Convex Hull Incremental Algorithm

MATH 261 Computational Geometry

Input: a set S of n points in the plane, specified by xy-coordinates

Output: a list L of vertices of $\text{conv}(S)$ in counterclockwise order

Algorithm:

1. Sort the points in S by their x-coordinates. Let the resulting list be denoted $p_1, p_2, p_3, \ldots, p_n$.

2. Consider the first three points p_1, p_2, p_3. Let H_3 be a list containing these points in counterclockwise order.

3. For k from 4 to n:

   Consider H_{k-1} together with p_k. Remove interior points, and insert p_k into the list to form a new list H_k. Then H_k is the convex hull of the first k points, in counterclockwise order.

   How would you program a computer to do this?

4. Let $L = H_n$.