QUESTION 1 (10 points). Suppose $T$ is a pointer to the root of a PR-quadtree. Assume that all nodes have REG,NW,SW,NE,SE fields respectively denoting the implicit region represented by the node, and the four directional pointers. Given $T$ and a point $(x,y)$ as input, you must write an algorithm that prints out the $k$ points stored in the tree that are as far away from point $(x,y)$ as possible. You may assume that the distance between two points $(x_1, y_1), (x_2, y_2)$ is given by $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$. The order in which the answers are printed is significant - the most distant point from $(x,y)$ is printed out first, the second most distant point from $(x,y)$ is printed out next, and so on. If multiple values are at the same distance from $(x,y)$ those values can be printed out in any relative order.

QUESTION 2 (10 points). Suppose you are given a pointer $T$ to the root of an $R$-tree. Suppose each node in the $R$-tree can contain at most $c$ rectangles in it. You are also given as input, a query rectangle $Q$. Write, in pseudo code, an algorithm that finds all rectangles in the $R$-tree that do not intersect $Q$. You may assume the existence of some function $\text{checkint}$ that takes two rectangles as input and returns true if they intersect and false otherwise.