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COSC 420

Homework 02

22 Oct. 2024

Comparative Timing & Performance Analysis

*Values calculated using Microsoft Excel

a=0, b = 100	p	n	Serial Time (s)	Parallel Time (s)	Speedup	Efficiency	fs | Gustafson	fp | Gustafson
Timing 1	2	2000000	0.146375	0.01111289	1.036572054	0.518286027	0.9634279461	0.03657205393
Timing 2	3	3000000	0.264362	0.01129921	1.028094027	0.3426980091	0.9859529864	0.01404701362
Timing 3	4	4000000	0.330298	0.01106301	1.02491192	0.25622798	0.9916960267	0.008303973276
Timing 4	5	5000000	0.439511	0.01113003	1.020156844	0.2040313688	0.994960789	0.005039211046
Timing 5	6	6000000	0.550033	0.01129709	1.017057386	0.1695095643	0.9965885228	0.003411477201
Timing 6	7	7000000	0.657967	0.01116826	1.014513855	0.1449305508	0.9975810241	0.002418975908
Timing 7	8	8000000	0.761961	0.01137933	1.013043136	0.126630392	0.9981366949	0.001863305149
Timing 8	9	9000000	0.879397	0.01134444	1.011450475	0.1123833861	0.9985686906	0.001431309383
Timing 9	10	10000000	1.087802	0.01131149	1.009348913	0.1009348913	0.9989612319	0.001038768083
Timing 10	11	11000000	1.196874	0.01138736	1.008641845	0.09169471316	0.9991358155	0.000864 1844748
Timing 11	12	12000000	1.294767	0.01224762	1.008664217	0.0840553514	0.9992123439	0.000787656073

a=0, b = 100	p	n	Serial Time (s)	Parallel Time (s)	Speedup	Efficiency	fs | Amdahl	fp | Amdahl
Timing 1	12	10000	0.000116	0.00011544	1.004851005	0.08373758374	0.9947335423	0.00526645768
Timing 2	12	50000	0.000674	0.00022955	2.936179482	0.2446816235	0.2806312382	0.7193687618
Timing 3	12	100000	0.001301	0.00031582	4.119435121	0.3432862601	0.1739109776	0.8260890224
Timing 4	12	500000	0.005454	0.00079193	6.886972333	0.5739143611	0.06749274927	0.9325072507
Timing 5	12	1000000	0.012007	0.00145831	8.233503165	0.6861252637	0.04158725592	0.9584127441
Timing 6	12	1500000	0.019301	0.00219582	8.789882595	0.7324902163	0.03320054072	0.9667994593
Timing 7	12	10000000	0.091158	0.00899897	10.12982597	0.8441521641	0.01678368627	0.9832163137
Timing 8	12	25000000	0.250801	0.02363684	10.61059769	0.8842164745	0.01190407027	0.9880959297
Timing 9	12	50000000	0.552559	0.05128514	10.77425157	0.8978542972	0.01034240523	0.9896575948
Timing 10	12	75000000	0.844806	0.07654588	11.03659661	0.9197163845	0.00793560996 1	0.9920643 9
Timing 11	12	100000000	1.218663	0.10942933	11.13652985	0.9280441542	0.00704863071 6	0.9929513693
Timing 12	12	500000000	5.493874	0.49214677	11.16308048	0.9302567064	0.00681564494 3	0.9931843551

For what values does the parallel program have a performance advantage over the serial program?

At n > 10000, the parallel program has a performance advantage over the serial program. The respective a and b values have a very insignificant impact on the program's total runtime.