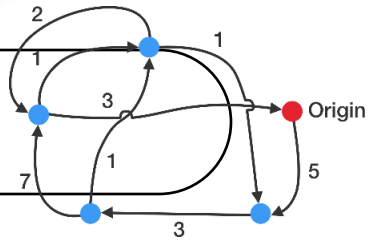
GA Project

Genetic Algorithm

The Traveling Salesman Problem (TSP)



1.The idea of project :-

"This project employs a genetic algorithm to solve **TSP**, which is the task of **finding the shortest route that passes through a given set of cities**. The algorithm initializes a population of candidate solutions and improves them through **selection**, **crossover**, and **mutation** operations to obtain better solutions."

2.The the fitness function : **The inverse of the total distance [*fitness = 1 / total distance*]**

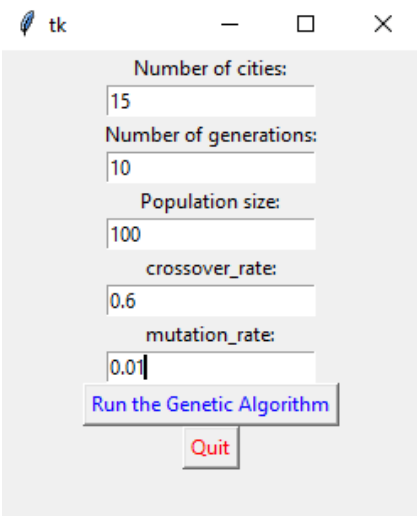
Return the chromosome with the highest fitness (i.e., the shortest distance)

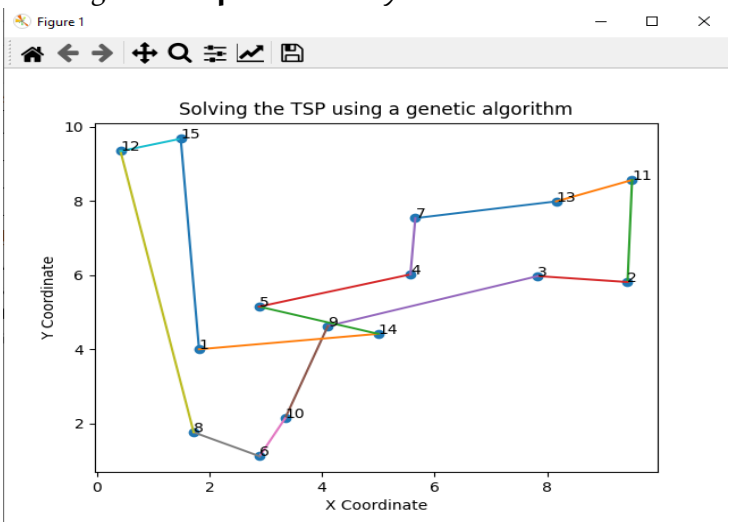
3. The table showing the methods used in performing genetic algorithm operations

Operation	Method
Selection	**Roulette Wheel Selection**
Crossover	**Ordered Crossover (OX)**
Mutation	**Swap Mutation**

4. The running of code :

"When the code is executed, a window appears using the **tkinter** library that prompts the user to input the parameters of the genetic algorithm. Once the user clicks the **'Run the Genetic Algorithm'** button, the algorithm uses the provided parameters to find the shortest route that visits all cities and computes the total distance of this route. Finally, the algorithm visualizes the route using the **matplotlib** library."



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Shortest route: [7, 13, 11, 2, 3, 9, 10, 6, 8, 12, 15, 1, 14, 5, 4]
Total distance: 42.68978001532011
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