



Semester Project

Problem Statement:

The traveling salesman problem (TSP), or, in recent years, the traveling salesperson problem, asks the following question: "Given a list of cities and the distances between each pair of cities, what is the shortest possible route that visits each city exactly once and returns to the origin city?" It is an NP-hard problem in combinatorial optimization, important in operations research and theoretical computer science.¹

Based on what you've learned during *Distributed and Parallel Systems* course and using CUDA² with your favorite programming language, **model** and **implement** one exact and one approximate parallel algorithms for solving TSP problem on the cities of the world.³

Deliverables (in electronic form):

1. A detailed report about the selected algorithms covering:
 - a) *Algorithm Model*
 - b) *Communication Model*
 - c) *Decomposition and Mapping Techniques*
 - d) *Analytical Modeling*
2. Complete source code (in a ready to work state) of the selected algorithms
3. Presentation Slides

Due Date:

On the same day as the final exam.

Grading:

The project is worth **20 points** distributed as follows:

- Modeling (10 points)
- Implementation (06 points)
- Presentation (04 points)

Groups:

Groups of **not more than two** students are allowed.

Good Luck
Dr. Islam ElShaarawy

1 https://en.wikipedia.org/wiki/Travelling_salesman_problem

2 <https://developer.nvidia.com/about-cuda>

3 A commonly used benchmarking database of world cities can be found here:
<http://www.math.uwaterloo.ca/tsp/world/world.tsp.gz>