

Geometric Intersection

B0 Algorithm: Analysis

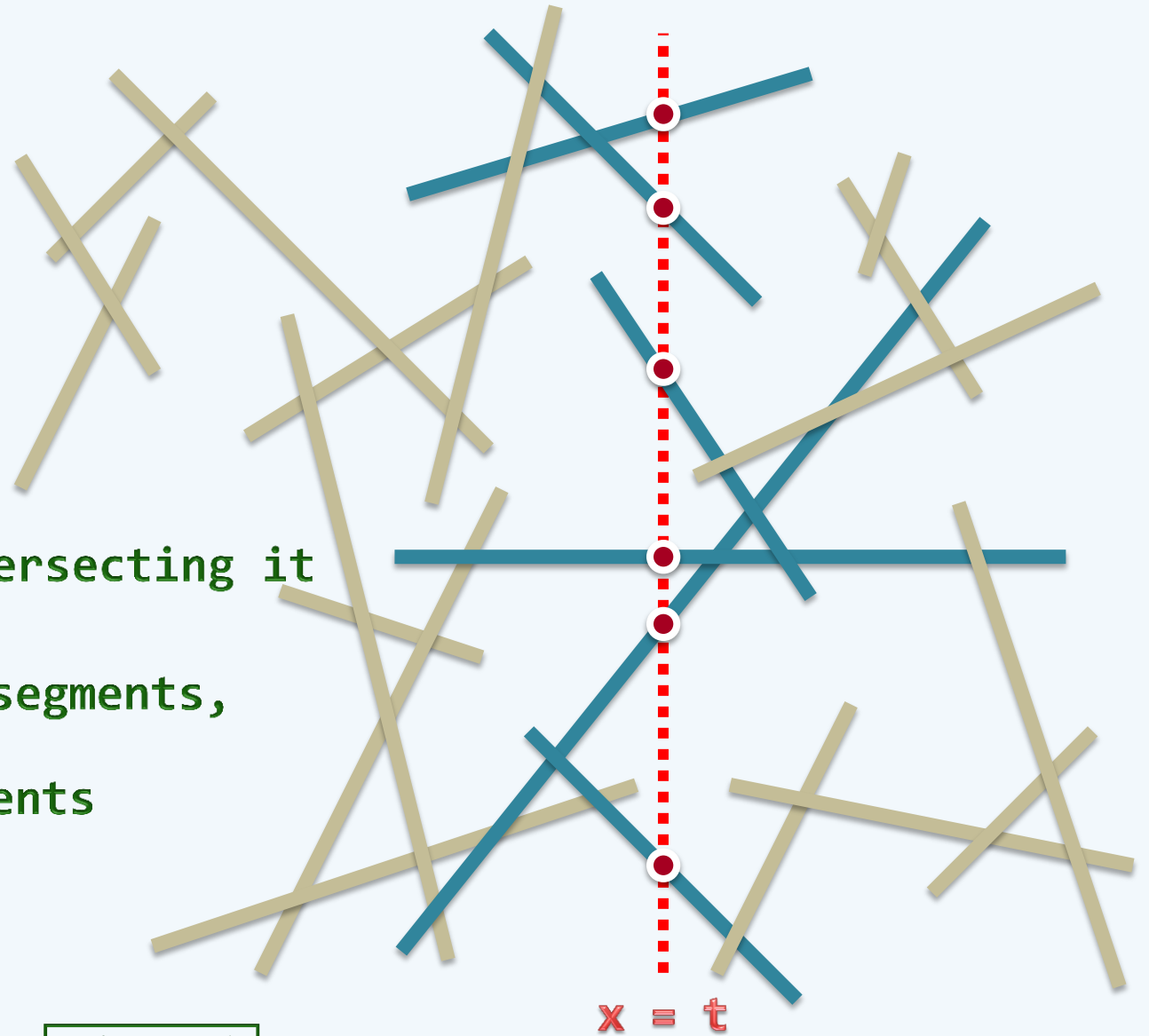
- Complexity of Status Structure

Junhui DENG

deng@tsinghua.edu.cn

Maximum Size of \mathcal{L}

- ❖ Also as we have seen,
 \mathcal{L} will sweep over the plane
from left to right
- ❖ At any moment/location,
 \mathcal{L} consists of the segments intersecting it
- ❖ Since there are altogether n segments,
there would be at most n segments
intersecting \mathcal{L} at any time
- ❖ Hence each operation on \mathcal{L} costs $\mathcal{O}(\log n)$ time



Conclusion

- ❖ The plane-sweep algorithm processes $2n + I$ events, each of which costs a constant number of operations to either \mathcal{L} or \mathcal{E}
- ❖ [Bentley & Ottmann, 1979]
All the I intersections among n segments in the plane can be reported by plane-sweeping
 - in $\mathcal{O}((2n + I) * \log n) = \mathcal{O}((n + I) * \log n)$ time
 - using $\mathcal{O}(n + I)$ space
- ❖ Can you give an example of $\mathcal{O}(n + I)$ space?
- ❖ But, what if $I \sim n^2 \gg n$?

