YONSEI UNIVERSITY

CSI3108-01 2016. 11. 09

Programming HW#5&6

Max 60 points
Due on Nov. 25(Fri) by 5pm

For the Symmetric Traveling Salesman Problem, write a Java program for each of the following algorithms:

1. Dynamic programming algorithm in Chapter 6 (20pts)
2. Backtracking algorithm (10pts)
3. Branch-and-Bound algorithm using the Best-First-Search with the following lower bound computation method
   minimum spanning tree cost + the weights of the two lightest edges connecting some nodes in the set of nodes visited so far + weight of the partial solution (as in the textbook) (10pts)
4. Genetic algorithm with P_c=1.0, P_m=1/the input size, and the binary tournament selection; choose one crossover operation from those discussed in class. (10pts)
5. Simulated Annealing algorithm; the cooling rate=0.9, use a neighboring structure discussed in class and the cooling schedule and k_T should be determined through experiments. (10pts)

You should report the comparisons for the execution results of the above algorithms along with proper analysis.

Sample input

There are 8 input files (13tsp.log, 16tsp.log, 38tsp.log, 51tsp.log, 70tsp.log, 131tsp.log, 2924tsp.log, and 10639tsp.log). For each input, the first line has the number of nodes. From the second line, three non-negative integers, node ID, x- and y-coordinates of the node are given in each line. The x- and y- coordinates of a node must be of **type** double. The start node is always set to node 1.

The following shows a portion of an input file;

```
131        // number of nodes
1 0 13     //node ID, x-coord, y-coord
2 0 26
3 0 27
(omitted)
…
131 107 27
```

Sample output

The output for each test case consists of two lines;

In the first line print the nodes of the minimum distance tour with a space between two nodes.
In the second line print the total distance of the tour.

```
1 12 (omitted)… 6 1
564
```