FeedBack: Make sure you test and see if the advance technique helps improve your algorithm performance. Runtime optimization may need a bit more work.

Comp 3201 Final Project Proposal

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Design

For representation we will make a random ordered list consisting of all the city coordinates from city 2 to the last city, since the Traveling Salesperson Problem creates a Hamiltonian Path we can shorten the length of our representations by eliminating the first city and using it as our start/end point.

For our Fitness Evaluation we will take the sum of the distances between adjacent nodes in the representation and adding the distance from the first element in the list to the omitted first city and also adding the distance from the last element in the list to the omitted first city, thus giving us the total cost of traveling the path. We will try to minimize this evaluation.

We will then perform parent selection, mutation and/or recombination, Survivor selection and repeat the process a set number of times.

Techniques

As our Parent selection we will use a roulette wheel algorithm.

As our Survivor selection we will use tournament selection.

As our recombination algorithm we will use a crossover algorithm with a random number of crossover points(Advanced Technique)

As our mutation algorithm we will use scramble mutation

Runtime Optimization

To keep our program running quickly we will free up memory by keeping the first and last elements of our routes the same and omitting them from our representation. We will also only convert the 2 best and 2 worst representations from each generation to a list of cities. This means we will not have to create two lists for each representation, one for location and one for starting index. Also, keeping as few functions as possible for each implementation will help eliminate slow runtimes.

Team management

To complete this project we plan on dividing the work necessary to finish it evenly between the two of us. Currently we plan on dividing the work as follows: David will complete the Scramble Mutation as well as the tournament selection functions, Mackenzie will complete the Randomized Multipoint Crossover and the Roulette wheel functions. Both of us will work on and complete the main class.

To keep us organized throughout the duration of the project we plan on using Github in order to store and share our project files, as well as to keep a backup of our project files.