Project 1- Monte Carlo Simulation

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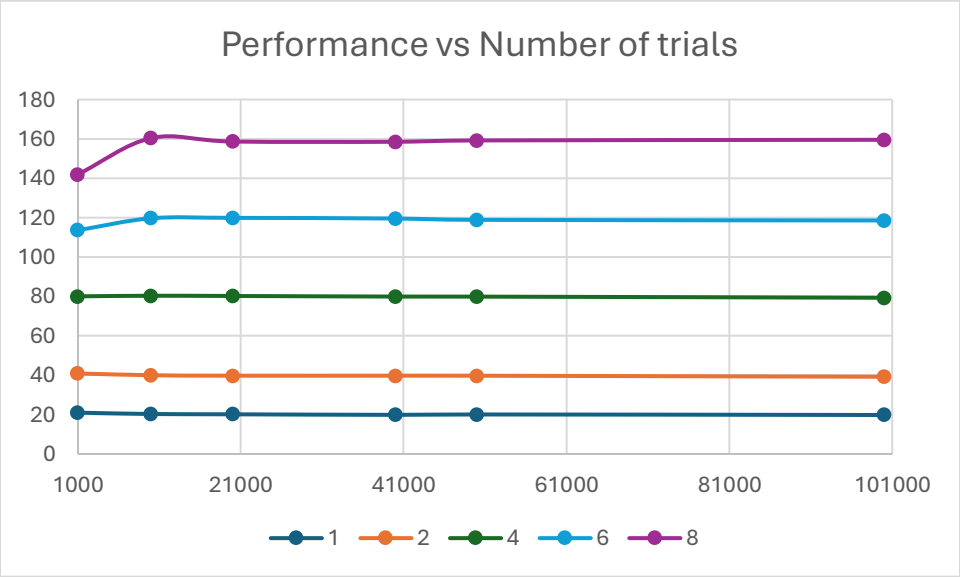
1. Provide a close estimate of the actual probability

Threads	Trials	Performance	Probability
1	1000	21	21.10%
1	10000	20.31	23.41%
1	20000	20.16	23.31%
1	40000	19.87	23.25%
1	50000	20.08	23.12%
1	100000	19.81	23.07%
2	1000	40.91	25.20%
2	10000	40	23.59%
2	20000	39.77	23.24%
2	40000	39.77	23.32%
2	50000	39.75	23.05%
2	100000	39.23	23.04%
4	1000	80.06	24.00%
4	10000	80.37	22.82%
4	20000	80.24	23.22%
4	40000	79.95	22.94%
4	50000	79.92	23.07%
4	100000	79.34	23.18%
6	1000	113.66	22.80%
6	10000	119.7	22.73%
6	20000	119.91	22.99%
6	40000	119.58	23.20%
6	50000	118.91	23.09%
6	100000	118.6	23.16%
8	1000	142.01	22.80%
8	10000	160.43	23.50%
8	20000	158.68	23.65%
8	40000	158.55	23.25%
8	50000	159.23	22.81%
8	100000	159.56	23.04%

	1000	10000	20000	40000	50000	100000
1	21	20.31	20.16	19.87	20.08	19.81
2	40.91	40	39.77	39.77	39.75	39.23
4	80.06	80.37	80.24	79.95	79.92	79.34
6	113.66	119.7	119.91	119.58	118.91	118.6
8	142.01	160.43	158.68	158.55	159.23	159.56

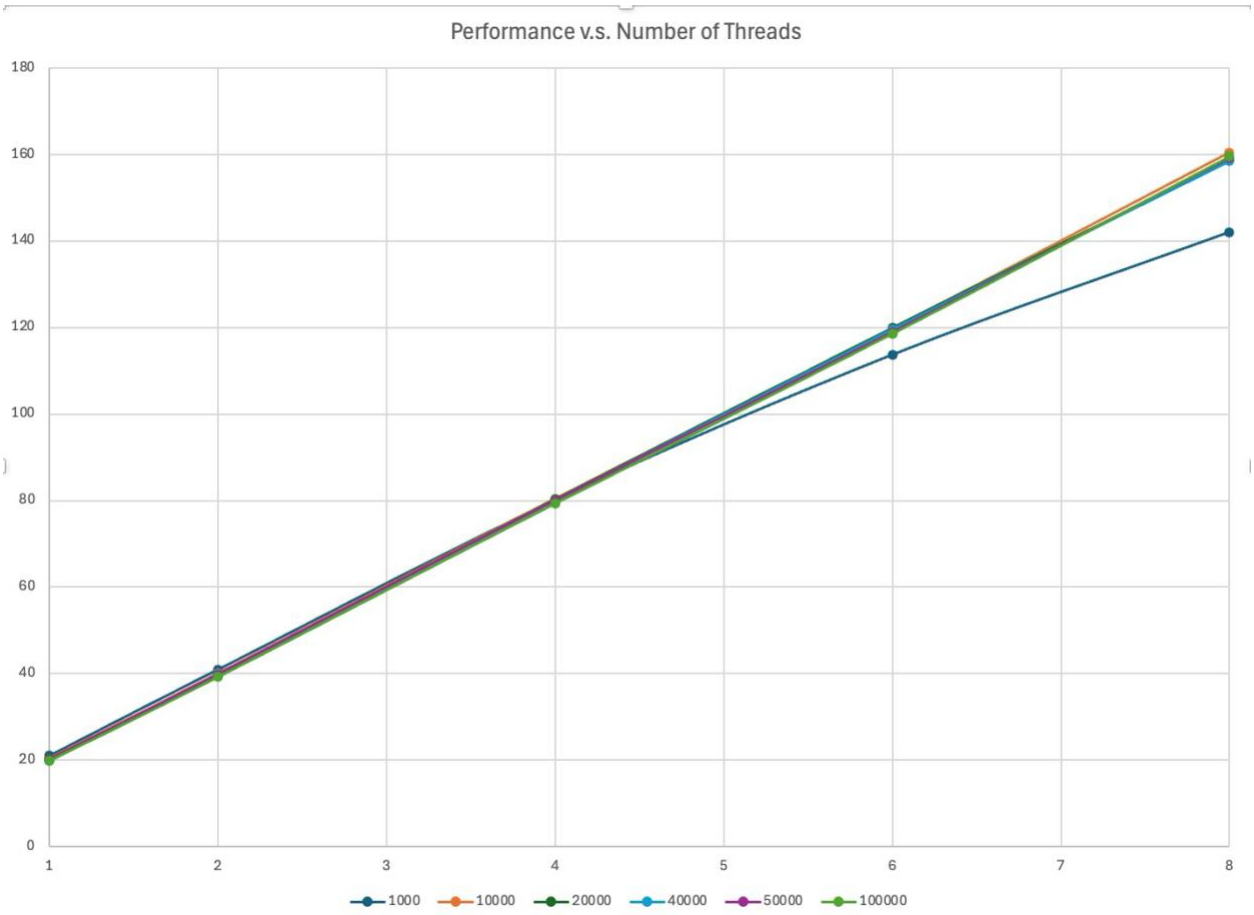
The close estimate of actual probability is **23.04%** .

2. Good graph of performance vs number of trials



The graph shows the performance (MegaTrials/Sec) changes vs the number of trials

3. Good graph of performance vs number of threads



The graph shows how performance (MegaTrials/Sec) changes with the number of threads

4. Compute Fp, the Parallel Fraction

The formula to calculate Fp is

Fp = (N/(N-1))*(1-(1/S))

N = 8

Speedup = performance with 8 threads / performance with 1 thread

For 10000 number of trials

S = 160.43/20.31

S = 7.89

Fp= 8/7 *(1-1/7.89)

Fp= 0.998

5. Compute Smax, the maximum Speedup

Smax = 1/1-Fp

= 1/1-0.998

= 1/0.004

= 500