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CSE 160: Parallel Computing
Programming Assignment #6
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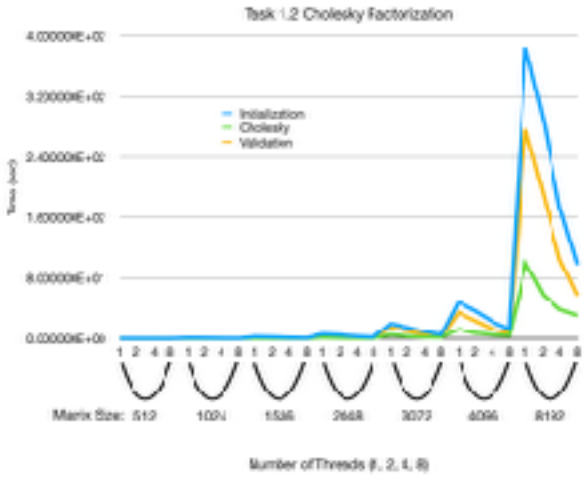
Task 1 Writeup



openMP Directives:

For task 1 we decided to use the openMP for directive to parallelize the 3 parts of computing the cholesky factorization. We changed the scheduling from static, dynamic, and guided to find out which schedule works the best, and in our case we decided to use the dynamic scheduling with a block size of N * N * 0.1 for initialization and validation, and N * 0.1 for multT, where N is the matrix size. Also the initialization and the validation were able to make use of collapse, since each thread is given the same work load each iteration, whereas multT and cholesky where not able to make use of collapse.

Speedup for Cholesky ($S = T_{serial} / T_{parallel}$):

1024x1024:
- 1 thread (serial): 0.1729879s
- 2 threads: S = 0.1729879 / 0.09918809 = 1.744
- 4 threads: S = 0.1729879 / 0.08123994 = 2.129
- 8 threads: S = 0.1729879 / 0.06154895 = 2.811

2048x2048:
- 1 thread (serial): 1.460700s
- 2 threads: S = 1.460700 / 0.8334501 = 1.753
- 4 threads: S = 1.460700 / 0.6300302 = 2.318
- 8 threads: S = 1.460700 / 0.5073581 = 2.879

4096x4096:
- 1 thread (serial): 12.62384s
- 2 threads: S = 12.62384 / 7.290255 = 1.732
- 4 threads: S = 12.62384 / 4.925299 = 2.563
- 8 threads: S = 12.62384 / 3.822506 = 3.303

8192x8192:
- 1 thread (serial): 100.1645s
- 2 threads: S = 100.1645 / 58.56536 = 1.710
- 4 threads: S = 100.1645 / 38.70444 = 2.588
- 8 threads: S = 100.1645 / 30.80954 = 3.251