

Pang-Fa Chou

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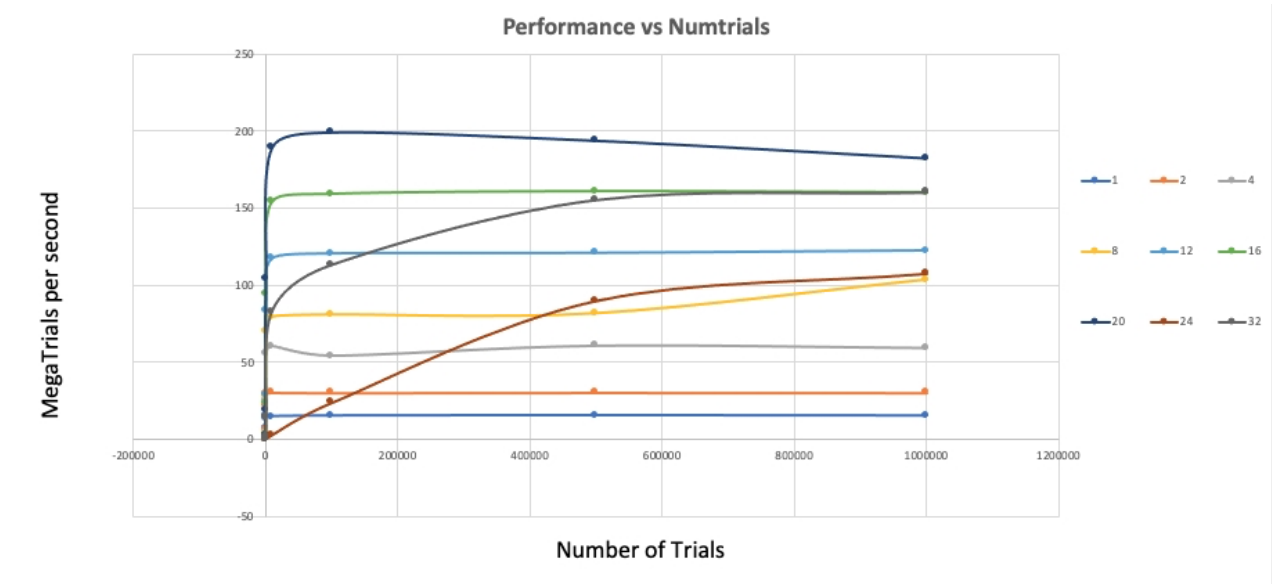
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The result after running the program is shown as
proj01.xlsx and the following as well:

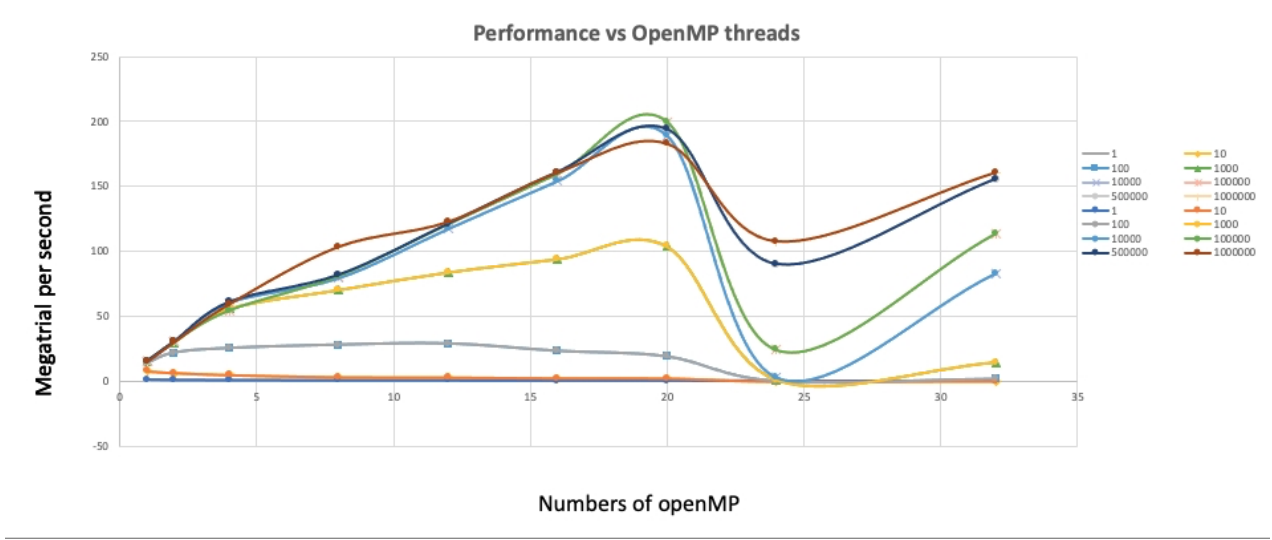
NUMT	NUMTRIALS	Probability	maxPerformance
1	1	0.00%	1.01
1	10	30.00%	7.52
1	100	32.00%	13.9
1	1000	28.20%	15.15
1	10000	29.16%	14.76
1	100000	28.98%	15.12
1	500000	29.06%	15.3
1	1000000	29.09%	15.1
2	1	0.00%	0.68
2	10	60.00%	6.28
2	100	28.00%	21.78
2	1000	29.30%	29.87
2	10000	28.85%	30.48
2	100000	28.82%	30.3
2	500000	29.11%	30.47
2	1000000	29.09%	30.33
4	1	100.00%	0.5
4	10	50.00%	4.77
4	100	31.00%	25.22
4	1000	29.90%	55.59
4	10000	28.69%	60.54
4	100000	29.18%	54.33
4	500000	29.05%	60.74
4	1000000	29.08%	59.29
8	1	0.00%	0.36
8	10	20.00%	3.15
8	100	31.00%	27.75
8	1000	28.40%	70.27
8	10000	28.57%	79.47
8	100000	29.17%	80.85
8	500000	29.04%	81.68
8	1000000	29.02%	103.5
12	1	0.00%	0.3
12	10	0.00%	2.91
12	100	25.00%	28.7
12	1000	27.30%	83.89
12	10000	28.40%	117.34
12	100000	28.80%	120.62
12	500000	29.05%	121.01
12	1000000	29.04%	122.57
16	1	0.00%	0.23
16	10	20.00%	2.34
16	100	31.00%	23.03
16	1000	28.40%	94.13
16	10000	28.21%	154.14
16	100000	29.01%	159.26
16	500000	29.08%	160.97
16	1000000	29.06%	160.28
20	1	0.00%	0.21
20	10	30.00%	2.25
20	100	34.00%	18.77
20	1000	30.10%	103.93
20	10000	29.38%	189.22
20	100000	28.74%	199.38
20	500000	29.16%	193.97
20	1000000	29.08%	182.55
24	1	100.00%	0
24	10	30.00%	0
24	100	30.00%	0.06
24	1000	26.70%	0.56
24	10000	28.94%	3.04
24	100000	29.26%	23.88
24	500000	29.13%	90.06
24	1000000	29.14%	107.71
32	1	0.00%	0.02
32	10	40.00%	0.21
32	100	29.00%	1.71
32	1000	31.00%	14.27
32	10000	29.25%	83.11
32	100000	29.25%	113.29
32	500000	29.16%	155.58
32	1000000	29.13%	160.44

proj01.xlsx is transformed into 2 graphs as following:

1. Graph of performance vs. number of trials



2. Graph of performance vs. number of threads



For the probability and Fp, I choose the data from 1,000,000 trials. Based on the test result, I believe the actual probability is approximate 29.13%

For Speedup:

$$S_2 = 30.33 / 15.1 = 2.01$$

$$S_4 = 59.29 / 15.1 = 3.94$$

$$S_8 = 103.5 / 15.1 = 6.85$$

$$S_{12} = 122.57 / 15.1 = 8.11$$

$$S_{16} = 160.28 / 15.1 = 10.61$$

$$S_{20} = 182.55 / 15.1 = 12.08$$

$$S_{24} = 107.71 / 15.1 = 7.13$$

$$S_{32} = 160.44 / 15.1 = 10.62$$

For Fp:

$$Fp_2 = 2/1 * (1 - 1/S_2) = 0.502$$

$$Fp_4 = 4/3 * (1 - 1/S_4) = 0.994$$

$$Fp8 = 8/7 * (1 - 1/S8) = 0.975$$

$$Fp12 = 12/11 * (1 - 1/S12) = 0.956$$

$$Fp16 = 16/15 * (1 - 1/S16) = 0.996$$

$$Fp20 = 20/19 * (1 - 1/S20) = 0.965$$

$$Fp24 = 24/23 * (1 - 1/S24) = 0.897$$

$$Fp32 = 32/31 * (1 - 1/S32) = 0.935$$