ICS 340 Programming Project, Deliverable D

Specification:

Start with your Java program "prog340", ideally it should be working for Deliverable A, B, and C.

Enhance this program to find the shortest bitonic tour of the cities.

A bitonic tour of cities traditionally starts at the westernmost city, goes strictly east to the easternmost city (passing through zero or more intermediate cities on the way) and returns to the westernmost city, picking up any cities not visited on the way out, going strictly east to west. Of course, a bitonic tour could also start at the southernmost, easternmost, or northernmost city.

The "val" field lists a floating point number that indicates either the latitude or longitude of the city. Start at the city with the highest number, go by decreasing numbers to the city with the lowest number, and then go back by increasing numbers through all unvisited cities to the city with the highest number. (This will turn out to be going from west→east→west or north→south→north, depending on the file.)

Output the distance of the shortest bitonic tour, and the order of cities in the tour. Note that most of the points will be for outputting the correct distance, and fewer points will be for the harder problem of listing the cities. Note that in each case there are two shortest tours, and they are the mirror images of each other. Either is worth full credit.

As will always be the case in this class, the program must be written in Java and must run on the University Windows computer systems.

Submit the package to the open Deliverable D submission folder.

Algorithm:

The algorithm for the bitonic tour is well known. I have uploaded two files that describe the algorithm. They are the PDFs "bitonic_tsp" and "BitonicTour Paper". You may use either one of them as the basis for your building of the algorithm.

Output:

Please see the test files and corresponding output files in D2L under Deliverable D/Test Files.

Submit:

Submit your code as an Eclipse package, or submit all the ".java" source files in a zipped archive. Do not include test files.

Grading:

This deliverable is worth 65 points: Correctness will be assessed for 5 files, including both of the test files provided. You will get 10 points for each correct test file (7 points will be given for getting the optimal distance and 3 points will be given for printing the tour correctly) and 5 points each for regression testing of Deliverable A, B, and C.

Due Dates:

The program is due on Saturday, April 2nd at noon for full credit in the D2L "Deliverable D" dropbox. For a 10-point deduction, you may (re)submit it by noon Saturday, April 9th. The time of submission is the time that D2L lists the file as submitted.