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Algorithm A: A* search

Algorithm B: Genetic Algorithm

Description of enhancement of Algorithm A:

Algorithm A has been enhanced by changing the heuristic to completing the subtour via greedy instead of nearest neighbour + random city back to the start. The final tour is also passed into a 2-opt implementation in order to improve the result further for a small increase in runtime. The fringe pruning has been changed from randomly taking the first 250 nodes of a 1000 node fringe to taking the top 10 nodes of a 100 node fringe. This is due to increased time cost of the greedy heuristic.

Description of enhancement of Algorithm B:

Initial population is generated via running greedy on 100 random cities instead of just generating random permutations. Elitism has been implemented to keep the best individual from the previous generation in the new generation. Crossover has been changed from just splitting in half and merging alternated prefix and suffix to instead using Ordered Crossover (OX). Mutation has been changed from swapping to random cities to instead reversing a random subtour as this maintains the path between 2 swapped cities. Instead of always having a crossover it only occurs 70% of the time to prevent going down an optimisation "rabbit hole".