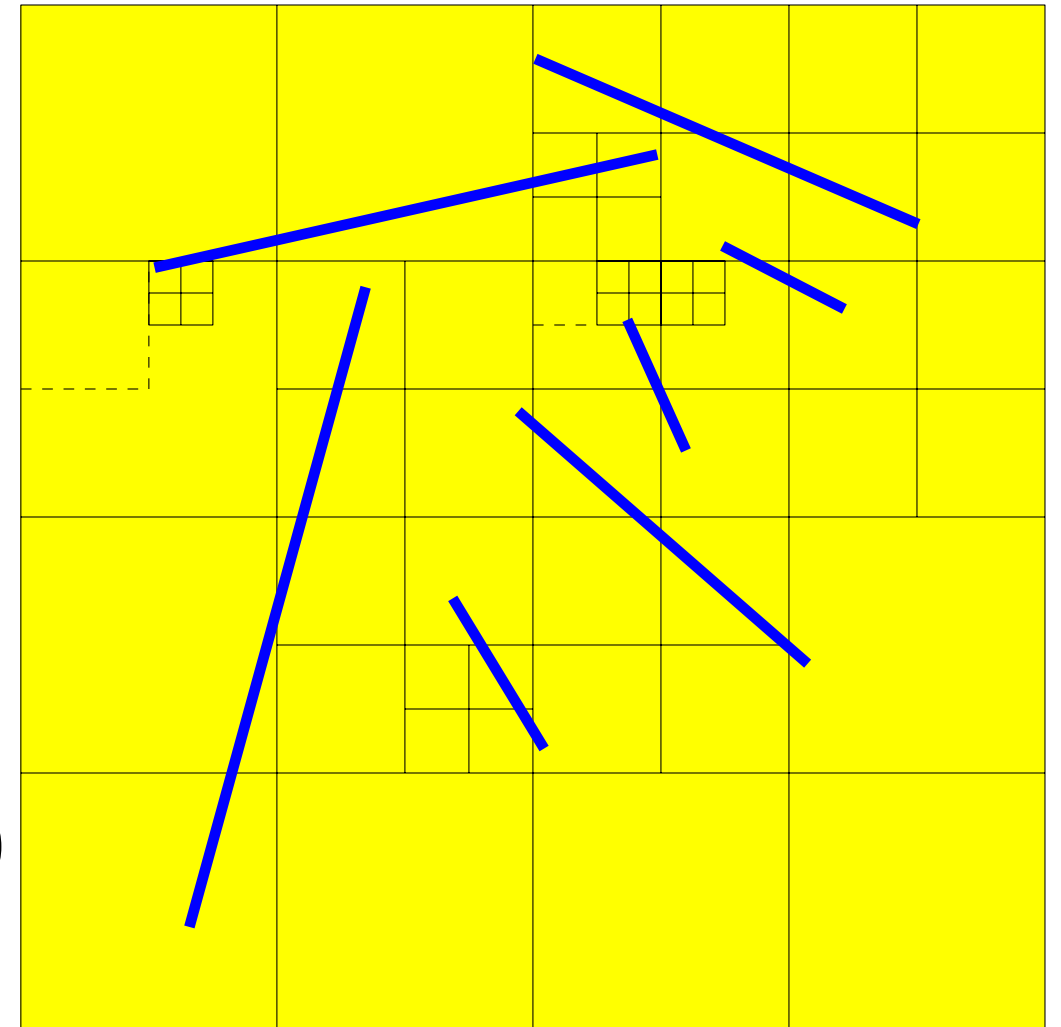


How to get that quadtree in Z-order (for line segments in unit square)

Input: file with for each line segment its endpoints.

Algorithm:

1. Sort bounding box vertices of line segments into list $L = \{L_1, \dots, L_m\}$ in Z-order
2. For $i \leftarrow 1$ to m :
 - find smallest cell Q that contains L_i and L_{i+1} ;
 - output cell boundaries of Q and its subquadrants
3. Sort cell boundaries in Z-order (removing duplicates)
4. Put line segments in cells



To prove for input of n line segments: (compressed)

- together cell boundaries form ^{quadtree subdivision of unit square;}
- $O(1)$ line segments per cell;
- $O(n)$ cells in total;
- algorithm runs in $O(\text{sort}(n))$ I/O's