Parallel DCEL Construction Report

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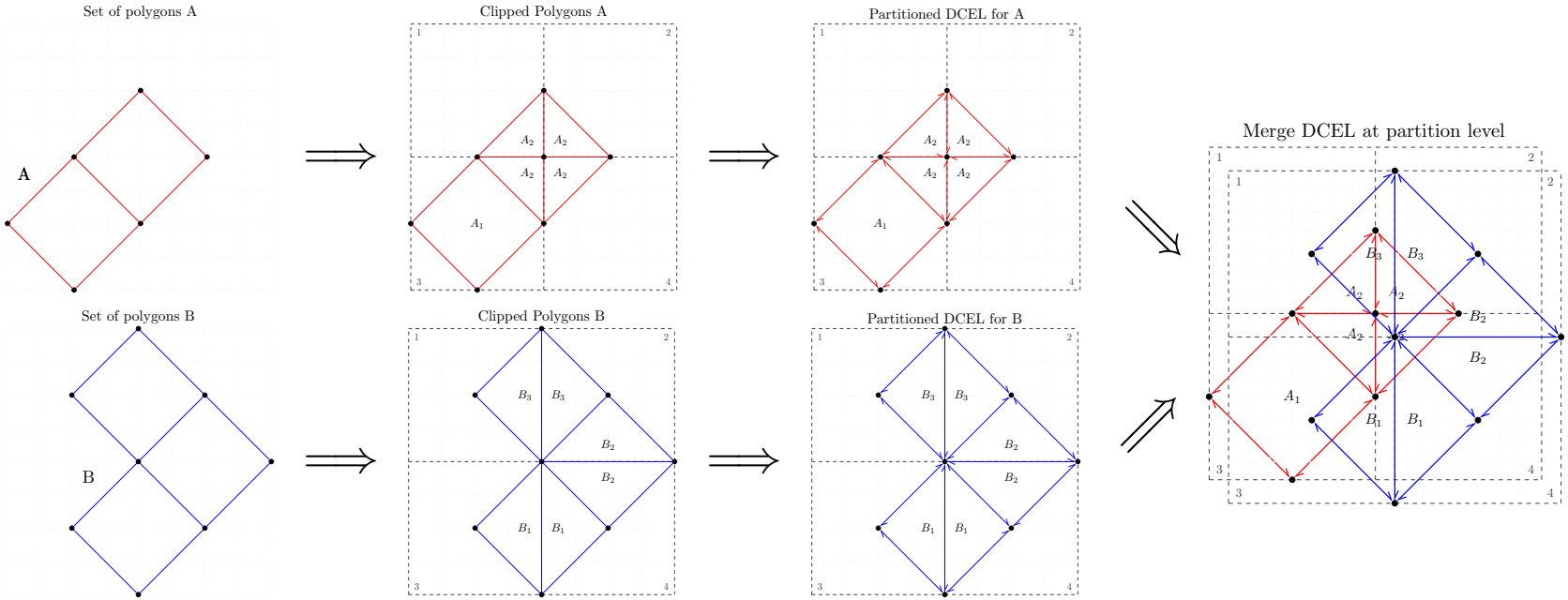
Sweep-line algorithm

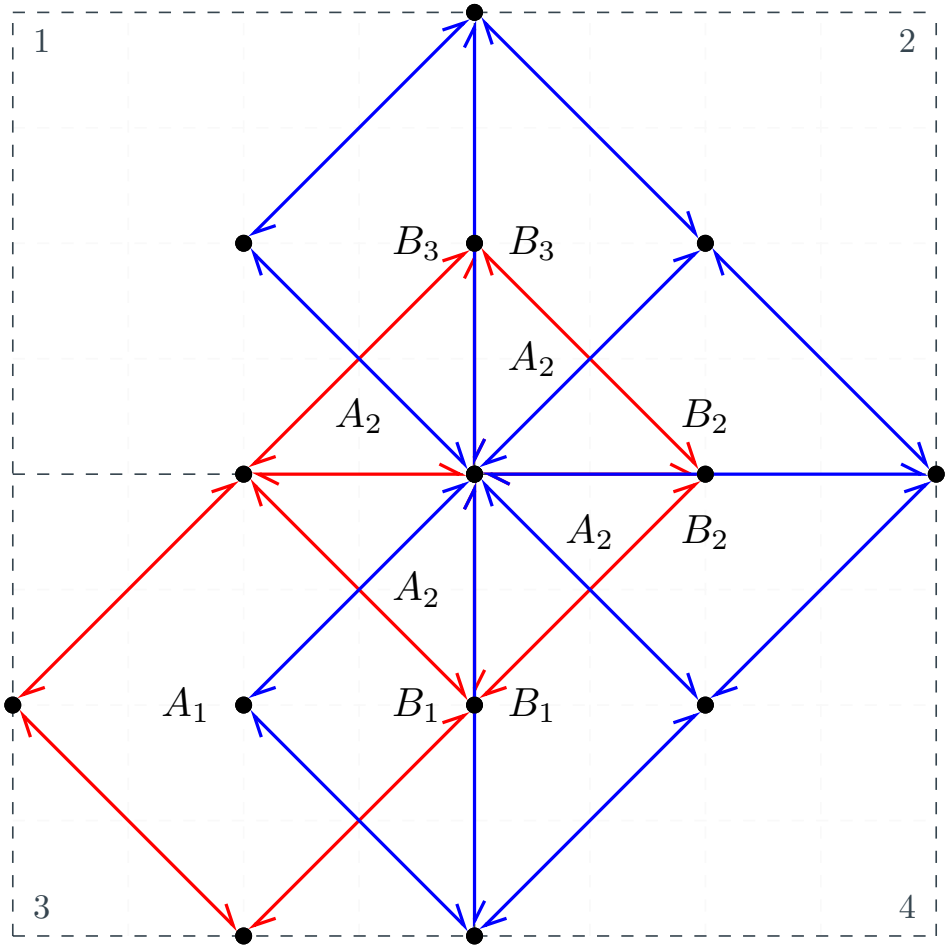
- Using an available implementation from JTS Plus library:
  - SimpleMCSweepLineIntersector[1]: Finds all intersections in one or two sets of edges, using an x-axis sweepline algorithm in conjunction with Monotone Chains. While still $O(n^2)$ in the worst case, this algorithm drastically improves the average-case time. The use of MonotoneChains as the items in the index seems to offer an improvement in performance over a sweep-line alone.

[1] Available at: `https://tinyurl.com/y3z37a4c`

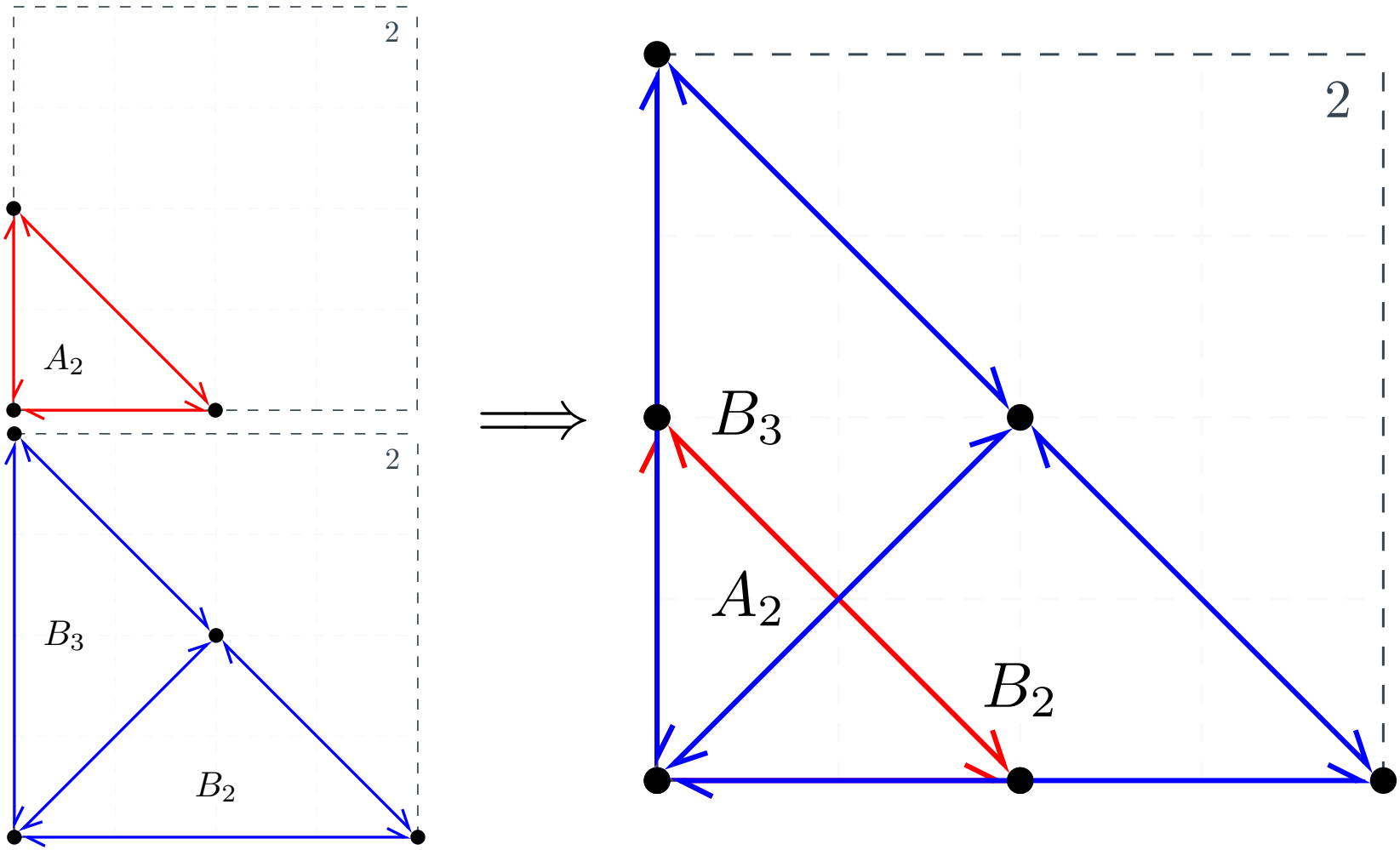
DCEL merger


Set of polygons A
A
Clipped Polygons A
Partitioned DCEL for A
Set of polygons B
B
Clipped Polygons B
Partitioned DCEL for B
Merge DCEL at partition level

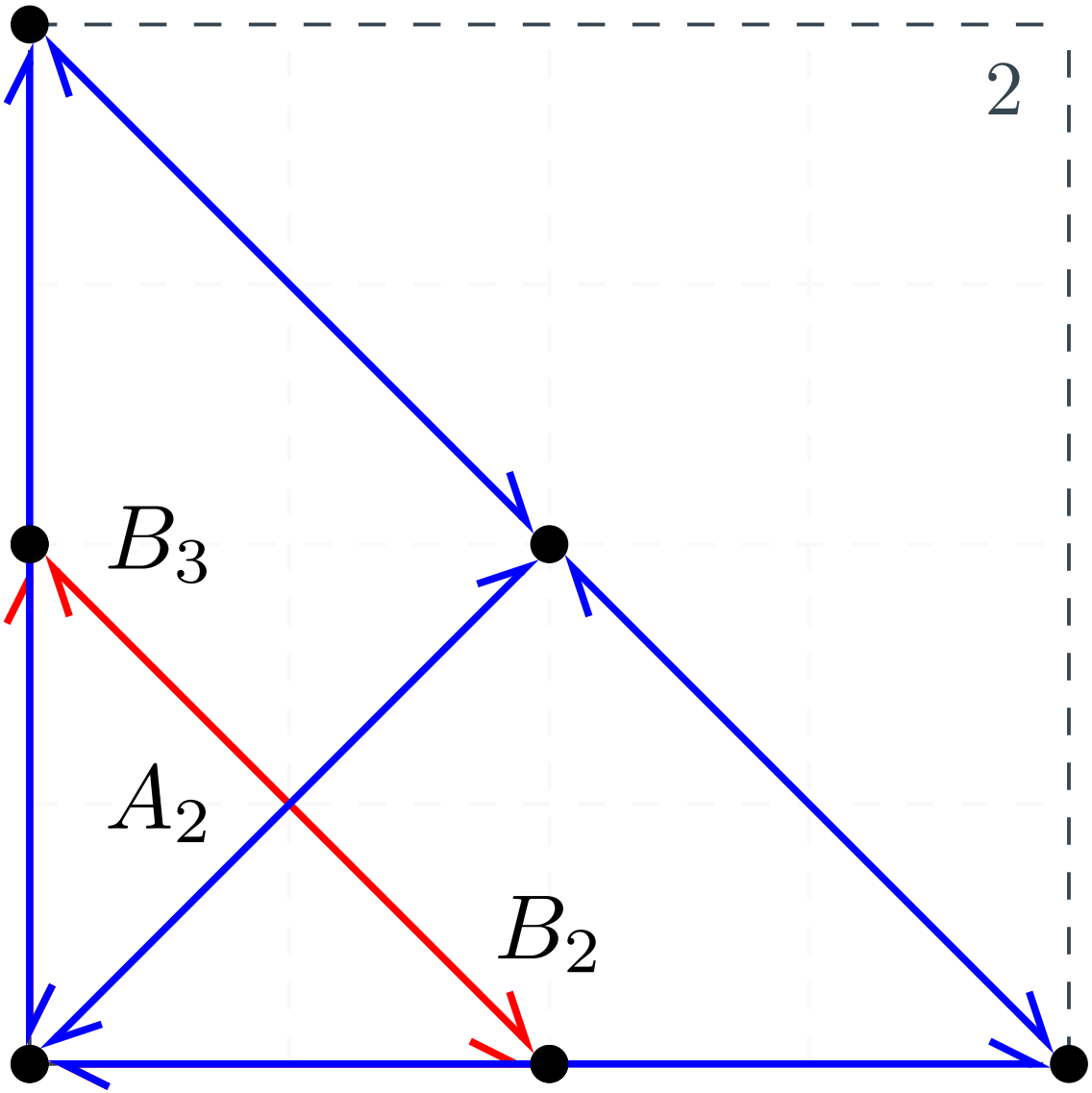
DCEL merger



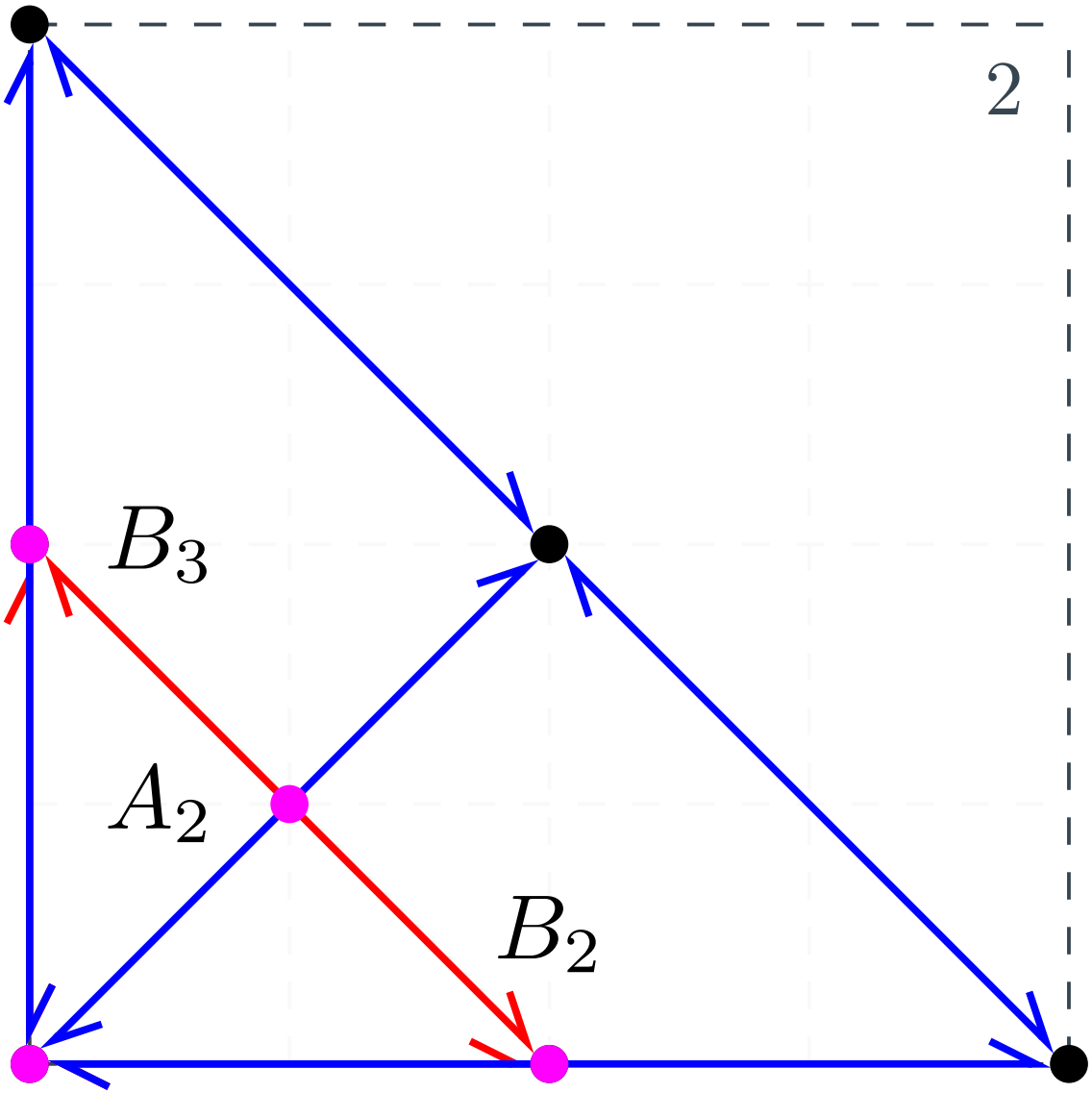
Focus on partition 2



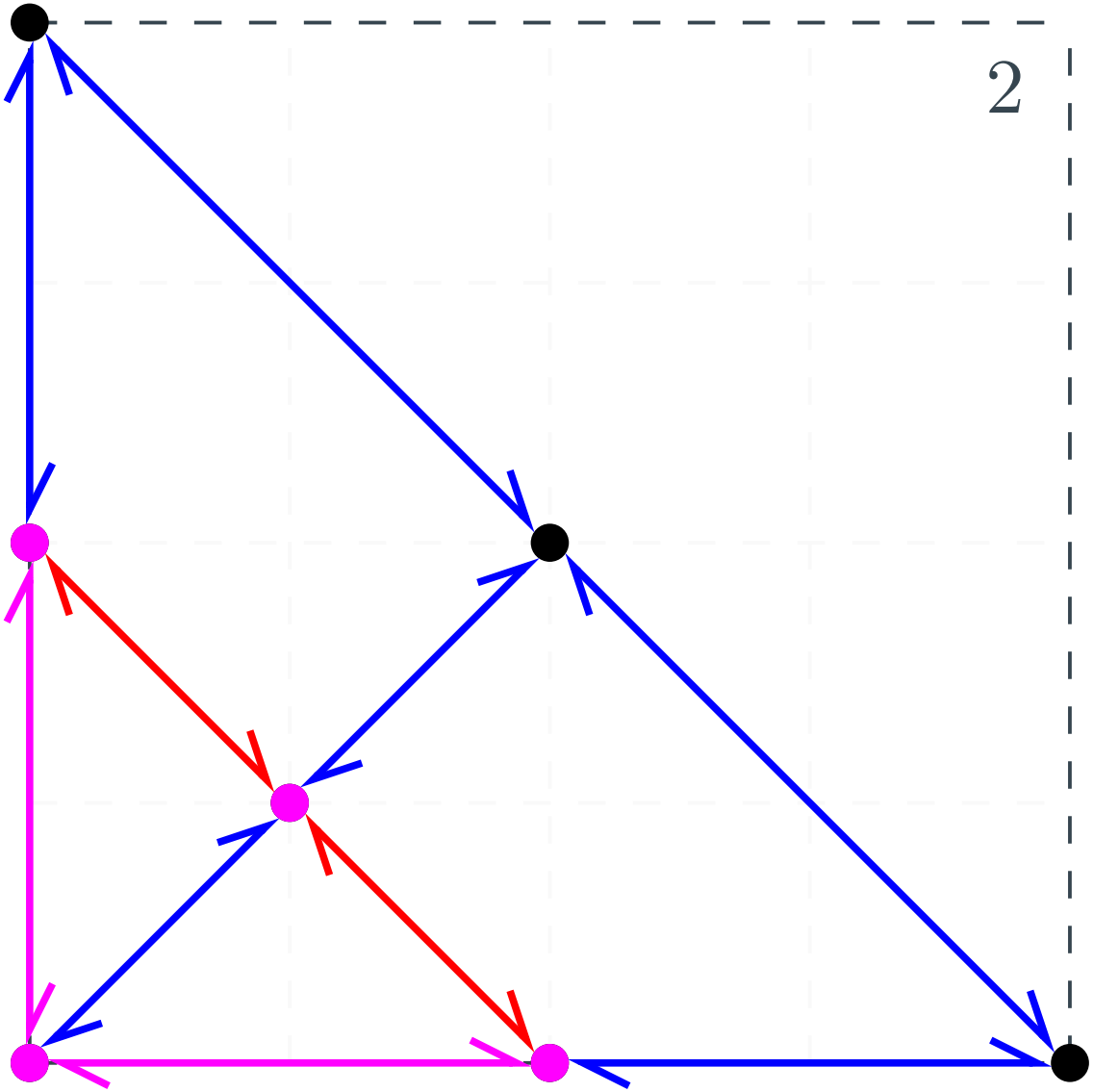
Focus on partition 2



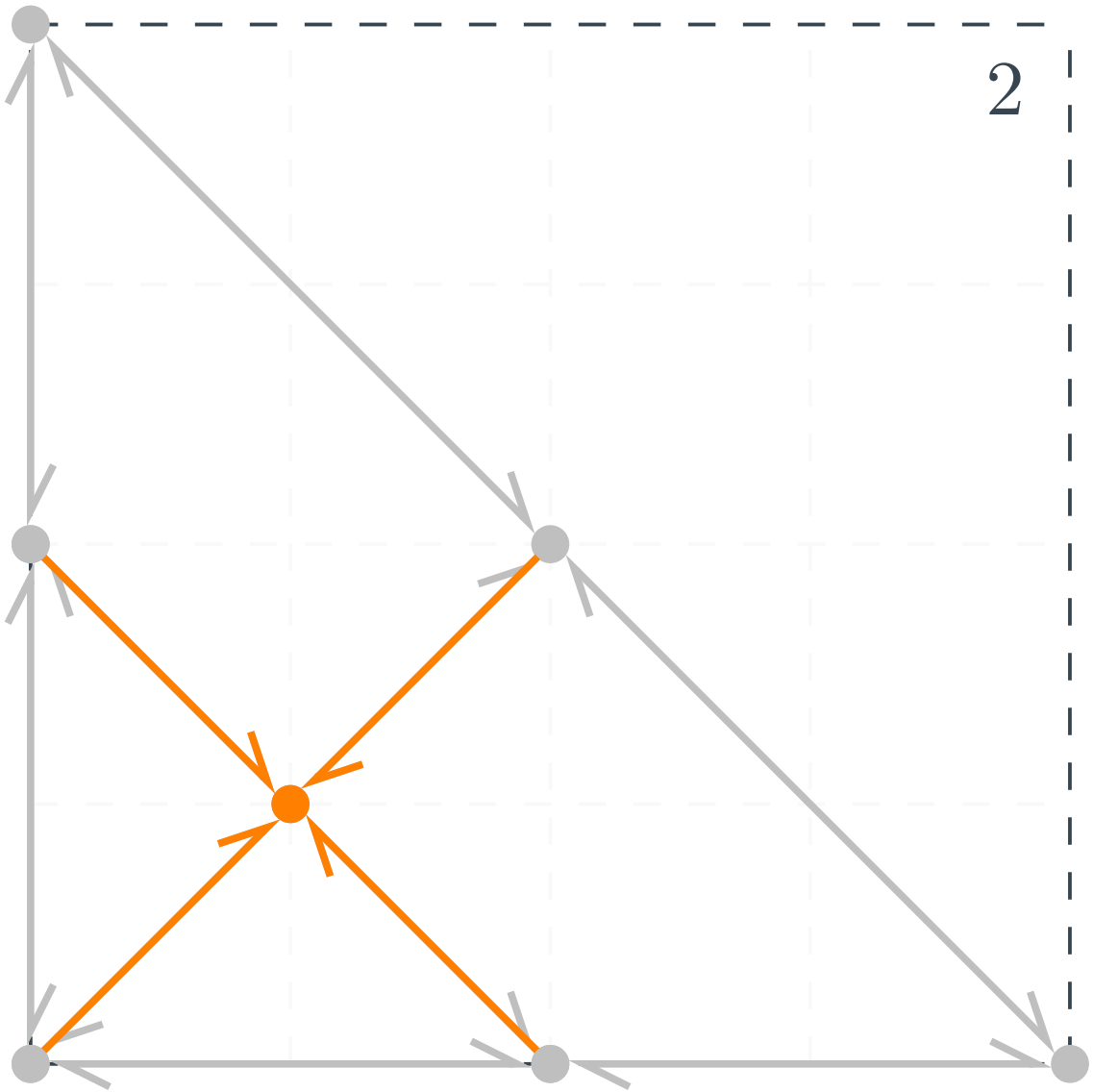
Finding intersections



Doing splits and grouping duplicates



Collecting vertices and their incidents



What is next

- Update the pointers (twin, next, prev) for the new vertices (intersections).
- Update the face labels.
- Finish integration with the current code.
- Perform tests.