

Algorithmn HW12

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Problem 18.12

There must exists

- 1) the first vertex p_i s.t. $p_{i-1} \rightarrow p_i \rightarrow p$ is left-rotated and $p_i \rightarrow p_{i+1} \rightarrow p$ is right-rotated
 - 2) the first vertex p_j s.t. $p_{j-1} \rightarrow p_j \rightarrow p$ is right-rotated and $p_j \rightarrow p_{j+1} \rightarrow p$ is left-rotated
- which can be found in $O(\log n)$ time using bisection method, then just put p in between p_i and p_j .

Problem 18.17

set two points P_0 and P_1 as base line, then pick another point P_k , compute $\angle P_1 P_0 P_k$. Order all P_k other than P_0 and P_1 by this angle. Then the simple polygon constructed is $P(P_0 P_1 P_{k_1} \dots P_{k_{n-2}})$

Problem 18.17

Problem 18.12 shows that union convex hull can be computed in $O(\log n)$ time.

And we need $O(n)$ time of insertion for each vertex.

So the total time will be $\sum_{k=1}^n (k + \log k) \leq n^2 = O(n^2)$.