**HALF TSP**

Before starting to research how we could solve this problem, we have to decide on if we are going to choose half of the cities before computing a path, or while computing. We decided that precomputing would be a lot less costly and more advantageous. So, our solution is split into 2 distinct parts: choosing half of the cities and solving TSP for chosen cities. While choosing the cities, our criteria is closeness. We want to find the closest cluster of cities. This can be done with statistics.

**Choosing Cities**

**Solving TSP**

As said in the report, it would be unfeasible to try and solve exactly. So, this means we can’t use brute force, dynamic programming, backtracking or branch and bound solutions. So, we started researching heuristics and approximation algorithms. It is also important to keep in mind that in our problem every city can go to every other city, as there are no predefined paths. This makes our graph a **complete** graph. This limits the different type of algorithms we can use, since there are so many edges.

At first, we implemented a simple nearest neighbor algorithm. We did this to better understand the problem and use this as a benchmark (reference 3).

We decided that our final algorithm should be a greedy algorithm, optimized with a 2-opt heuristic. We need to calculate all edges for our graph and sort them. Afterwards, we will add them to our solution while removing cycles (reference 3). This will give a solution at worst 20% worse than the theoretical optimal solution (reference 3). But this path can be optimized with 2-opt.

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