To create my GSA I started by creating an initial population of paths that were generated randomly so no two paths are the same. Then I got the fitness by adding up the sum of the distances of the path within the population and dividing each path distance by the total. Then I proportionally selected a new population equal to the initial population size. I then made the new population with itself using mutation and crossover making sure every pair of parents got mated only once. The crossover worked by selecting a random selection of a parent's path a switching it with equal values within the child path. The mutation workled by selecting a random index 25% of the time and swapping them within the child. Then I recalculated the fitness and made the new population equal to the initial population. I then looped through this process until the fitness of a generation converged in which the program would stop. I then print out the best distance and path of the current population. Below is ten runs of each test case with each of their best paths and distances printed out next to it. I think mine didn't always get great values because the fitness scores were very close to each other in value so the algorithm did not select a good set of paths to create new generations off of a large portion of the time. I think if I were to give a higher value to the better fitnesses and a lower value to the worse fitnesses in a proportional manner the algorithm would run a lot better.

48 Cities:

[34, 38, 44, 27, 43, 9, 3, 37, 28, 32, 42, 17, 47, 1, 23, 35, 14, 36, 40, 33, 7, 4, 41, 2, 6, 10, 45, 11, 30, 19, 15, 26, 0, 46, 31, 39, 21, 16, 29, 5, 22, 13, 24, 20, 12, 18, 8, 25]135537.0

[24, 34, 39, 25, 47, 8, 18, 36, 46, 31, 5, 12, 43, 16, 37, 27, 35, 15, 7, 42, 23, 20, 13, 38, 45, 4, 30, 28, 21, 14, 19, 2, 44, 17, 40, 26, 1, 11, 6, 3, 33, 29, 0, 9, 32, 41, 22, 10]169399.0

[7, 2, 20, 22, 4, 5, 38, 13, 31, 19, 45, 24, 21, 15, 37, 3, 41, 29, 47, 10, 44, 26, 27, 23, 36, 43, 32, 1, 16, 12, 11, 14, 40, 39, 0, 28, 30, 33, 9, 17, 34, 25, 8, 6, 46, 42, 18, 35]155680.0

[33, 26, 28, 12, 13, 10, 46, 24, 4, 32, 19, 11, 20, 15, 42, 9, 18, 34, 1, 39, 44, 17, 7, 8, 3, 6, 14, 45, 38, 23, 0, 16, 22, 2, 30, 21, 37, 41, 47, 43, 5, 29, 35, 40, 36, 27, 25, 31]157919.0

[3, 27, 1, 26, 8, 30, 11, 34, 28, 6, 15, 42, 44, 41, 4, 33, 24, 38, 46, 13, 29, 40, 18, 23, 10, 7, 39, 45, 16, 31, 2, 0, 14, 17, 43, 22, 20, 37, 47, 35, 25, 36, 32, 21, 12, 5, 9, 19]169531.0

[36, 23, 31, 39, 29, 30, 3, 4, 28, 20, 11, 25, 43, 5, 35, 24, 21, 46, 26, 17, 13, 8, 10, 16, 1, 38, 14, 6, 15, 33, 18, 34, 40, 2, 7, 22, 12, 45, 32, 44, 42, 37, 27, 41, 9, 47, 0, 19]150796.0

[30, 26, 41, 13, 31, 25, 3, 40, 28, 23, 45, 18, 46, 15, 32, 0, 8, 16, 9, 36, 1, 21, 43, 14, 5, 24, 2, 39, 4, 27, 42, 22, 17, 6, 33, 29, 19, 11, 47, 20, 7, 44, 10, 12, 35, 34, 37, 38]158888.0

[24, 15, 18, 38, 36, 29, 45, 10, 43, 23, 37, 32, 42, 5, 44, 39, 16, 35, 14, 46, 31, 26, 34, 40, 11, 28, 8, 41, 3, 7, 20, 30, 25, 47, 0, 9, 1, 12, 6, 2, 33, 17, 4, 21, 22, 19, 27, 13]161294.0

[12, 40, 17, 47, 35, 1, 3, 46, 29, 37, 33, 8, 0, 19, 44, 41, 13, 31, 11, 39, 20, 22, 36, 5, 24, 2, 16, 23, 6, 42, 18, 34, 14, 28, 32, 38, 4, 27, 30, 26, 45, 9, 7, 43, 15, 10, 21, 25]157143.0

[37, 1, 11, 4, 17, 23, 19, 46, 14, 38, 42, 22, 16, 34, 28, 45, 32, 9, 6, 21, 3, 36, 40, 26, 25, 10, 5, 35, 27, 13, 33, 2, 39, 24, 43, 12, 8, 31, 47, 41, 44, 7, 30, 20, 15, 0, 18, 29]165733.0

42 Cities:

[28, 19, 21, 4, 7, 34, 32, 18, 31, 1, 37, 14, 12, 5, 20, 27, 35, 15, 6, 26, 10, 23, 22, 8, 30, 9, 29, 17, 2, 11, 13, 3, 24, 36, 40, 16, 33, 41, 39, 25, 38, 0]3064.0

[17, 39, 22, 23, 5, 34, 28, 15, 19, 26, 0, 10, 13, 4, 33, 7, 14, 9, 29, 40, 24, 25, 20, 18, 35, 37, 41, 16, 1, 2, 38, 27, 30, 21, 12, 32, 6, 36, 31, 8, 11, 3]3064.0

[34, 20, 30, 5, 21, 22, 40, 38, 12, 18, 33, 41, 14, 27, 24, 9, 1, 31, 26, 32, 7, 39, 17, 8, 23, 0, 28, 19, 10, 15, 29, 25, 36, 6, 4, 11, 35, 3, 37, 2, 13, 16]3112.0

[5, 14, 36, 31, 27, 3, 0, 25, 39, 12, 41, 2, 19, 24, 10, 37, 9, 11, 8, 7, 38, 6, 33, 16, 35, 13, 29, 21, 4, 26, 23, 34, 18, 1, 28, 32, 22, 40, 20, 30, 17, 15]3499.0

[26, 20, 5, 0, 33, 2, 21, 17, 13, 8, 9, 16, 24, 3, 1, 18, 11, 30, 23, 41, 37, 7, 19, 32, 25, 6, 22, 10, 35, 36, 38, 4, 15, 27, 31, 14, 40, 12, 28, 29, 39, 34]2967.0

[29, 37, 6, 33, 28, 38, 18, 20, 14, 8, 15, 9, 12, 2, 23, 25, 3, 0, 4, 1, 7, 36, 34, 22, 41, 39, 21, 30, 35, 5, 16, 11, 27, 40, 10, 19, 26, 31, 13, 32, 24, 17]3072.0

[21, 32, 2, 20, 26, 14, 39, 4, 6, 11, 1, 40, 9, 28, 41, 13, 27, 16, 31, 15, 36, 22, 29, 0, 18, 10, 5, 25, 3, 19, 34, 33, 23, 30, 38, 35, 17, 7, 37, 8, 24, 12]3397.0

[39, 14, 31, 15, 38, 37, 2, 22, 18, 28, 17, 40, 33, 29, 25, 19, 30, 5, 9, 26, 8, 16, 13, 24, 41, 36, 23, 6, 21, 0, 1, 7, 35, 3, 4, 20, 12, 27, 34, 32, 10, 11]2958.0

[32, 21, 18, 6, 13, 22, 11, 40, 8, 23, 5, 36, 3, 27, 14, 39, 2, 19, 35, 0, 17, 1, 9, 37, 34, 38, 33, 12, 30, 31, 26, 29, 7, 24, 28, 25, 15, 4, 16, 41, 10, 20]3276.0

[10, 18, 25, 34, 3, 15, 7, 17, 33, 39, 32, 20, 35, 9, 16, 5, 40, 24, 12, 8, 13, 14, 26, 11, 1, 30, 27, 31, 36, 37, 4, 41, 2, 22, 28, 23, 21, 0, 19, 6, 38, 29]3049.0

26 Cities:

[4, 24, 2, 10, 3, 12, 9, 0, 15, 8, 6, 23, 14, 17, 19, 7, 5, 16, 25, 1, 20, 18, 22, 13, 21, 11]2899.0

[2, 4, 24, 23, 8, 25, 5, 12, 1, 6, 9, 3, 14, 13, 21, 10, 20, 11, 16, 7, 17, 15, 18, 22, 0, 19]2667.0

[3, 19, 9, 0, 8, 2, 23, 12, 5, 18, 24, 15, 13, 4, 21, 10, 17, 7, 6, 25, 14, 1, 20, 16, 11, 22]3015.0

[14, 9, 2, 5, 10, 1, 23, 21, 7, 16, 8, 20, 6, 11, 12, 13, 22, 0, 18, 25, 17, 15, 3, 24, 19, 4]2709.0

[4, 0, 12, 14, 20, 1, 25, 15, 21, 22, 5, 23, 13, 6, 16, 17, 9, 2, 11, 8, 18, 24, 3, 19, 7, 10]2891.0

[3, 17, 20, 12, 24, 14, 22, 19, 8, 0, 2, 9, 6, 7, 4, 11, 18, 5, 16, 10, 23, 1, 15, 13, 25, 21]2765.0

[5, 12, 16, 14, 9, 25, 17, 15, 4, 1, 19, 7, 13, 8, 6, 11, 2, 18, 20, 3, 23, 24, 22, 10, 0, 21]2565.0

[13, 10, 5, 0, 11, 2, 9, 25, 1, 21, 15, 18, 4, 7, 14, 16, 20, 24, 17, 23, 8, 22, 19, 6, 12, 3]2694.0

[20, 10, 13, 12, 24, 8, 2, 18, 15, 22, 0, 11, 14, 7, 5, 1, 3, 19, 6, 25, 23, 9, 21, 4, 16, 17]2506.0

[16, 14, 24, 6, 1, 23, 17, 21, 11, 8, 9, 15, 20, 7, 18, 13, 22, 19, 3, 4, 25, 2, 5, 0, 12, 10]2684.0

17 Citie

[3, 5, 10, 15, 13, 9, 16, 2, 0, 6, 12, 4, 8, 1, 11, 14, 7]5143.0

[6, 2, 13, 16, 8, 11, 10, 4, 9, 3, 12, 5, 0, 1, 15, 14, 7]4180.0

[5, 4, 7, 9, 15, 1, 13, 10, 14, 2, 11, 6, 3, 8, 0, 16, 12]4755.0

[16, 15, 8, 10, 14, 0, 7, 13, 11, 4, 1, 2, 5, 6, 3, 12, 9]4077.0

[7, 0, 1, 8, 5, 16, 6, 10, 3, 13, 9, 4, 12, 11, 2, 15, 14]5137.0

[12, 3, 0, 8, 13, 7, 10, 14, 5, 9, 6, 15, 4, 16, 1, 11, 2]5069.0

[4, 16, 14, 15, 1, 6, 3, 0, 8, 7, 2, 13, 12, 11, 5, 10, 9]4440.0

[16, 10, 12, 9, 1, 14, 11, 15, 6, 7, 3, 5, 4, 8, 0, 13, 2]4155.0

[11, 14, 3, 16, 9, 1, 10, 12, 15, 4, 6, 2, 13, 7, 0, 8, 5]4551.0

[3, 11, 6, 10, 4, 16, 7, 8, 12, 2, 9, 0, 5, 15, 1, 14, 13]4537.0

15 Cities:

[0, 8, 1, 6, 5, 11, 2, 13, 10, 14, 7, 12, 4, 9, 3]637.0

[6, 13, 5, 11, 14, 9, 8, 4, 7, 3, 10, 1, 0, 2, 12]625.0

[6, 12, 10, 0, 4, 2, 13, 7, 5, 3, 1, 8, 11, 14, 9]574.0

[3, 1, 11, 2, 0, 7, 5, 8, 9, 10, 14, 6, 4, 13, 12]695.0

[8, 13, 12, 7, 11, 6, 9, 3, 4, 0, 14, 1, 5, 10, 2]702.0

[12, 5, 10, 2, 9, 7, 14, 11, 8, 4, 3, 1, 13, 0, 6]741.0

[3, 7, 11, 10, 4, 9, 8, 2, 5, 14, 1, 12, 6, 13, 0]688.0

[7, 11, 12, 14, 3, 2, 0, 9, 5, 6, 1, 4, 8, 10, 13]736.0

[7, 10, 8, 2, 14, 5, 3, 9, 1, 4, 13, 11, 6, 12, 0]609.0

[3, 1, 6, 7, 2, 14, 12, 4, 10, 13, 8, 9, 0, 5, 11]710.0

5 Cities:

[1, 0, 4, 2, 3]29.0

[4, 0, 2, 1, 3]27.0

[0, 2, 4, 3, 1]27.0

[3, 0, 1, 4, 2]21.0

[2, 0, 1, 3, 4]27.0

[1, 4, 3, 0, 2]19.0

[2, 1, 3, 4, 0]27.0

[3, 0, 2, 1, 4]19.0

[0, 4, 3, 1, 2]27.0

[4, 3, 1, 0, 2]27.0