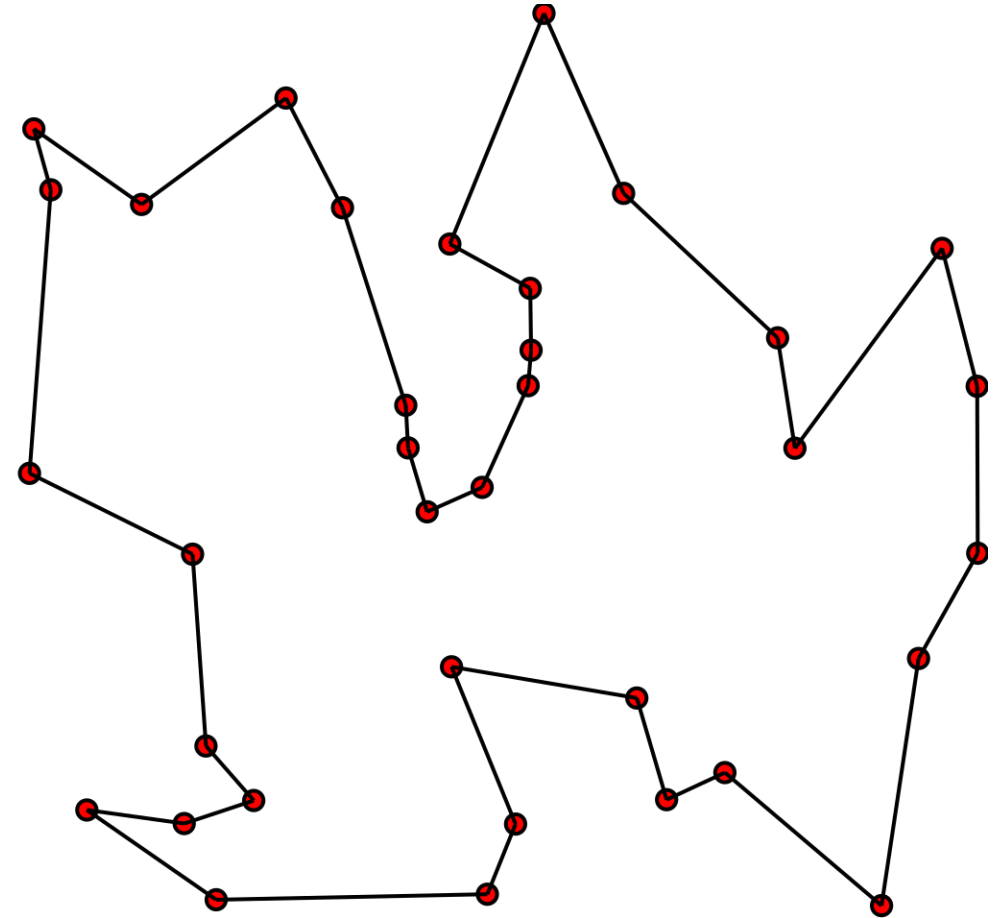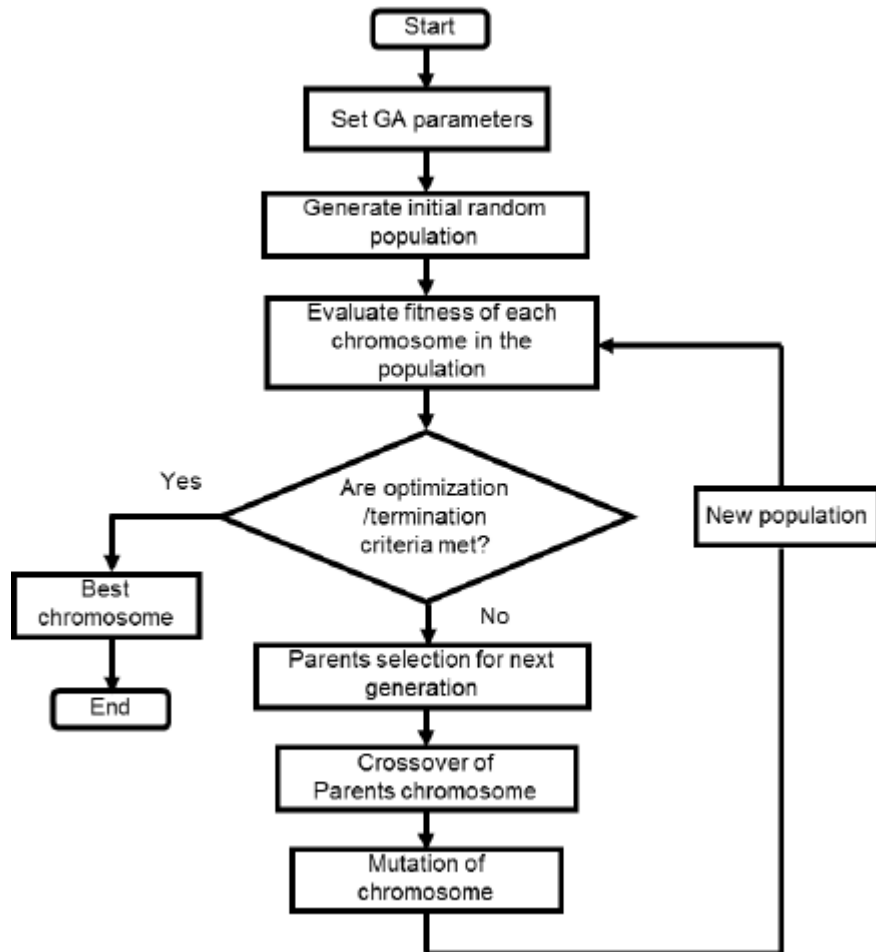# Genetic Algorithm & Travelling Salesman Problem

Travelling Salesman Problem (TSP)

- Input:
  - n cities
  - distances between cities
- Goal:
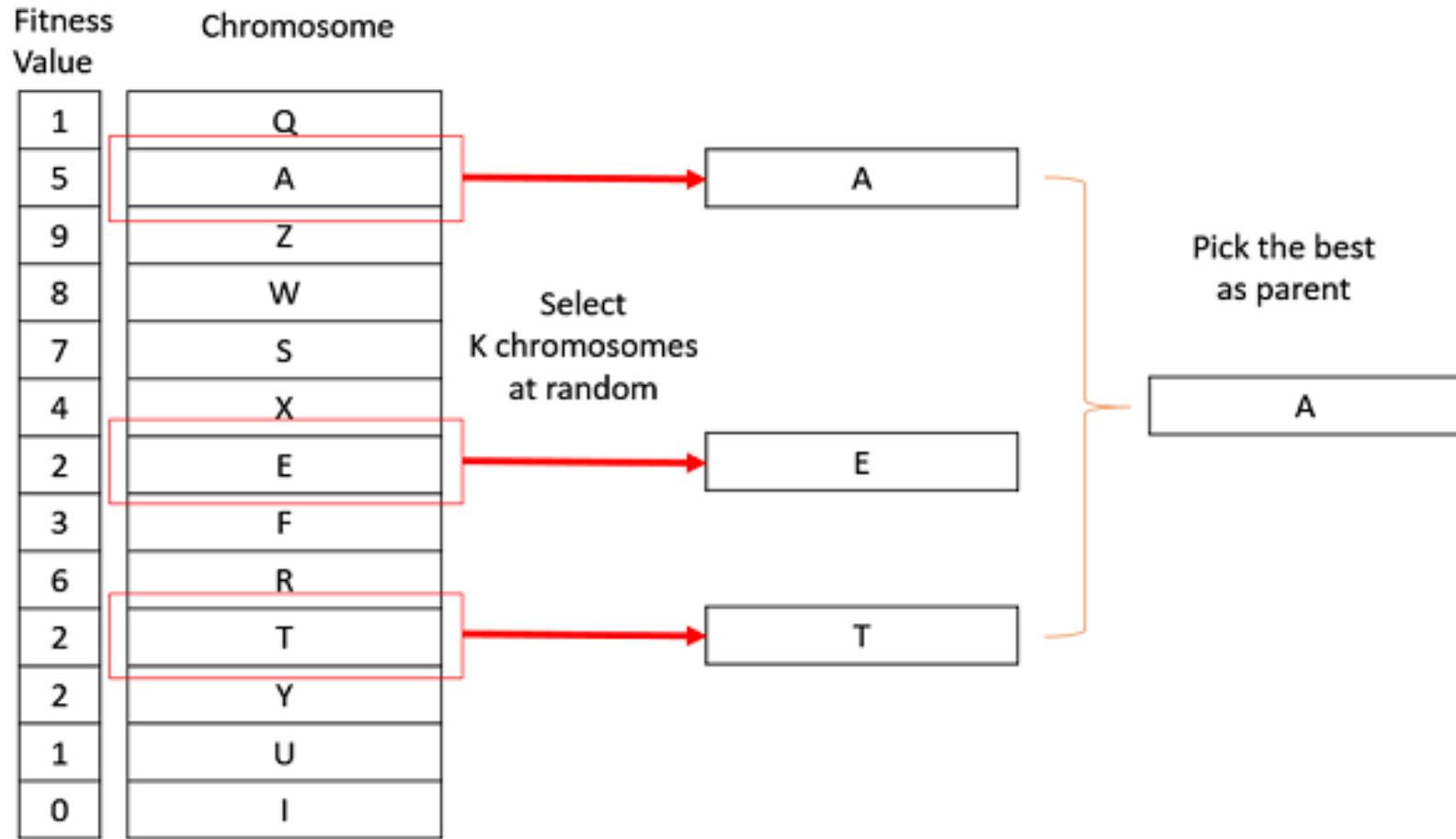 - find permutation with minimum travel distance

Genetic Algorithm

Source: Genetic Algorithms Performance Between Different Selection Strategy in Solving TSP - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Genetic-algorithm-procedure-for-TSP_fig1_236179246 [accessed 25 Feb, 2019]

- Chromosome
  - Representation of a solution/individual
  - Permutation of cities
- Fitness – distance
- Selection - parents for next generation
  - K-tournament – best from k randomly selected individuals (probability of selection
- Crossover
  - Combination of two parents into a new individual
  - Single-point crossover
- Mutation
  - Small change in an individual
  - Swap mutation – swap two cities in the permutation

Tournament Selection

Single Point Crossover

Parents

Children

crossover point