CS 5724 Evolutionary Computation 2012

Homework #1

Write a genetic algorithm to approximately solve the Euclidian Traveling salesman Problem. The program needs to find the shortest closed path that goes through all points exactly once. The program can be written in any language of your choice.

Run your program on the following sets of 50 points:
TSP1.txt TSP2.txt TSP3.txt

Use any representation, variation operators, selection mechanism you choose.

For the class on Sep 11, be ready to report the shortest path your program found for each of these problems and the number of evaluations (path length calculations) you required to arrive at that length.

For the class on Sep 18, run the algorithm to find

1. The shortest path (the salesman wants to complete the travel quickly)
2. The longest path (the salesman likes to be on the road)
3. The path that has the least horizontal travel (the salesman hates jetlag)[1]
4. The path that passes the most near point 0.25;0.25 (close to home)[2]

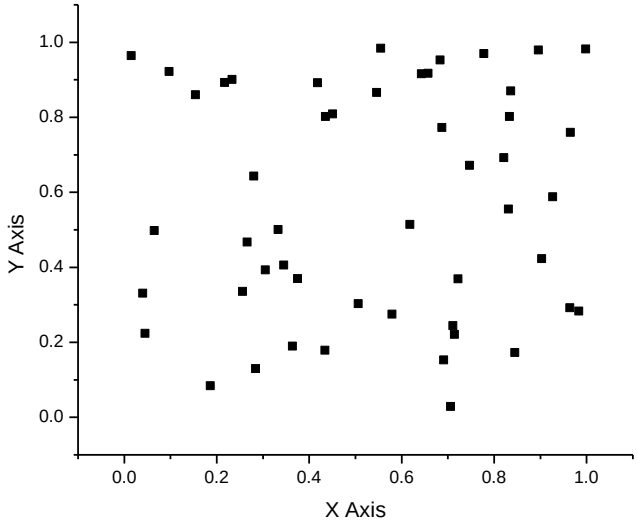
Compare performance on at least two selection mechanisms and variation operators.

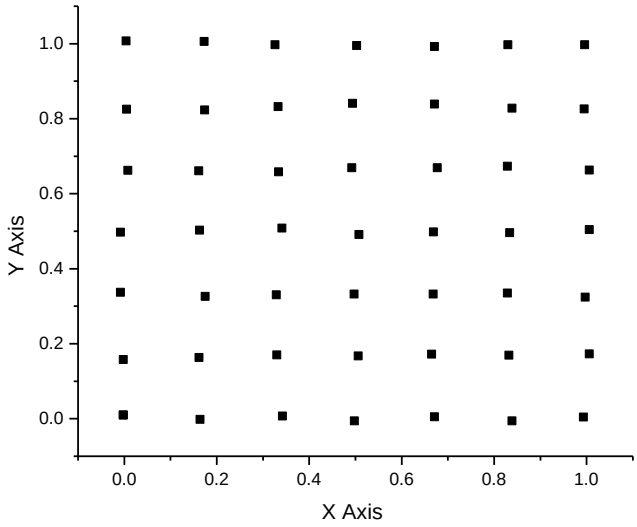
On Sep 18 Hand in a brief PDF report that summarizes:

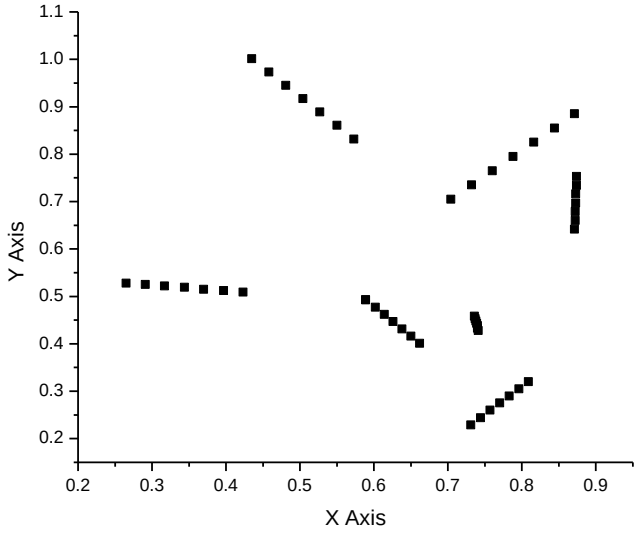
1. A description of the representation, variation operators and selection process you used for your implementation
2. Performance curves (fitness vs. evaluations) that summarize your runs, and plots of the best paths found, one page for each of the three test problems

Include (in an appendix) a printout of your code (only the parts you wrote), in Courier 9pt single space) with functions highlighted in bold and underline.

[1] This might require you to somehow combine multiple objectives
[2] What would be an appropriate fitness function?


Y Axis
X Axis
0.0
0.2
0.4
0.6
0.8
1.0


Y Axis
X Axis
0.0
0.2
0.4
0.6
0.8
1.0


Y Axis
X Axis
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1