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Novemeber 14th, 2023

Analysis Questions:

1. Comparing the results of your basic and vectorized implementations at N=16384, which code has better performance in terms of MFLOP/s, and by how much? Which code has better memory system utilization, and by how much?

Assuming I am answering this correctly, it seems to be basic for both questions? It is by a fair bit for both questions, too. Especially vectorized.

2. Comparing the results of your basic and OpenMP 8-way parallel implementation at N=16384, which code has better performance in terms of MFLOP/s and by how much? Which code has better memory system utilization, and by how much?

Once again, it seems to be basic? The numbers for it are less, so I assume it is faster then, yes? It is better by a fair bit for both questions.

3. Looking at the results of your OpenMP implementation at N=16384, what is the ***speedup*** of this code going from 1 to 4 threads, from 1 to 16 threads, and from 1 to 64 threads? Use your runtime data to compute these speedup metrics.

Runtime (s)							
Problem size	Blas	Basic	Vectorized	omp-1	omp-4	omp-16	omp-64
1024	0.00015	0.00362	0.00028	0.00101	0.00046	0.00049	0.00045
2048	0.00072	0.01516	0.00139	0.00410	0.00242	0.00182	0.00202
4096	0.00428	0.05870	0.00572	0.01659	0.00519	0.00538	0.00447
8192	0.01857	0.23640	0.02393	0.07297	0.02050	0.01779	0.01667
16384	0.07634	0.98851	0.08755	0.26837	0.07859	0.07037	0.06970

MFLOPs							
Problem size	Blas	Basic	Vectorized	omp-1	omp-4	omp-16	omp-64
1024	14352.06198	579.75104	7603.74903	2070.85218	4512.45947	4253.68545	4646.05889

2048	11667.37322	553.19000	6052.39546	2043.87283	3466.85975	4614.74664	4159.60045
4096	7832.36700	571.60141	5868.46066	2022.63485	6459.15131	6241.61321	7501.02653
8192	7227.28378	567.74489	5607.90160	1839.32656	6548.71245	7546.20869	8049.66527
16384	7032.78082	543.11278	6131.99916	2000.46407	6831.28142	7629.62506	7702.66631

Memory Bandwidth (% memory bandwidth utilized)							
Problem size	Blas	Basic	Vectorized	omp-1	omp-4	omp-16	omp-64
1024	0.02737	0.00111	0.01450	0.00395	0.00861	0.00811	0.00886
2048	0.01113	0.00053	0.00577	0.00195	0.00331	0.00440	0.00397
4096	0.00373	0.00027	0.00280	0.00096	0.00308	0.00298	0.00358
8192	0.00172	0.00014	0.00280	0.00044	0.00156	0.00180	0.00192
16384	0.00084	0.00006	0.00073	0.00024	0.00081	0.00091	0.00092

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