (32 - 1) = 0.913743935$**