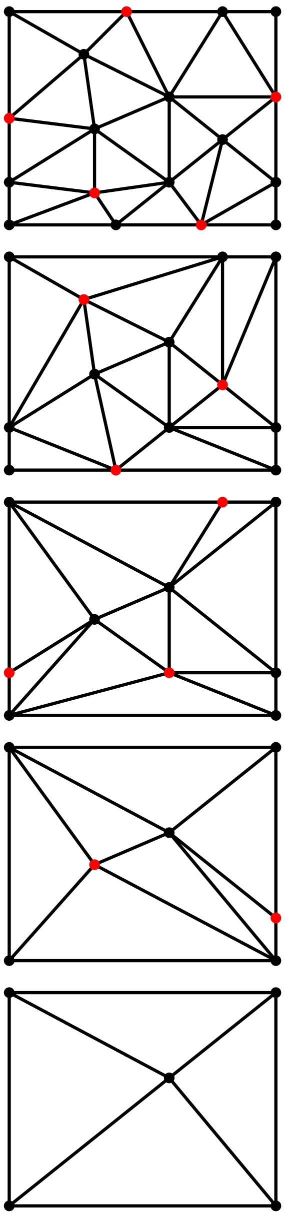
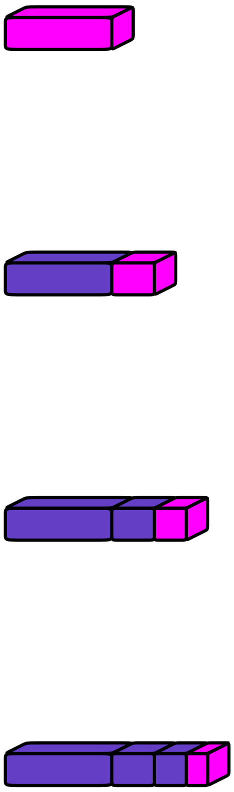
Good Orders for Incremental (Re)construction

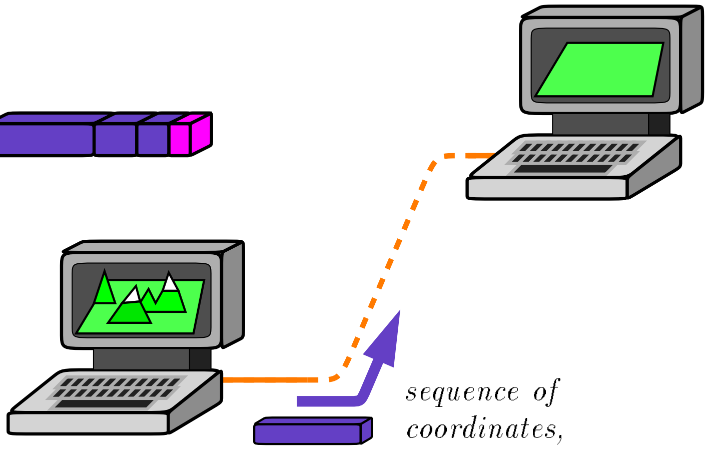
Jack Snoeyink & Marc van Kreveld

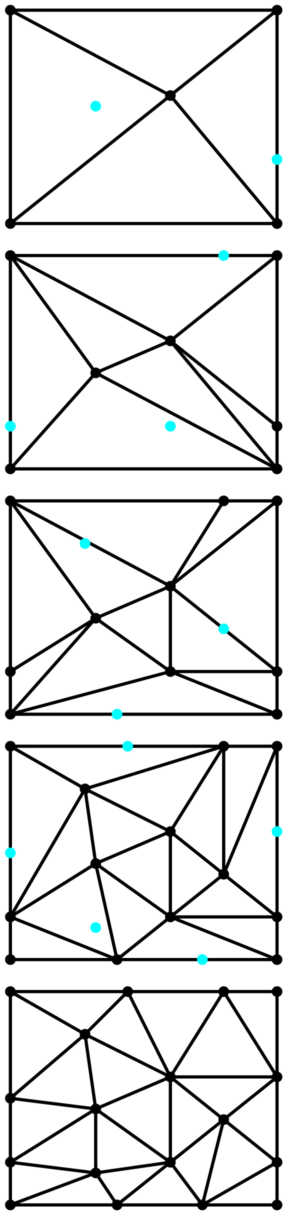




Determine order for Delaunay Triangulation:

1. Find large maximal independent set of vertices.
2. Sort these vertices using canonical traversal. Delete them and restore Delaunay triangulation.
3. Insert end-of-phase marker.
4. Repeat until only the four corners remain.





Reconstruction from order:

1. Locate points of one phase in the current triangles using canonical traversal.
2. Insert them incrementally by flipping.
3. Repeat until last phase is completed.

- $O(n)$ time destruction and reconstruction of the Delaunay triangulation.
- Allows compression for storage and transmission by discarding edges and triangles.
- Reconstruction can start when the first vertices arrive.
- Also works for trapezoidal decomposition, Voronoi diagrams, and 3D convex hulls.