

Point Location

Slab Method

- Preprocessing Time

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Coherence

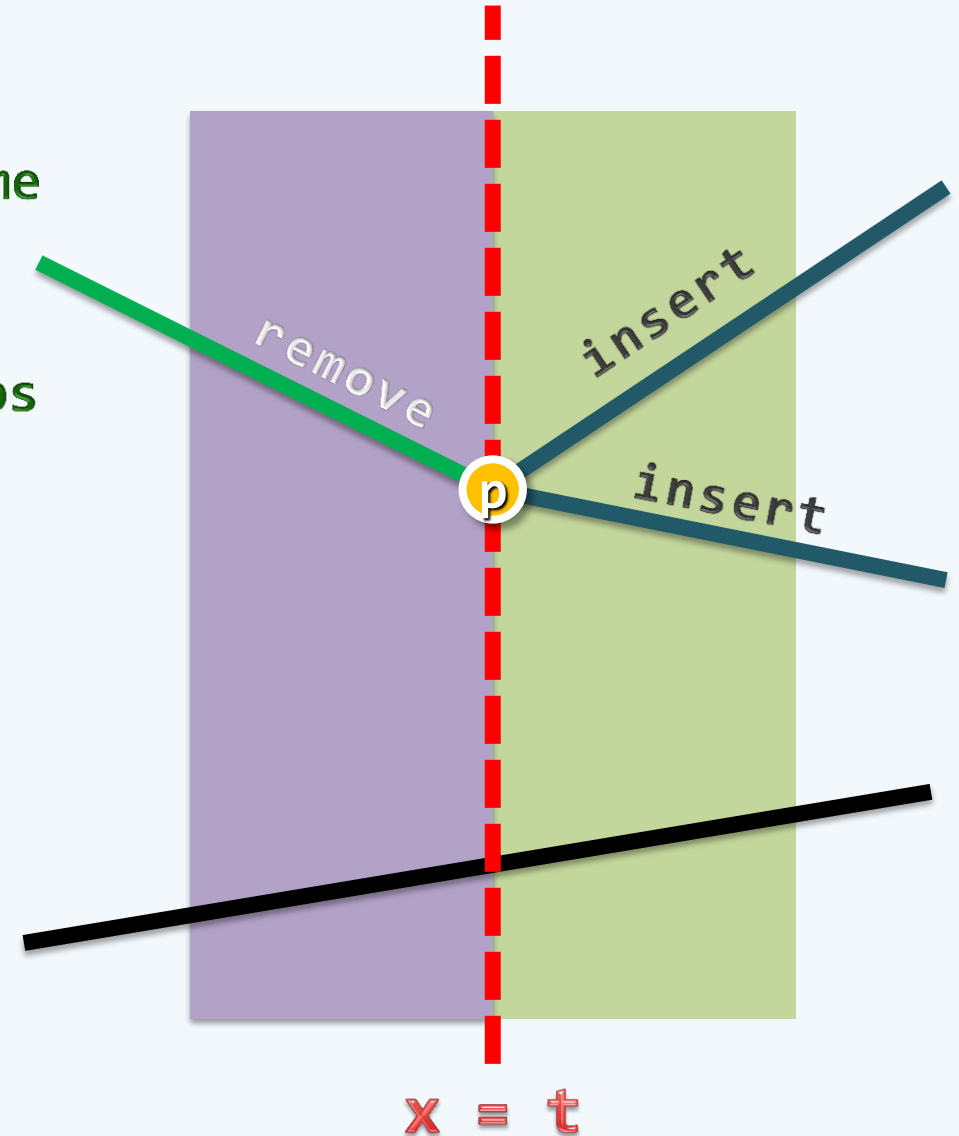
❖ Claim: The slab-decomposition structure
can be constructed in $O(n \log n)$ time

❖ Note that
coherence exists between adjacent slabs

❖ So the slab-decomposition can be done
in a **plane-sweep** manner

❖ Suppose we

- sort all the $2n$ endpoints
by x -coordinates before
- sweeping a vertical line
from left to right ...



Plane Sweep

❖ While we move from a slab to its right neighbor,

- segments with **right** endpoints on boundary are **removed** and
- those with **left** endpoints are **inserted**

❖ Thus by using a BBST,

we need $O(n)$ updates

to construct all the $n + 1$ slabs

❖ More precisely

- there are $2n$ node insertions/removals,
- each of which costs $O(\log n)$ time

