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Algorithm A: A\*

Algorithm B: Basic Greedy

Description of enhancement of Algorithm A:

*The heuristic used in the basic A\* implementation is designed to heavily over-estimate the remaining path, it is calculated with where is the maximum path weight in the distance matrix, is the total number of cities and is the size of the current tour (state), hence when (goal state).*

*The enhanced A\* implementation performs a greedy search from the current state to a goal state and uses the tour length as a heuristic (trivially the for a goal node as there is no step cost to be added). For larger city sizes this runs slower however it generally provides a small over-estimation (but not as much as in the basic implementation) meaning it tends to find lower-cost routes on average.*

Description of enhancement of Algorithm B:

*In the basic greedy implementation, a state transition with colliding lowest transition cost is chosen to be the first instance of the smallest value found.*

*The enhancement works on the basis that there is an ever-increasing chance that using the first collision every time does not form the optimal path, hence a random minimum transition is chosen. This minor tweak has minimal impact on performance and was able to yield better tours in the case of some city sizes, it is most effective on those with many tied state transition costs.*