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Algorithm A: Genetic Algorithm

Algorithm B: Hill Climbing

Description of enhancement of Algorithm A:

Initial population generation: I use the Nearest Neighbour algorithm once for each possible starting city in order to generate the initial population. If this gives less than 200 members then the algorithm repeatedly mutates already present members until the population is large enough.

Elite survival: The best 100 tours from the parent population will carry to the child population, allowing mutation while maintaining a population with high fitness.

Edge Recombination(ER) operator: Tries to preserve the edges common to both parents, treating them as the reason for why they both have good fitness.

Simple Inversion Mutation(SIM): Reverses the substring between two randomly selected cut points, therefore, only changing two edges within the tour.

Description of enhancement of Algorithm B:

To increase the rate of climbing, instead of computing the tour of every node in the neighbourhood of the current node, as soon as a node with shorter tour length is found it becomes the current node. The computation of the neighbourhood then continues but now for the new current node. This is the most significant improvement.

I also changed the algorithm so that multiple iterations can occur, each with a new randomly generated tour.

Thinking that tours already encountered will likely pull the algorithm towards the same local maxima, I made a set to hold all tours that had been computed. However, for larger city sets this required too much memory, therefore, the algorithm only stores every other tour computed. Tours generated at the start of each iteration are then shuffled until an unencountered tour is found.