Lec 9/7

Thursday, September 7, 2017 12:43

Closest-pair-between-two-sets

input: $A[i, \ldots, j]$, ptr, δ

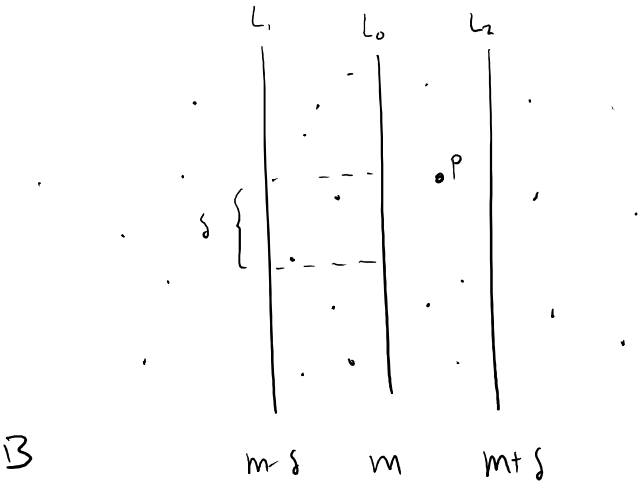
output: closest pair btwn $A[i, \ldots, m]$, $A[m+1, \ldots, j]$

Want complexity $O(j-i)$

go thru ptr (sorted by y vals) and then

check every point p within δ of dividing line

for distance w/ points in δ-box (half-open) in other set below p



this number of points is at most 3.

So this takes $\Theta(1)$ time

These are among the 3 most recently visited points in ptr between L_1 and L_0

So closest-pair is $\Theta(n \log n)$

Can't sort it all by y in beginning bc we need to only consider some points in cpb2s.

Convex hull of points

$CH(A)$ is smallest convex polygon that encloses all points of A.

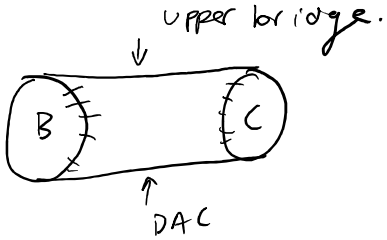
observation:

$\overline{P_1P_2}$ is in $CH(A)$ if all other points in A are on the same side of $\overleftrightarrow{P_1P_2}$

DAC:

Split points into $A = B \cup C$ by x-coordinate.

again do y-sorting inside algorithm



Not just top & bottom 2 points.

move CCW in $CH(B)$, CW in $CH(C)$

Finally upper bridge is linear (n)

Lower

So algorithm is $O(n \log n)$ by Master theorem.

What data structure to use for convex hull?

circular doubly linked list

What if remove assumption of noncollinearity.