Gretel Rajamoney

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Project #1

Project Table:

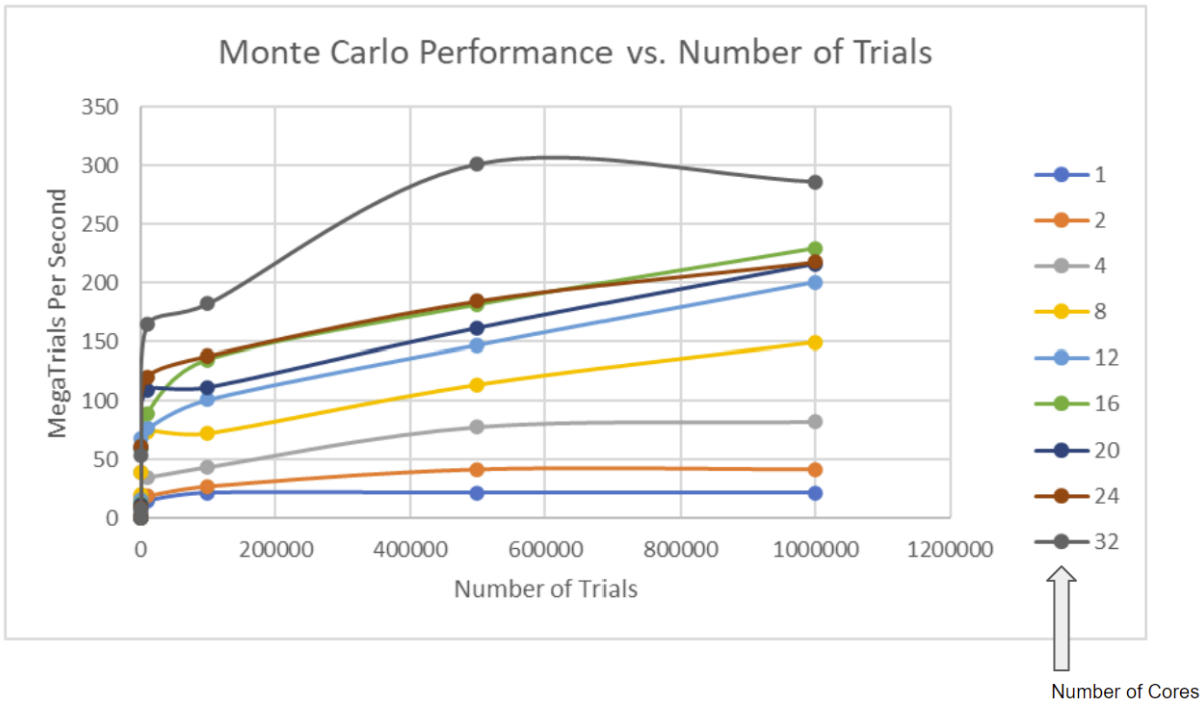
num threads	num trials	probability	performance
1	1	0.00%	0.528936859
1	10	20.00%	4.60438175
1	100	29.00%	9.640346777
1	1000	28.50%	10.34672587
1	10000	29.08%	14.75499749
1	100000	29.16%	21.63203213
1	500000	29.09%	21.7422329
1	1000000	29.16%	21.70351513
2	1	0.00%	0.286636899
2	10	50.00%	2.969418761
2	100	29.00%	13.23646233
2	1000	28.60%	19.68362647
2	10000	29.29%	19.11273214
2	100000	28.87%	27.25677189
2	500000	29.01%	41.58726098
2	1000000	29.14%	41.61598388
4	1	100.00%	0.309257438
4	10	50.00%	2.475200148
4	100	40.00%	10.99244292
4	1000	30.50%	38.84176762
4	10000	29.07%	35.28563339
4	100000	29.15%	44.03259294
4	500000	29.13%	78.09283616
4	1000000	29.14%	82.55918618
8	1	100.00%	0.232009902
8	10	40.00%	2.08331747
8	100	28.00%	20.88179354
8	1000	28.90%	39.65073205
8	10000	29.31%	74.0440112
8	100000	29.17%	72.67848917
8	500000	29.07%	114.000096
8	1000000	29.09%	149.6932397
12	1	0.00%	0.150468305
12	10	50.00%	2.084935581
12	100	28.00%	16.31330635
12	1000	29.20%	67.87242882
12	10000	29.24%	76.63563086
12	100000	29.30%	101.0614782
12	500000	29.13%	147.202941
12	1000000	29.15%	200.6612995
16	1	100.00%	0.122994482
16	10	40.00%	1.357791887

16	100	39.00%	12.1491494
16	1000	29.70%	59.78517951
16	10000	28.47%	89.51727615
16	100000	29.08%	135.2002962
16	500000	29.01%	181.4373401
16	1000000	29.04%	229.3874106
20	1	0.00%	0.108568435
20	10	10.00%	1.238742298
20	100	20.00%	11.39853316
20	1000	26.40%	60.404018
20	10000	28.82%	109.5923312
20	100000	28.99%	111.7426495
20	500000	29.05%	161.6609711
20	1000000	29.12%	216.1134236
24	1	100.00%	0.08998842
24	10	40.00%	1.038836904
24	100	28.00%	9.177280547
24	1000	26.70%	61.36368865
24	10000	29.06%	120.6695538
24	100000	29.17%	138.4740749
24	500000	28.99%	184.5807778
24	1000000	29.02%	217.7803022
32	1	100.00%	0.082837666
32	10	40.00%	0.889153548
32	100	30.00%	8.288882384
32	1000	30.90%	53.35098003
32	10000	29.06%	164.5984953
32	100000	28.87%	182.3127405
32	500000	29.03%	301.3585794
32	1000000	29.06%	286.1852368

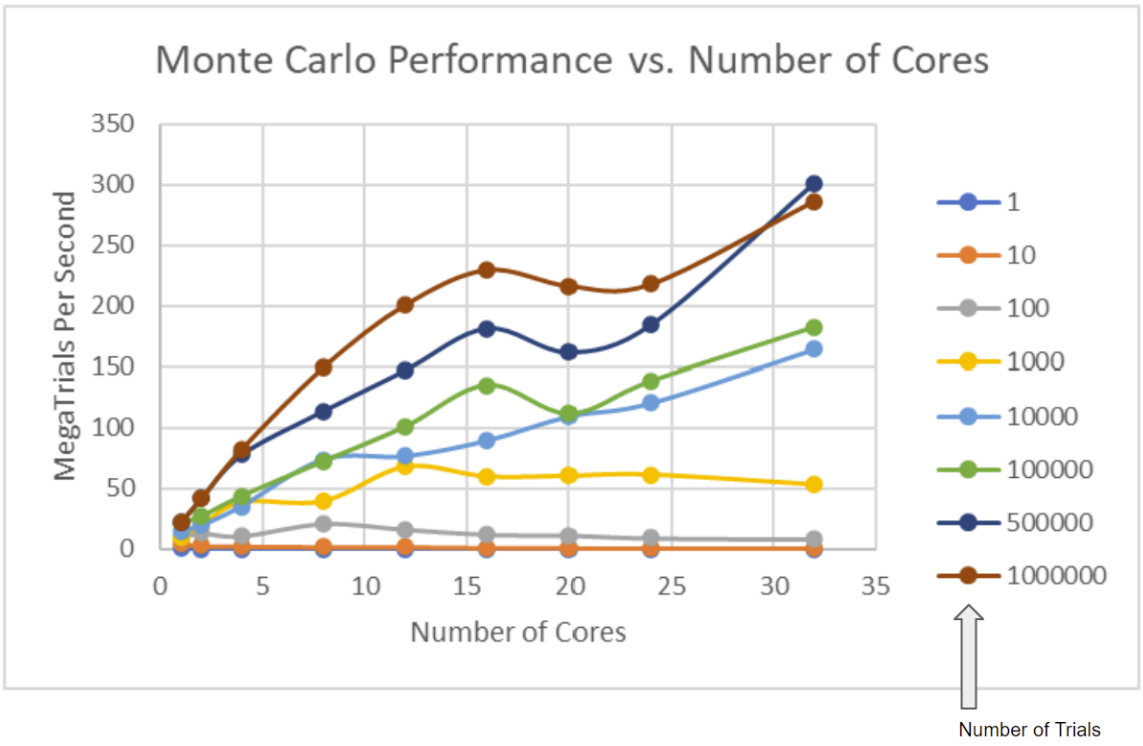
Project Pivot Table:

	1	10	100	1000	10000	100000	500000	1000000
1	0.528937	4.604382	9.640347	10.34673	14.755	21.63203	21.74223	21.70352
2	0.286637	2.969419	13.23646	19.68363	19.11273	27.25677	41.58726	41.61598
4	0.309257	2.4752	10.99244	38.84177	35.28563	44.03259	78.09284	82.55919
8	0.23201	2.083317	20.88179	39.65073	74.04401	72.67849	114.0001	149.6932
12	0.150468	2.084936	16.31331	67.87243	76.63563	101.0615	147.2029	200.6613
16	0.122994	1.357792	12.14915	59.78518	89.51728	135.2003	181.4373	229.3874
20	0.108568	1.238742	11.39853	60.40402	109.5923	111.7426	161.661	216.1134
24	0.089988	1.038837	9.177281	61.36369	120.6696	138.4741	184.5808	217.7803
32	0.082838	0.889154	8.288882	53.35098	164.5985	182.3127	301.3586	286.1852

Performance vs. Number of Monte Carlo Trials Graph:



Performance vs. Number of OpenMP Threads Graph:



Project Questions:

Analyzing the run containing 32 threads and 1,000,000 trials, the actual probability according to our programs generated output is 29.06%.

1-Thread & 1,000,000 Trials = 21.70351513
32-Thread & 1,000,000 Trials = 286.1852368

Speed-Up = (32-Thread / 1-Thread) = 286.1852368 / 21.70351513 = 13.18612377

Parallel Fraction = (n / (n-1)) * (1 - (1 / Speed-Up)) = (32/31) * (1 - (1 / 13.18612377)) = 0.95397