

CSE 2046 HOMEWORK #3

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What we did?

First we used an algorithm for solving the travelling salesman algorithm. This algorithm worked well for small size inputs. However we saw this algorithm not a good solution for big size inputs.

Then we used another algorithm. This algorithm aims split cities in input list into binary groups. These groups are the closest cities among themselves then unites these city groups. But at the end this algorithm not worked well too.

Lastly we decided the use nearest neighbour algorithm for solving this problem. The nearest neighbor algorithm aims a traveling salesman tour is as follows. The salesman starts at first city, then visits the city nearest to the starting city. Afterwards, he visits the nearest unvisited city, and repeats this process until he has visited all the cities, in the end, he returns to the starting city. The steps of the algorithm are as following :

Algorithm of our code

1. Select first city as current city.
2. Find out the shortest edge connecting the current city and an unvisited city.
3. Set the new city as current city.
4. Mark the previous current city as visited.
5. If all the cities are visited, then terminate.
6. Go to step 2.

We can obtain the best result by running the algorithm over again for each vertex and repeat it for n times.

Here are the results we found :

Input	Length of the Tour
Test input-1	3210

Test input-2	338693
Test input-3	a lot of time has passed.
Test input-4	12602

Division of Labor:

First, we both learned what this problem was and investigated the solutions produced. We then discussed the solutions and methods used in the Discord environment. The two of us wrote two different programs, but both did not give the exact result we wanted, they were working very slowly (especially for test-input-3). After that we decided to use nearest neighbour algorithm.

In the Discord environment; Emre YİĞİT wrote the codes and Furkan Kemal DÖNMEZ prepared the report.