

ALL of the homeworks and project writeups in this course must be written using latex. See the template latex file (cs560-template.tex) at <http://www.cs.colostate.edu/~cs560/Spring2012/assignments.php>. Homework assignments are to be completed individually. Homeworks need to be submitted electronically via RamCT AND by email to mstrout@cs.colostate.edu by 11:59pm on the due date. Total points: 100

1. [30 points] Parallelize the Smith-Waterman example

Parallelize the ~~Smith-Waterman~~ SpMV example that will be placed on the Resources web page <http://www.cs.colostate.edu/~cs560/Spring2012/resources.php> on January 30th and describe how you did the parallelization in text and with short snippets of code. How did you check that the parallel code and the serial code get the same answer? The answer to this question should take one page at most.

2. [30 Points] Plot Execution Time Averages and Error

Execute the parallel version of SpMV on a vege machine and the cray. Time each number of threads (1 through 8) 10 times. Plot the average execution time and the standard deviation using error bars. (Shell or Python or some other scripts will help collect and plot this data.) Include the plots in your report for HW1 and describe what the plot indicates about the variability of execution times.

3. [30 Points] Speedup and Efficiency

Plot speedup and efficiency for both a vege machine and a cray machine using average execution time. Include the plots in your report for HW1 and describe what the plot indicates about the variability of execution times.

4. [10 Points] Performance Tuning

Play around with some OpenMP scheduling strategies and see how much you can improve the efficiency. Report what strategy gives you the fastest execution time on 24 threads of the cray and which strategy works best for the veges and their corresponding times. We will compare everyone's best time in class for fun.