In this assignment your goal is to profile two different solutions for the Game task of IOI 2013.

The task description can be found at the bottom of the Tasks page of IOI 2013 in English, in Turkish, and also in many other languages:

http://www.ioi2013.org/competition/tasks/

The problem is a classical orthogonal range query problem which includes lots of updates to the set of points and queries in between these updates. The expected solution uses range-trees with efficient rebalancing of the trees after the update operations.

In this assignment, you are going to implement two solutions for this problem: 1) a basic kd-tree solution and 2) a range-tree solution. Both of the solutions should support updates, i.e., insert/delete, on the trees; however, without re-balancing. In other words, your job is easy. Just implement the basic algorithms given in the book with simple insert/delete operations with no re-balancing of the trees. You do not need to worry about the time and memory limits specified in the task description.

After implementing kd-tree and range tree solutions, report the performance of both solutions on the input dataset provided below:


You should report the memory and time required for each individual test dataset for both of your implementations.

Provide a short, one-paragraph analysis of your results.

Submit your report along with the source codes of your range-tree and kd-tree solutions via ODTU-CLASS before the deadline.

Notes: You are free to use any resource including source codes you find on the internet provided that you cite them properly in your report.

Late submission policy: Late submission is allowed with 20 points penalty per day.