Homework 2 (Midterm 1)

Traveling Salesman Problem

Traveling salesman problem is to find a route that visits all cities in a minimum travel distance. Solve 30 Traveling Salesman Problems using Genetic Algorithm.

The problem specifications are in **`data(TSP).zip`**. Each text file (**`data-1.txt, data-2.txt, … data-30.txt`**) has a table that represents the distance between cities. The travel distance of a route is the sum of the distance of the adjacent cities. For example, **3-0-1-2** has a travel distance of **`table[3][0] + table[0][1] + table[1][2]`**.

You can apply any selection, crossover, and mutation operators. For example, you can use tournament selection, order-1 crossover, and reordering mutation. However, the population size and the generations must not exceed the limit.

- **Maximum population size = 100**
- **Maximum generation = 6000**

Submit a zip file to the TA's email containing the following:

- Final population and their fitness values (i.e. travel distances).
  - **`fitness-1.txt, fitness-2.txt, …, fitness-30.txt`**
- Source code (Python, C, or C++)

The name of the zip file must include **your name** and **your student id**.

The computation takes a long time (approximately 70 seconds per problem, coded with Python + NumPy, tested with AMD Ryzen 5 5600X), so consider coding in C or C++, or optimize your code with NumPy functions. You can test your genetic operators in smaller problems stated in **`data-dummy1.txt, data-dummy2.txt`**.

Due: 10/31 23:59

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