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MPI Matrix Project

CSCI 551

Problem: Write a program using MPI to calculate the Multiplication of two matrices.

I spent most of my time trying to get my timing runs to complete. As it stands I was unable to get runs for ijk using 20 processors. I wrote a script to run all of the timing runs in succession. I believe that I was disrupted multiple times by computers randomly going offline. Also with so many people running programs at once some of my timing runs did not follow the speedup or efficiency pattern. I got some very interesting output for those graphs. I ran all of the different forms of matrix multiplication over 20 times each. I used the smallest 5 values from all of the different runs and still got output that did not make much sense. The efficiency for kij and ikj look really good. Then ijk has an odd value for 16 processors.

Algorithm:

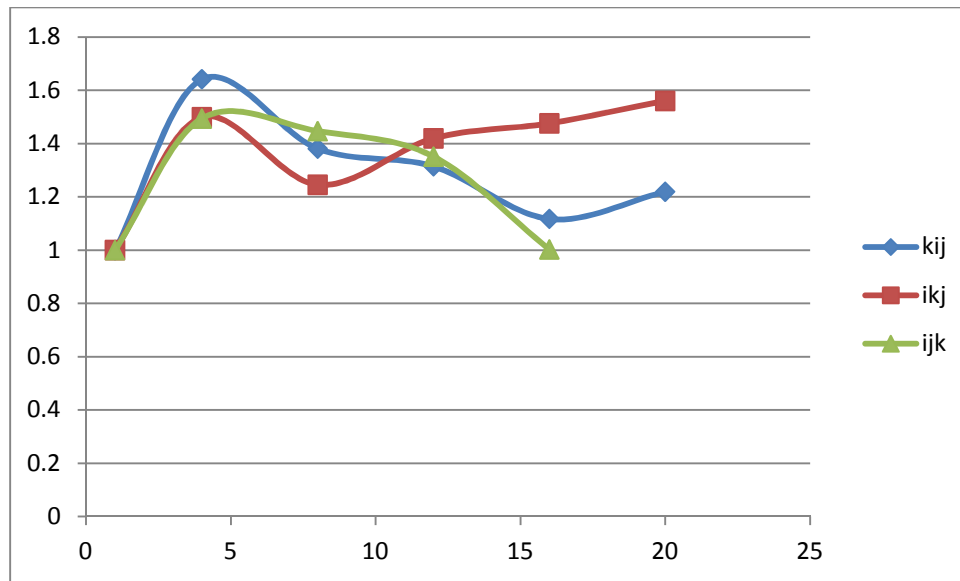
1. Each process calculates "its" interval of
the C Matrix. Intervals are collections of Rows in C
2. Each process gets the dot product of all of its individual
rows of A with each column or row in B. The way it actually
performs the calculation is based on user input.
over its interval using the trapezoidal rule.
- 3a. Each process including 0 sends its dot product results in intervals of rows to 0.
- 3b. Process 0 gathers the result in C.

kij results								
1proc	4proc	8proc	12proc	16proc	20proc	processors	speedup	efficiency
966.7943	588.992	700.1034	735.6357	865.1918	792.945	1	1	
966.8907	590.4752	703.5672	749.3192	881.4551	796.970	4	1.64143	0.41036
966.9126	611.4521	704.5967	821.0019	905.8329	798.814	8	1.38093	0.172616
967.0651	613.3768	704.7398	829.8121	956.835	804.518	12	1.31423	0.109519
967.2739	634.7314	738.8207	858.5607	993.3566	808.880	16	1.11743	0.06984
						20	1.21924	0.060962

ikj results								
1proc	4proc	8proc	12proc	16proc	20proc	processor	speedup	efficienc
961.483	641.626	772.194	677.445	651.575	616.307	1	1	
961.895	642.406	837.687	688.319	657.461	619.335	4	1.49851	0.374628
962.247	642.904	890.642	691.497	667.747	628.631	8	1.24513	0.155641
963.126	643.415	907.836	730.652	700.416	634.543	12	1.41927	0.118273
963.136	644.139	917.033	741.086	711.160	655.751	16	1.47562	0.092227
						20	1.56007	0.078004

ikj results								
1proc	4proc	8proc	12proc	16proc	20proc	processor	speedup	efficienc
1188.59	795.494	821.708	879.697	1185.63		1	1	
1194.66	880.527	850.820	879.714	1186.32		4	1.49416	0.37354
1197.63	982.800	1055.96	905.382	1191.83		8	1.44649	0.180812
1200.08	1077.76	1119.27	918.99	1253.81		12	1.35114	0.112595
1208.69	1083.29	1154.93	965.666	1430.17		16	1.0025	0.41036

Speedup



Efficiency

