Stephen Plautz

11570636

Project 2 Report

Part 1.

For N = 10000, input size is much larger than cache, so misses are calculated according to row-wise accesses having a .10 miss rate and column-wise accesses having a 1.0 compulsory miss rate.

	N = 10000		
	ijk/jik	kij/ikj	jki/kji
misses	1.1001E+12	2.0010E+11	2.0001E+12
miss %	37	6.7	67

For N = 10, input size is smaller than cache, so misses are calculated based on the number of first cache line fetches necessary based on input size. This comes to 10 for each matrix, totaling to 30 misses.

	N = 10		
	ijk/jik	kij/ikj	jki/kji
misses	30	30	30
miss %	30	30	30

Part 2.

Using a block size B = 10 effectively reduces the calculation portion for misses to a similar situation as that in the second half of part 1. Each block will have a total of 10 misses (one for each initial cache line fetch) resulting in a total of 30 misses per inner loop iteration. The inner loop is iterated (N/B)^3 times, and thus the resultant amount of misses and miss percent are achieved, assuming a total of 3E+12 total accesses:

Misses: 3E+10

Miss %: 1

Part 3.

Given an input size N of 2048 execution result times are given for use of the Pantarhei cluster with compilation with the no optimization flag set. Optimal times for a given block size and algorithm are highlighted in green, non-blocked algorithm times are reported first. Times are given in seconds.

ijk	jik	kij	ikj	jki	kji
113.679	104.860	24.224	23.622	219.751	203.824

	blocked_ijk	blocked_jik	blocked_kij	blocked_ikj	blocked_jki	blocked_kji
B = 8	28.389	30.534	29.085	29.398	42.433	40.819
B = 16	25.053	26.105	27.842	27.878	67.492	55.827
B = 32	23.543	24.3	26.783	27.156	68.625	67.17
B = 64	23.646	24.572	26.572	27.124	68.207	67.911

Part 4.

Not Completed.