Homework 3

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Simulation & Analysis

M = 64, N = 64, T = 500

Threads	Execution Time (s)	Speedup	Efficiency
1	0.106	*BASELINE*	*BASELINE*
2	0.062	1.710	0.855
4	0.049	2.163	0.541
8	0.017	6.235	0.779
16	0.396	0.268	0.017
32	0.624	0.170	0.005
64	0.971	0.109	0.002

M = 256, N = 256, T = 500

Threads	Execution Time (s)	Speedup	Efficiency
1	1.726	*BASELINE*	*BASELINE*
2	1.739	0.993	0.497
4	1.712	1.008	0.252
8	2.493	0.692	0.087
16	8.226	0.210	0.013
32	10.550	0.164	0.005
64	8.340	0.207	0.003

M = 512, N = 512, T = 100

Threads	Execution Time (s)	Speedup	Efficiency
1	1.461	*BASELINE*	*BASELINE*
2	1.373	1.064	0.532
4	1.523	0.959	0.240
8	2.192	0.667	0.083
16	4.780	0.306	0.019

| 32 | 7.496 | 0.195 | 0.006 |
| 64 | 4.966 | 0.294 | 0.005 |

The simulations for the program saw initial speedups as the number of threads increased but performance became progressively worse as more threads were used to run the program. It seems that smaller boards benefit more from parallelism while larger boards face worse performance with more threads. This is most likely because the process of spreading out the board between many threads is significantly slower than processing the board in just one thread. Efficiencies were decent for some of the simulations though most of them dropped to very low values when more threads were used.