Scott Todd and Forest Trimble April 5, 2013
Parallel Programming
Lecture 15: Group Project Proposals

Prompt:

Provide a 1 page summary of your group's project. Make sure all group member names appear on the project summary.

For our final group project, we plan to research parallel solutions and approximations for the Traveling Salesman Problem (TSP). The TSP is an NP-hard problem, with O(n!) run time using a brute force search. We hope to learn more about leveraging the computation capabilities of supercomputers to solve such challenging problems.

We will begin our project by studying existing serial and parallel approaches to solving the TSP, including dynamic programming algorithms, genetic algorithms, and any other methods that show up in our research. We will explore both algorithms that find the optimal solution as well as algorithms that approximate the optimal solution.

Once we have a clear understanding of what algorithms would be reasonable and beneficial to implement and study, we will code our own solutions in C using MPI for the Blue Gene/Q and analyze their performance. We may also implement multiple algorithms and compare them against one another, time permitting. Additionally, we will seek out existing code (that grants rights to use for research) and compare the performance of our algorithm(s) to the performance of these other solutions.

We will also research TSP data sets and choose several to run our tests on. A large number of existing data sets are available online, some with optimal tours already calculated to compare our results against.