Genetic Algorithm :

- The genetic algorithm solves the problem of finding the shortest path using evolutionary principles (selection, crossover, mutation).

The algorithm works as follows:

- **Population**: Initially, a population of random paths is generated (which may be solutions to the problem).
- **Evaluation:** For each individual in the population (each path), a "fitness" is calculated, which is determined by the length of the path (the shorter the length, the higher the fitness).
- **Selection:** A subset (the best individuals) is selected to be used to create the next generation.
- **Crossover:** New paths (descendants) are created from the selected paths (parents) through the crossover operation, where parts of one path are combined with parts of another.
- **Mutation:** Sometimes the order of points in the path changes randomly (redefining the order).
- **Adaptation:** After several generations, new paths can significantly improve the outcome (reducing distance).

In our project, for each iteration of the generation, the A* algorithm and local search are used to improve the paths before mutation in order to speed up the process of finding the optimal solution.