
Closest-Pair(P)

Construct P_x and P_y ($O(n \log n)$ time)

$(p_0^*, p_1^*) = \text{Closest-Pair-Rec}(P_x, P_y)$

Closest-Pair-Rec(P_x, P_y)

If $|P| \leq 3$ then

find closest pair by measuring all pairwise distances

Endif

Construct Q_x, Q_y, R_x, R_y ($O(n)$ time)

$(q_0^*, q_1^*) = \text{Closest-Pair-Rec}(Q_x, Q_y)$

$(r_0^*, r_1^*) = \text{Closest-Pair-Rec}(R_x, R_y)$

$\delta = \min(d(q_0^*, q_1^*), d(r_0^*, r_1^*))$

$x^* =$ maximum x -coordinate of a point in set Q

$L = \{(x, y) : x = x^*\}$

$S =$ points in P within distance δ of L .

Construct S_y ($O(n)$ time)

For each point $s \in S_y$, compute distance from s

to each of next 15 points in S_y

Let s, s' be pair achieving minimum of these distances

($O(n)$ time)

If $d(s, s') < \delta$ then

Return (s, s')

Else if $d(q_0^*, q_1^*) < d(r_0^*, r_1^*)$ then

Return (q_0^*, q_1^*)

Else

Return (r_0^*, r_1^*)

Endif
