# Algorithm Overview

The algorithm starts by creating the initial population from random path permutations. The next generation is then continuously created and swapped with the current population until the user chooses to stop the algorithm. The current best path in the population is selected at the end of each iteration and displayed to the user. The algorithm is currently hard coded to use a population size of 50 paths.

# Tournament Selection

In each iteration two selection pools are created by selecting nodes at random from the current population. The best candidate paths are then selected from each pool to be the parents of the new child path. The new path is then constructed from the two parents using crossover and mutation. This is done 50 (population size) times in a loop to create the entire next generation. The selection pool size is currently hard coded to 5.

# Crossover

To perform crossover a cut point is selected at random. The nodes from parent 1 are then copied to the child node, in order, up to the cut point. Then the algorithm attempts to take the remaining nodes from parent 2, while ensuring that no nodes are duplicated in the child path. If the algorithm is unable to take a node from parent 2 because it would result in a duplicate, then it attempts to take the node from the same index at parent 1. If this also fails then the algorithm walks backwards over both parents until it finds a node that is not currently in the child path.

# Mutation

Mutation is performed either by swapping two nodes at random, or by reversing the order of a subset of nodes in the path. The chance of mutation is currently hard coded to 0.2 and each different mutation is equally likely to occur.