Programming Assignment #1 Skyline Report

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1.Summary

The purpose of this programming assignment is to find the skyline of a data and maintain or update the skyline when insertion and deletion operation occur. Our group uses Java and R-tree implementation provided by https://github.com/davidmoten/rtree to finish this assignment.

2.How to run

We build a new directory under the "test" directory.Our code mainly lies in the relative path in the project "rtree-master/src/test/java/com/github/davidmoten/SkyLine/skyLine.java". If you want to run my code, just run the skyLine.java.

File input is in the getData() function. We just need to modify the variable path to adjust different test files.

3.Main function

a. Insertion()
   This function mainly processes the insertion operation. It first checks whether the point inserted is dominated by current Skyline points. If yes, current Skyline needs no modification. If no, we will then check whether it dominates some skyline point. If no, we just need to add it to the Skyline points and update the Skyline. Otherwise, we need to remove points in current Skyline points which are dominated by the new point and then add the new point to the Skyline points and finally update Skyline.

b. Deletion()
   This function mainly processes the deletion operation. It checks whether the point is a Skyline point first. If no, we need no modification on Skyline. If yes, we will find the new Skyline point in the dominated area of this point and add the new Skyline point to Skyline points and update the Skyline.

c. findSkyLine()
   The function mainly processes the find skyline operation. It uses a PriorityQueue to store and sort the MBRs. Use the DFS algorithm to find the skyline points using the isSkylinePt() method. During the process, we need a prune() and isDominated() methods to prune those points dominated by others.

d. visualize()
   We use the "Graphics2D" class to build a 2-D graph to show the points and skyline. In the end, we use the "image" package to make the png image of the visualization.

4.Result

This is part of the image of the visualized result.