

1 Goal

In this project, our aim is to code from scratch a parallel algorithm able to solve the exact **traveling salesman problem** (TSP). Specifically, given a list of objects and the distances between each pair of objects compute the path that travels through all objects and returns to the given starting location with minimum distance traveled. Moreover, we assume the distances between each pair of objects to be symmetric i.e. path between those objects are undirected.

2 Technical Approach (Revised)

Our approach towards achieving the goal is as follows -

- Start with a serial version of brute-force algorithm to solve the TSP.
 - Look for faster data structures (eg. stack, linked list) that are appropriate for the task.
- Develop the parallel version of brute-force algorithm by using **OpenMP** written in **C language**.
 - This program makes use of multiple tasks present inside a single node
 - Make sure that OpenMP is used efficiently
- Scaling out by utilizing vast number of nodes present on **Comet** by using **MPI**.
- Analyze benefits of serial and parallel approaches for different inputs.

3 Status V/S our proposed time-line

Week #	Task	STATUS
Week 1	Serial code complete	COMPLETED
Week 2-3	Parallelization	COMPLETED
Week 4	Scaling and Testing the parallel program	IN-PROGRESS
Week 5	Documentation & Result analysis	NOT YET STARTED
Week 6	Buffer	NOT YET STARTED

4 Current Task - Scaling and Testing the parallel program

We're testing our parallel program (OpenMP) and its behavior with different inputs and different number of tasks in a single node. We're also analyzing the intricacies (time taken by each function and what's the bottleneck) of our program in order to extract more parallelism. We have also started to involve profiling tools like VALGRIND, PAPI for further improvements to our algorithm.

5 Our Thoughts

We're going exactly as per our proposed time-lines. Although multiple sub-tasks have sprung up, but we have managed to fit them into our schedule.