Dalton Neely

Dr. Rader

CSCI 480

14 November 2017

Genetic Algorithm

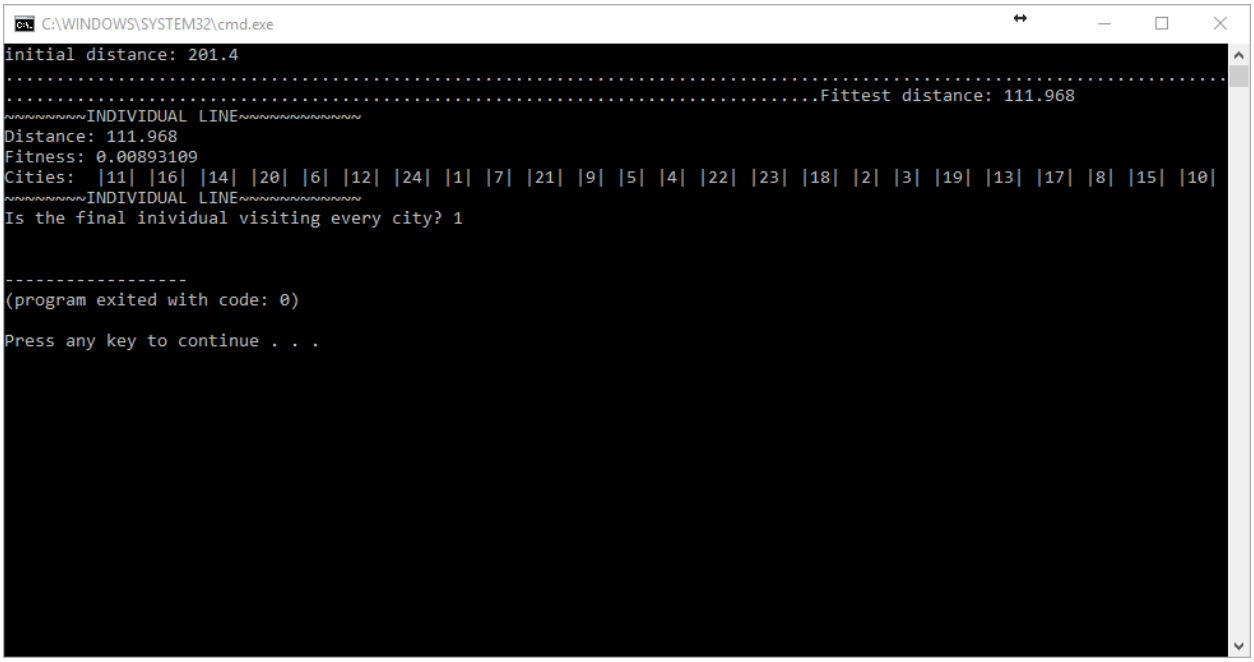
Crossover

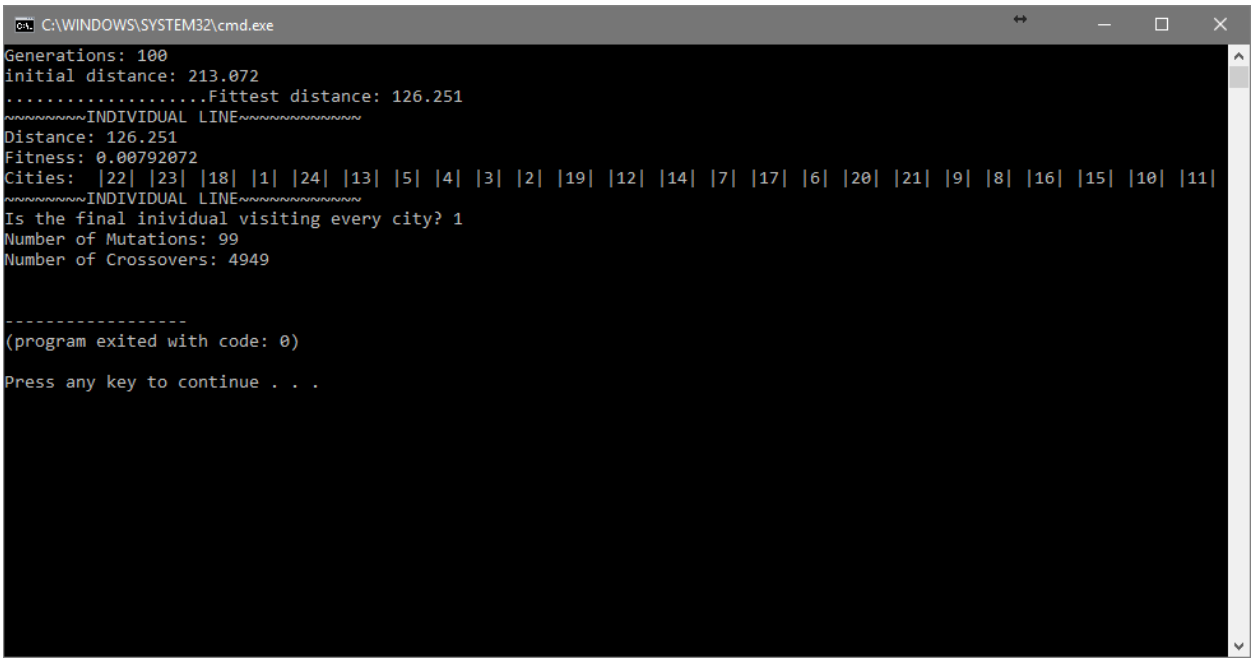
The crossover functionality was implemented with a start and end index of the chromosome of the individual. Meaning that, only a given portion of the chromosomes crossed over each other. The first parent's genes (cities) are added to the blank child chromosome from the start index to the end index. Then, the second parents' genes are transferred; however, if the current gene of parent two is already in the child's chromosome. Then, that gene in parent two is skipped, and continuation along the chromosome is resumed until all genes of the child are filled. Additionally, this makes it so no gene is repeated.

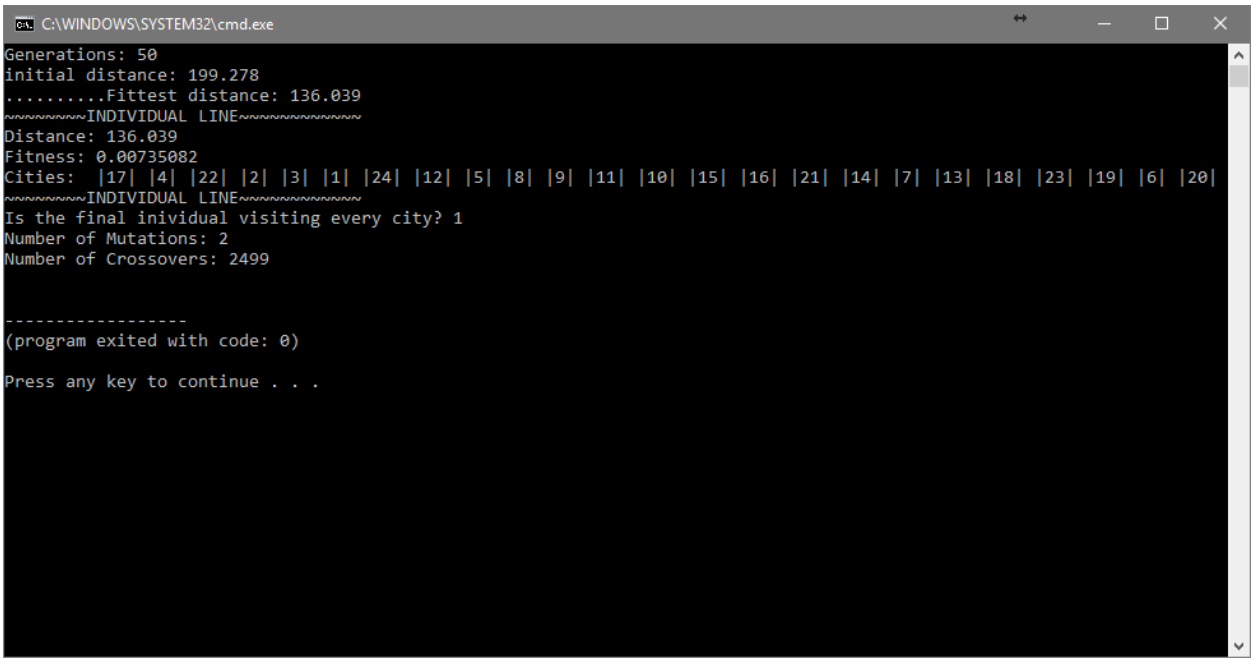
Mutation

The mutation functionality is implemented on individuals themselves. A for loop iterates through the length of the genes. Where, a conditional statement executes with a random number to determine if a mutation will happen. If the conditional statement evaluates to true; Then, the current gene is swapped with a gene that's index is picked at random.

Output


C:\WINDOWS\SYSTEM32\cmd.exe
initial distance: 201.4
.....Fittest distance: 111.968
~~~~~~~~~INDIVIDUAL LINE~~~~~~~~~~~~~
Distance: 111.968
Fitness: 0.00893109
Cities: |11| |16| |14| |20| |6| |12| |24| |1| |7| |21| |9| |5| |4| |22| |23| |18| |2| |3| |19| |13| |17| |8| |15| |10|
~~~~~~~~~INDIVIDUAL LINE~~~~~~~~~~~~~
Is the final inividual visiting every city? 1
(program exited with code: 0)
Press any key to continue . . .


C:\WINDOWS\SYSTEM32\cmd.exe
Generations: 100
initial distance: 213.072
.....Fittest distance: 126.251
~~~~~~~~~INDIVIDUAL LINE~~~~~~~~~~~~~
Distance: 126.251
Fitness: 0.00792072
Cities: |22| |23| |18| |1| |24| |13| |5| |4| |3| |2| |19| |12| |14| |7| |17| |6| |20| |21| |9| |8| |16| |15| |10| |11|
~~~~~~~~~INDIVIDUAL LINE~~~~~~~~~~~~~
Is the final inividual visiting every city? 1
Number of Mutations: 99
Number of Crossovers: 4949
(program exited with code: 0)
Press any key to continue . . .


C:\WINDOWS\SYSTEM32\cmd.exe
Generations: 50
initial distance: 199.278
.........Fittest distance: 136.039
~~~~~~~~~~INDIVIDUAL LINE~~~~~~~~~~~~~~
Distance: 136.039
Fitness: 0.00735082
Cities: |17| |4| |22| |2| |3| |1| |24| |12| |5| |8| |9| |11| |10| |15| |16| |21| |14| |7| |13| |18| |23| |19| |6| |20|
~~~~~~~~~~INDIVIDUAL LINE~~~~~~~~~~~~~~
Is the final inividual visiting every city? 1
Number of Mutations: 2
Number of Crossovers: 2499
(program exited with code: 0)
Press any key to continue . . .