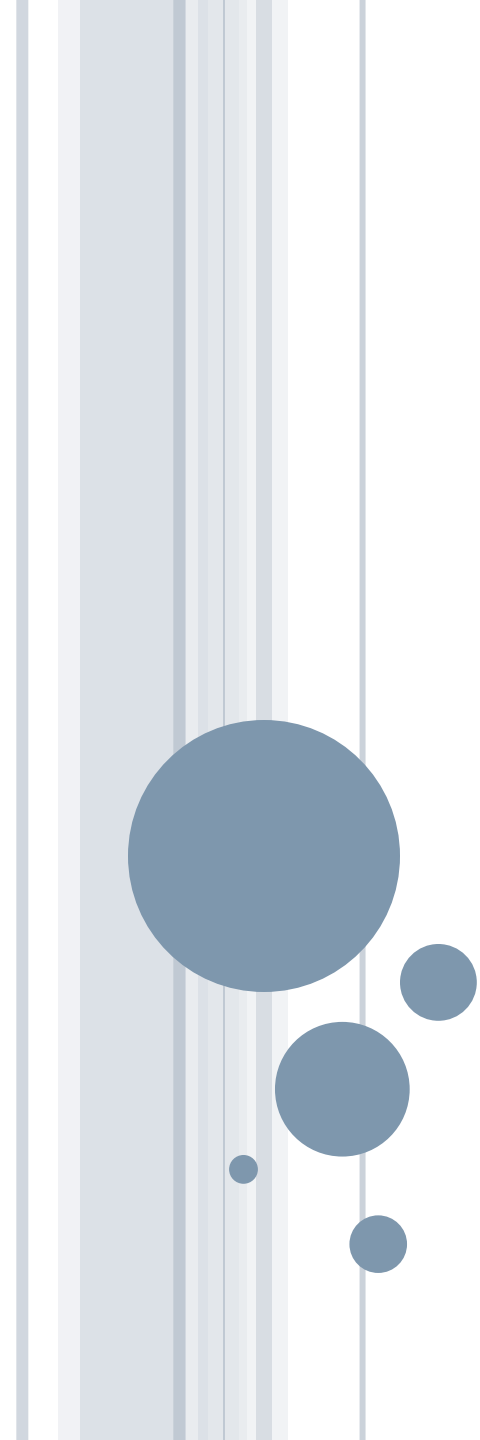




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The slide features a decorative left margin with a vertical gradient bar and several overlapping circles of varying sizes in shades of blue and grey. The main content is centered on the right side of the slide.

Convex Hull of a simple polygon: algorithm of Lee

Pavla Balíková

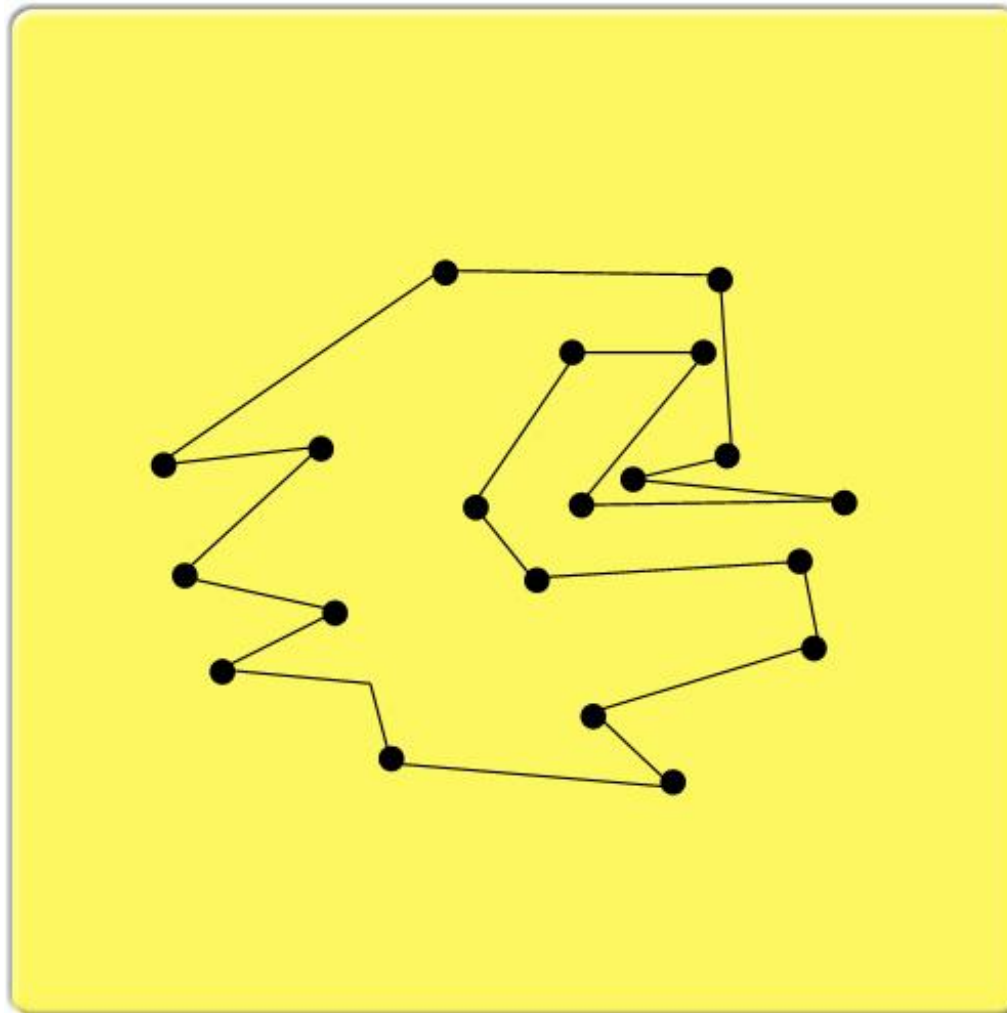
CONTENT

- Basic information about Lee's algorithm
- The algorithm in steps
- Complexity

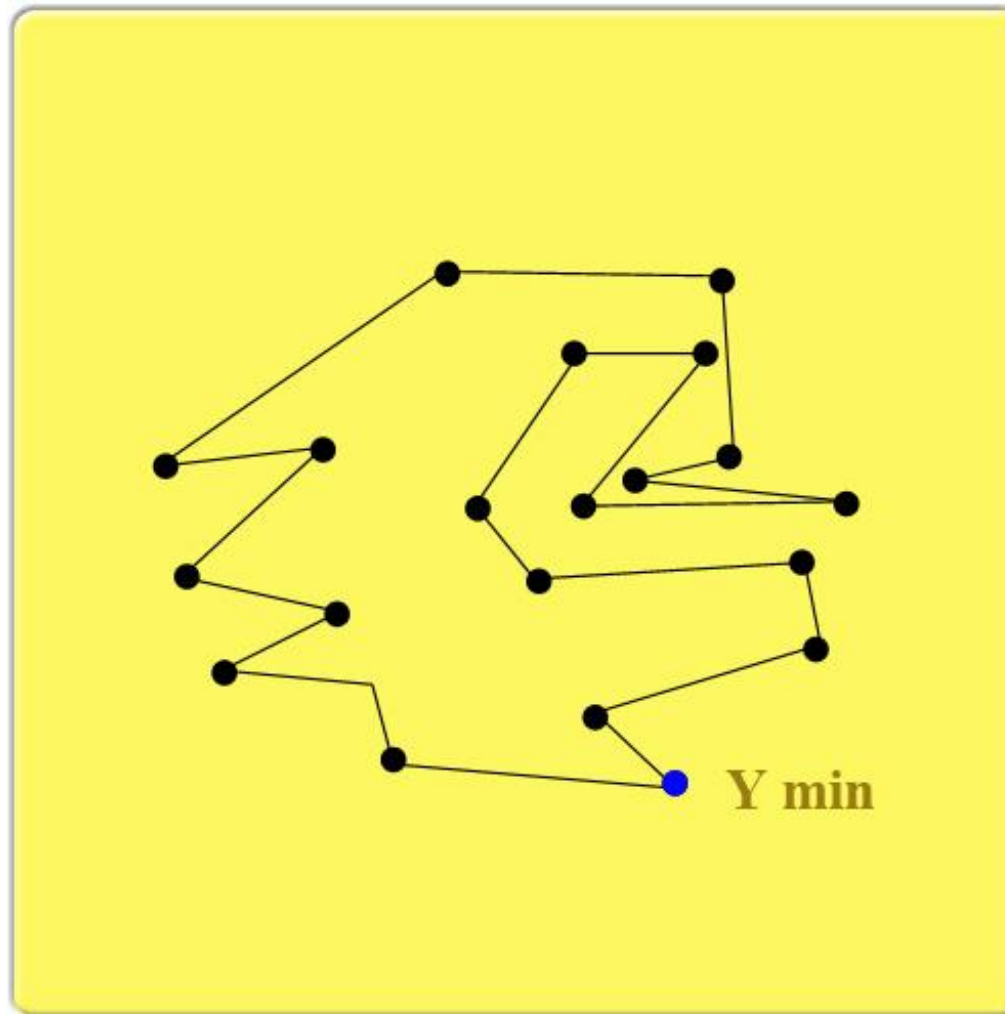
LEE'S ALGORITHM (1983)

- Decomposition plane to regions – different actions
- Vertices are enumerated counterclockwise
- No collinear points
- Input - connected simple polyline
- no self-intersections of lines

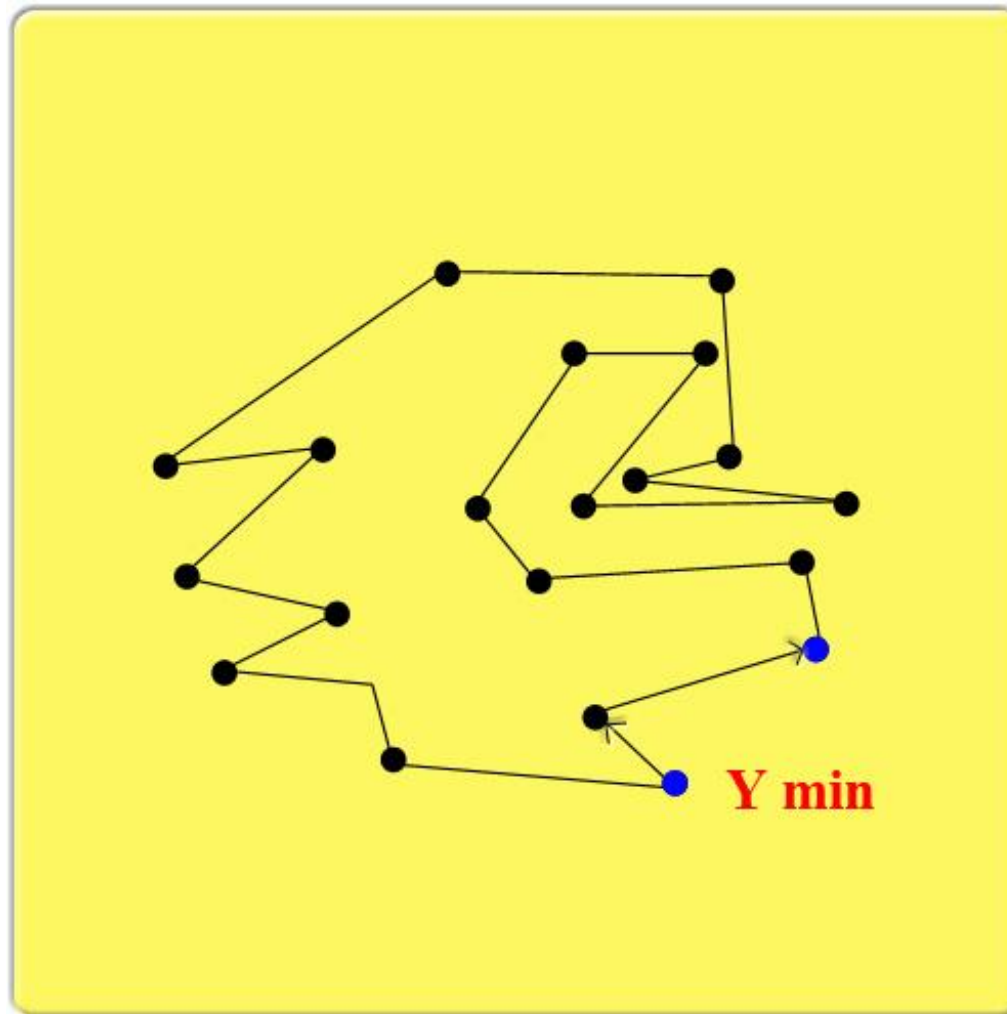
ALGORITHM IN STEPS



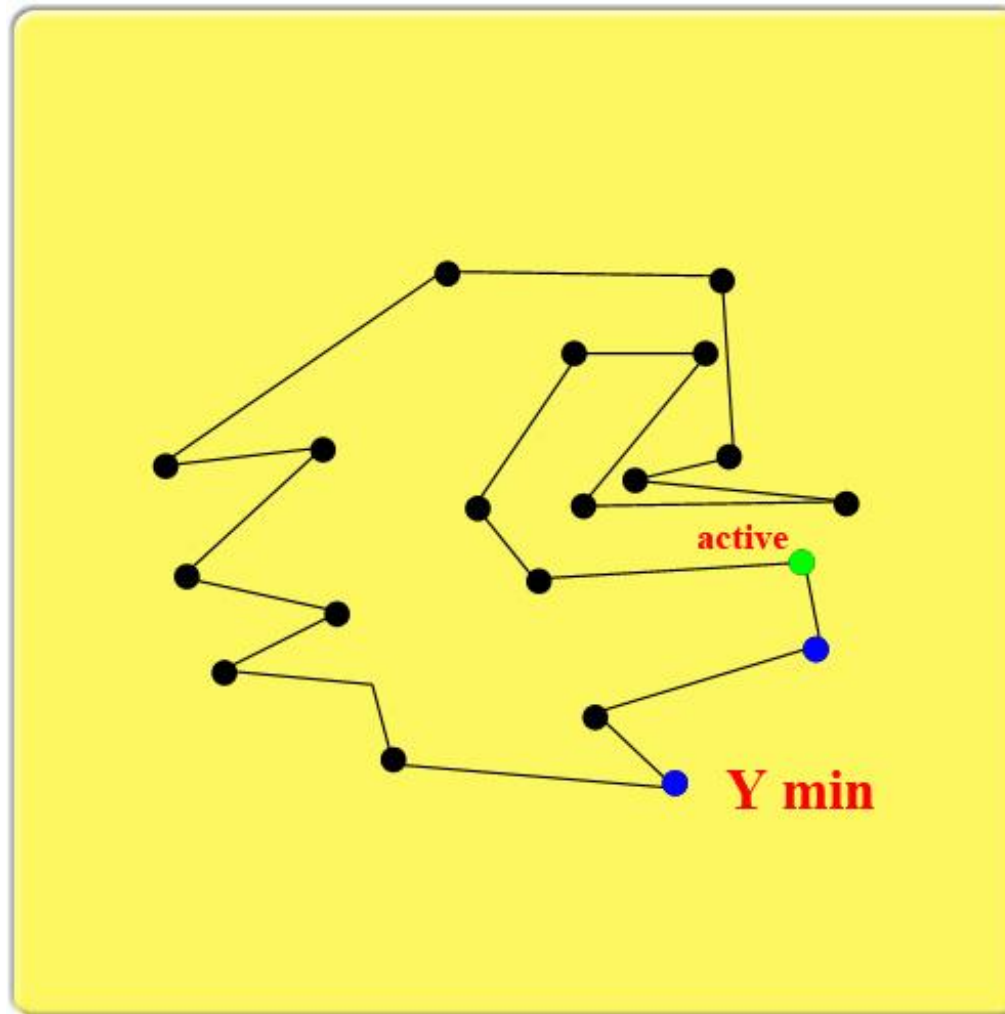
ALGORITHM IN STEPS



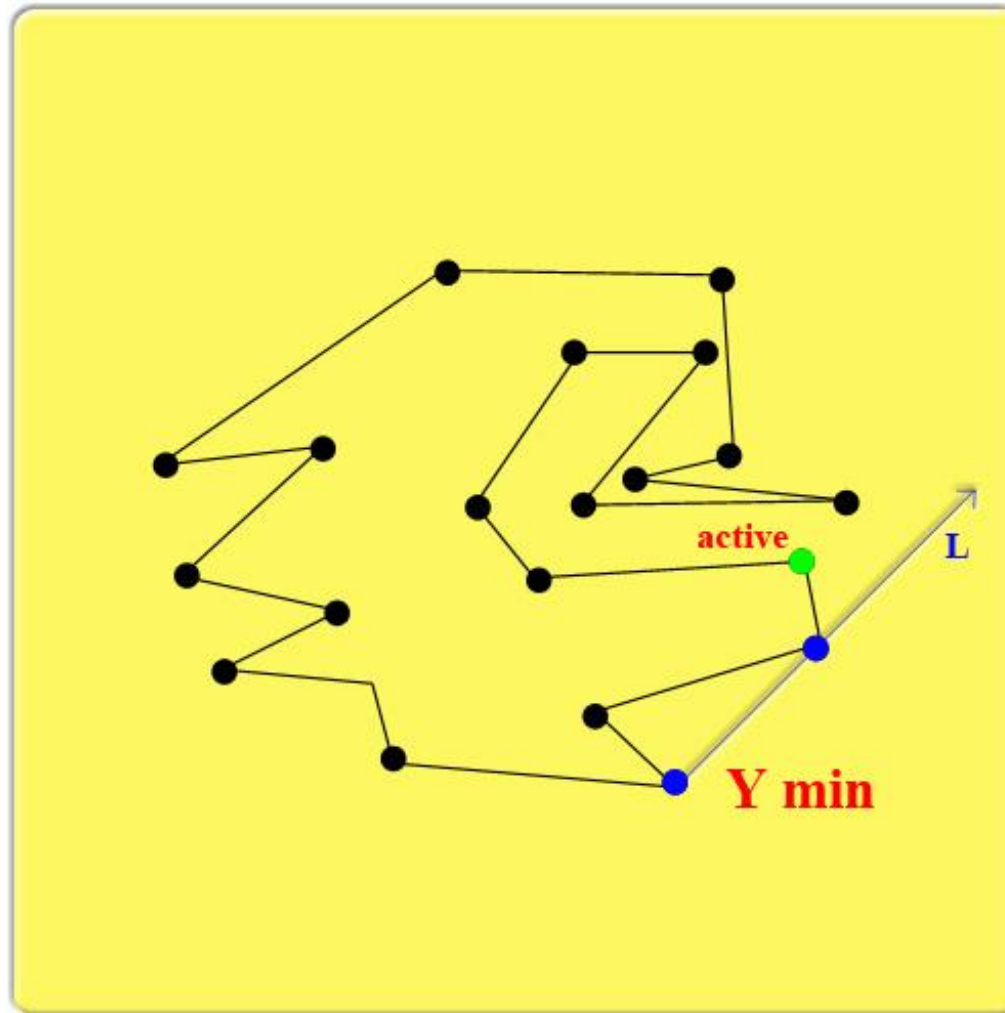
ALGORITHM IN STEPS



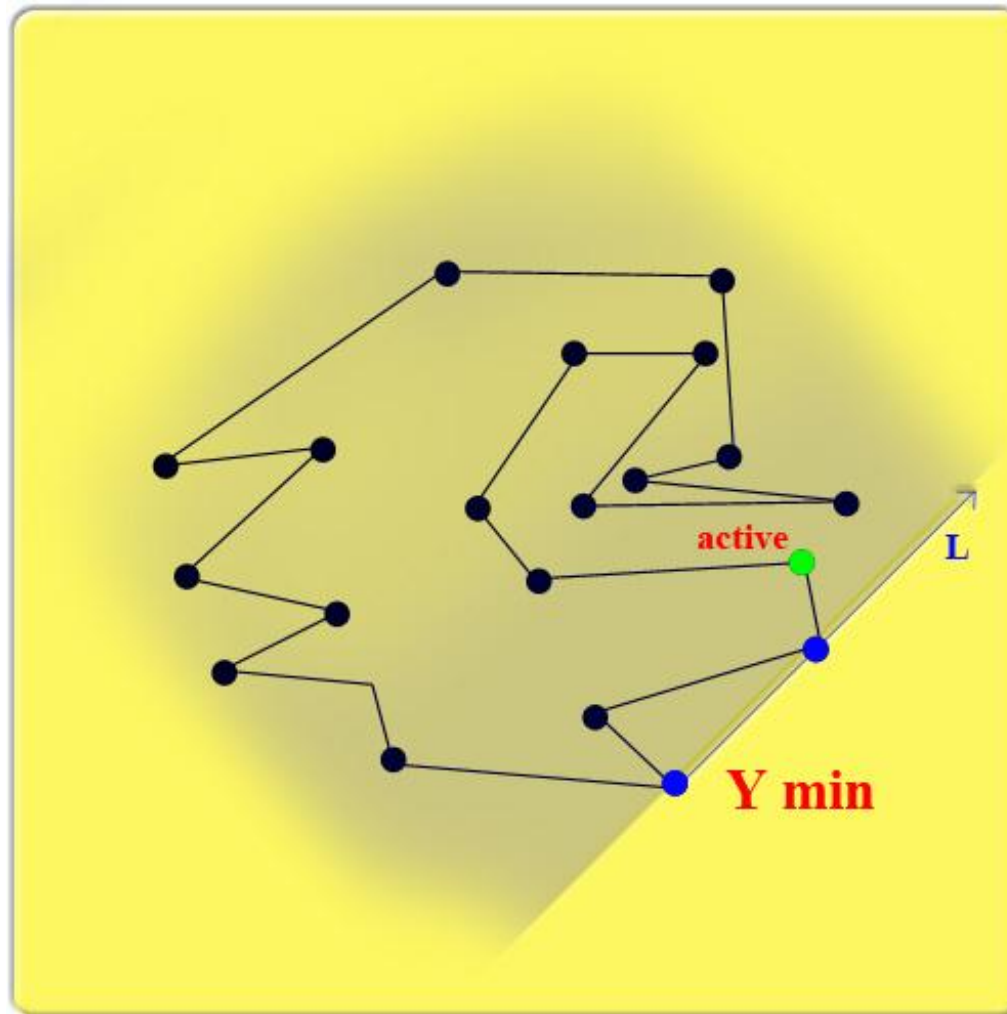
ALGORITHM IN STEPS



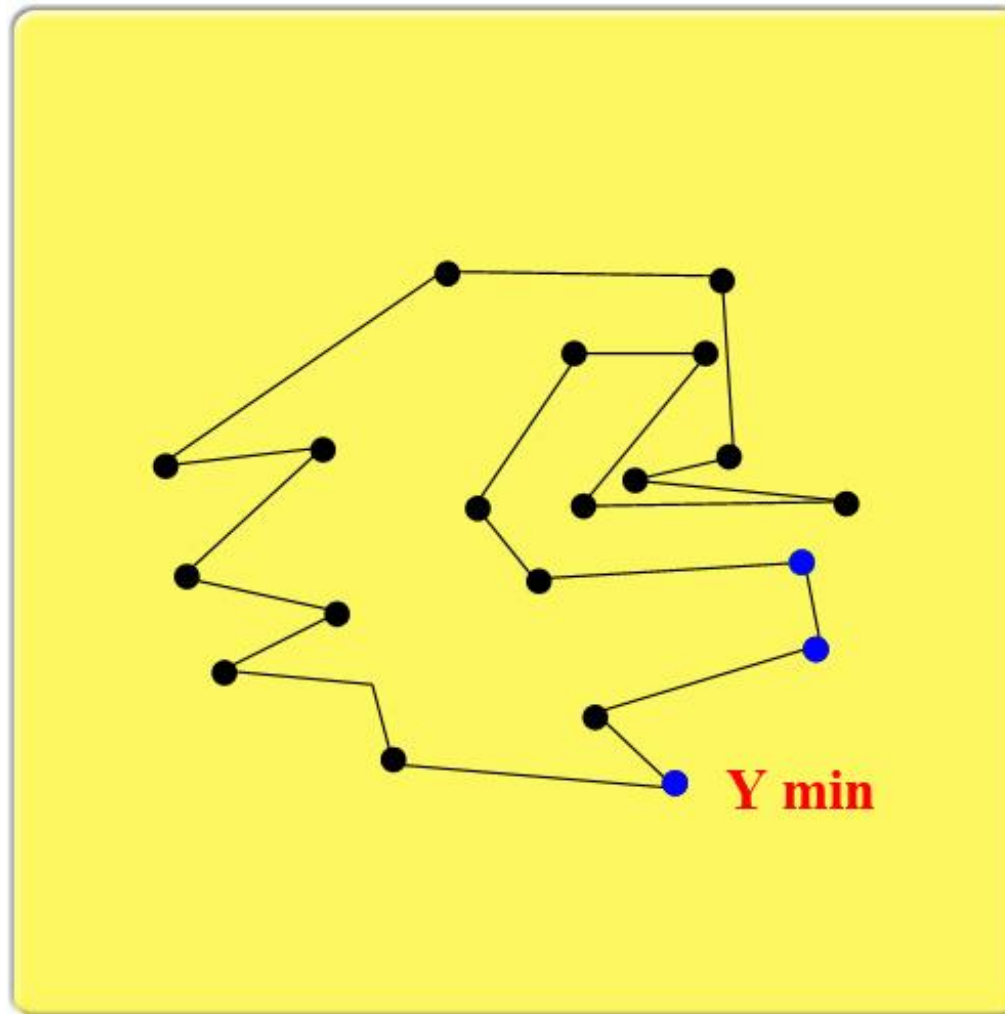
ALGORITHM IN STEPS



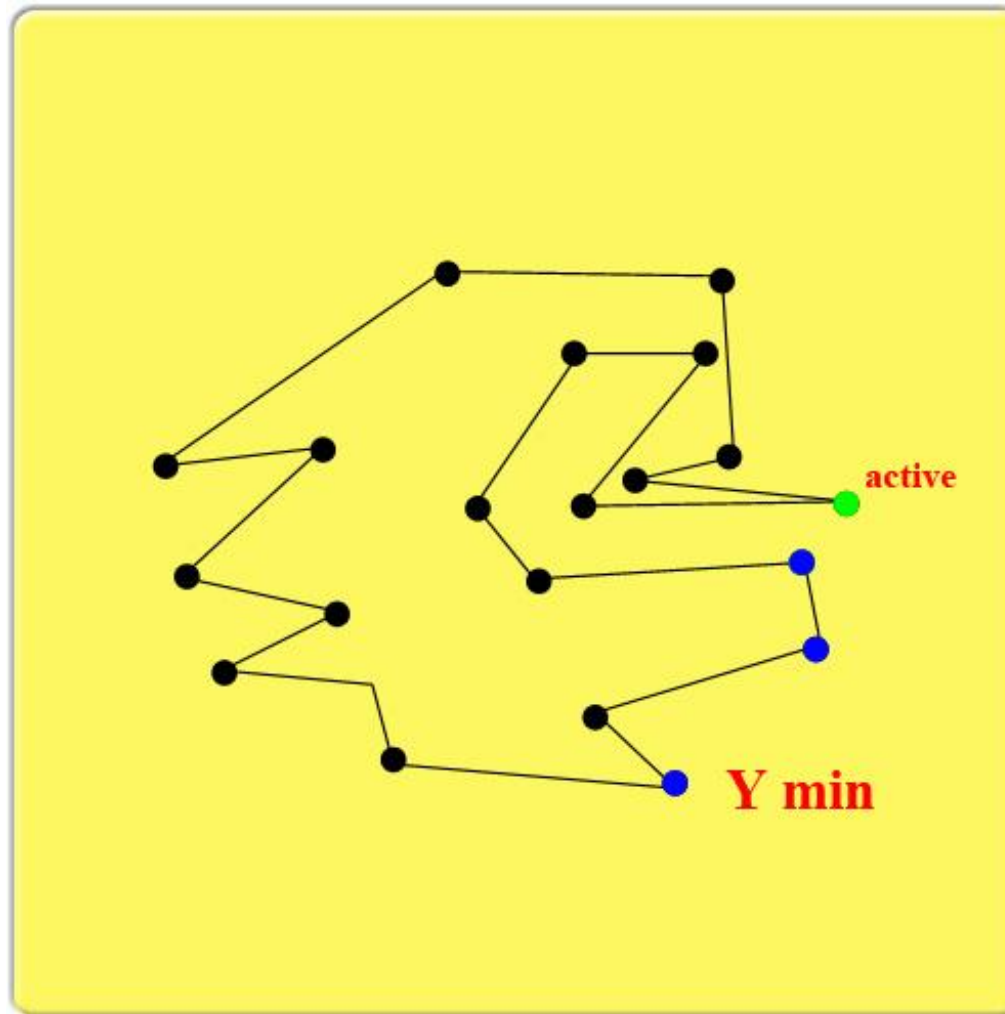
ALGORITHM IN STEPS



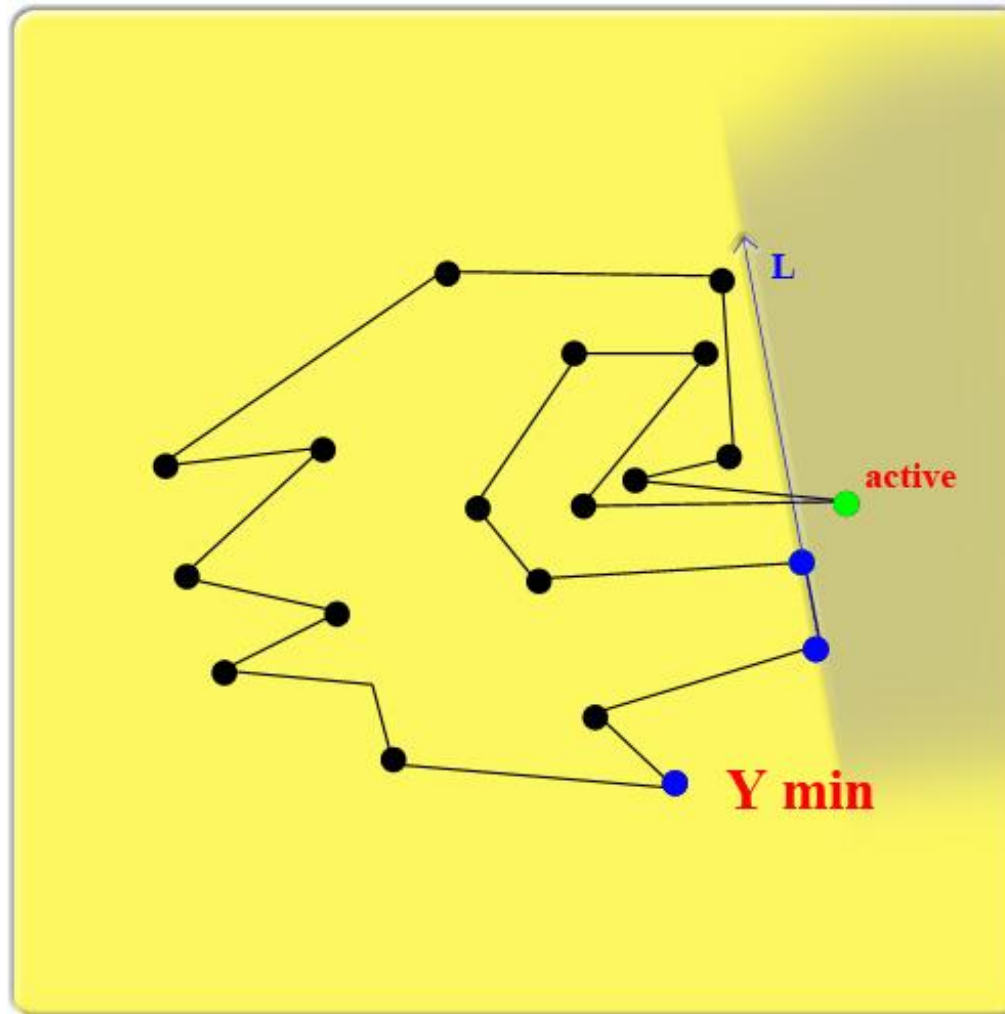
ALGORITHM IN STEPS



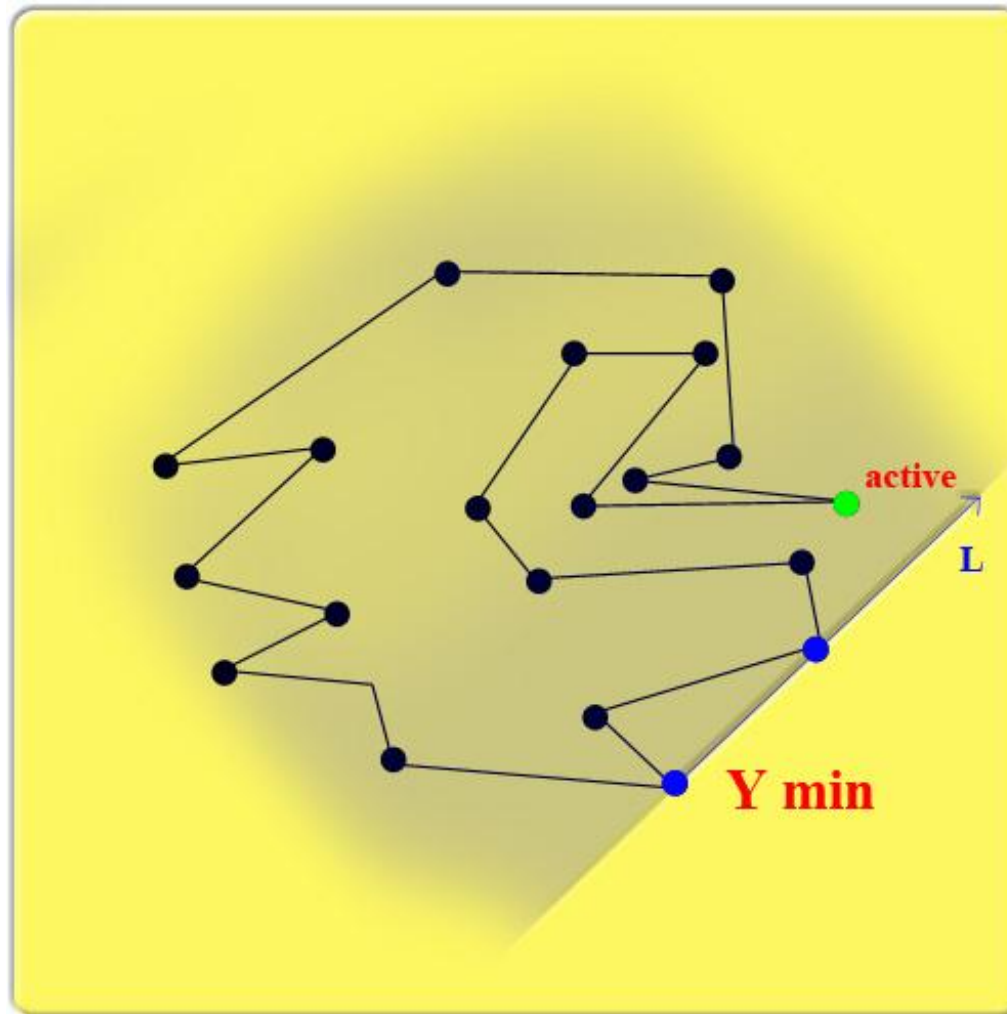
ALGORITHM IN STEPS



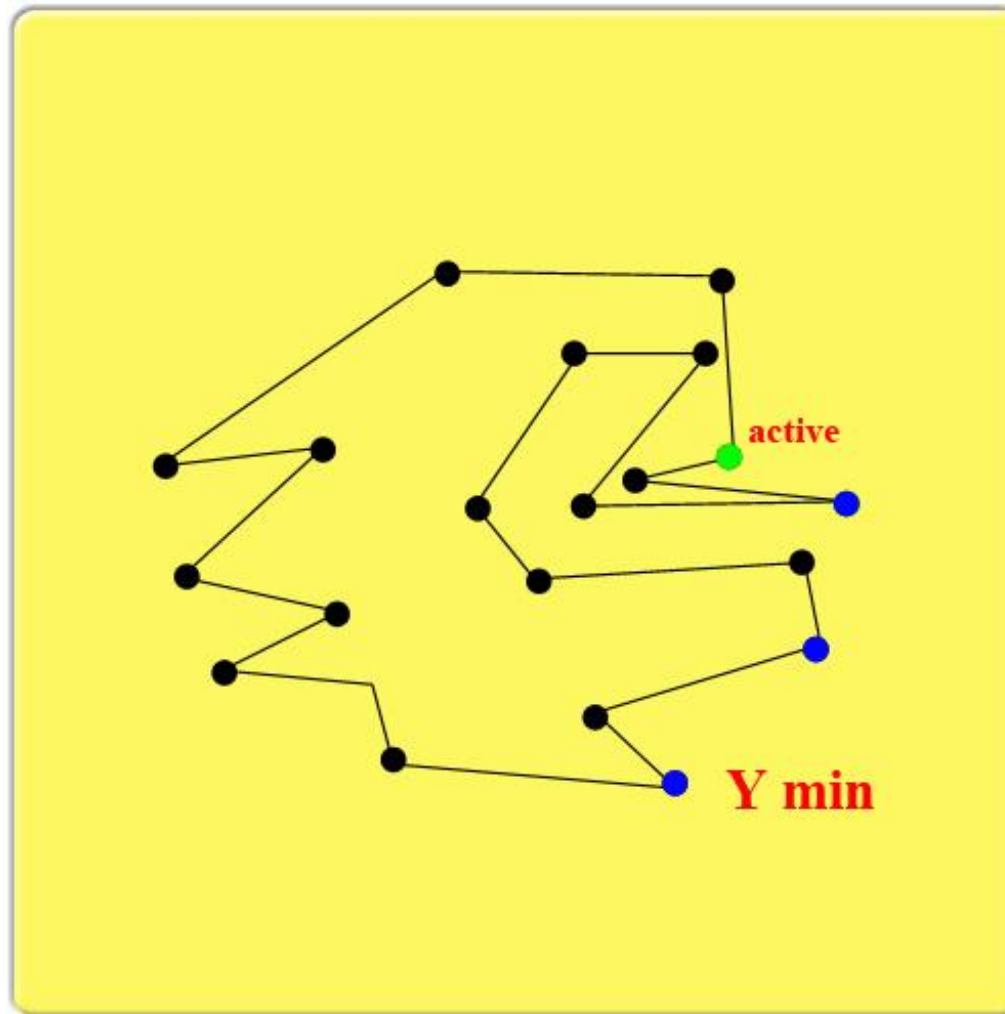
ALGORITHM IN STEPS



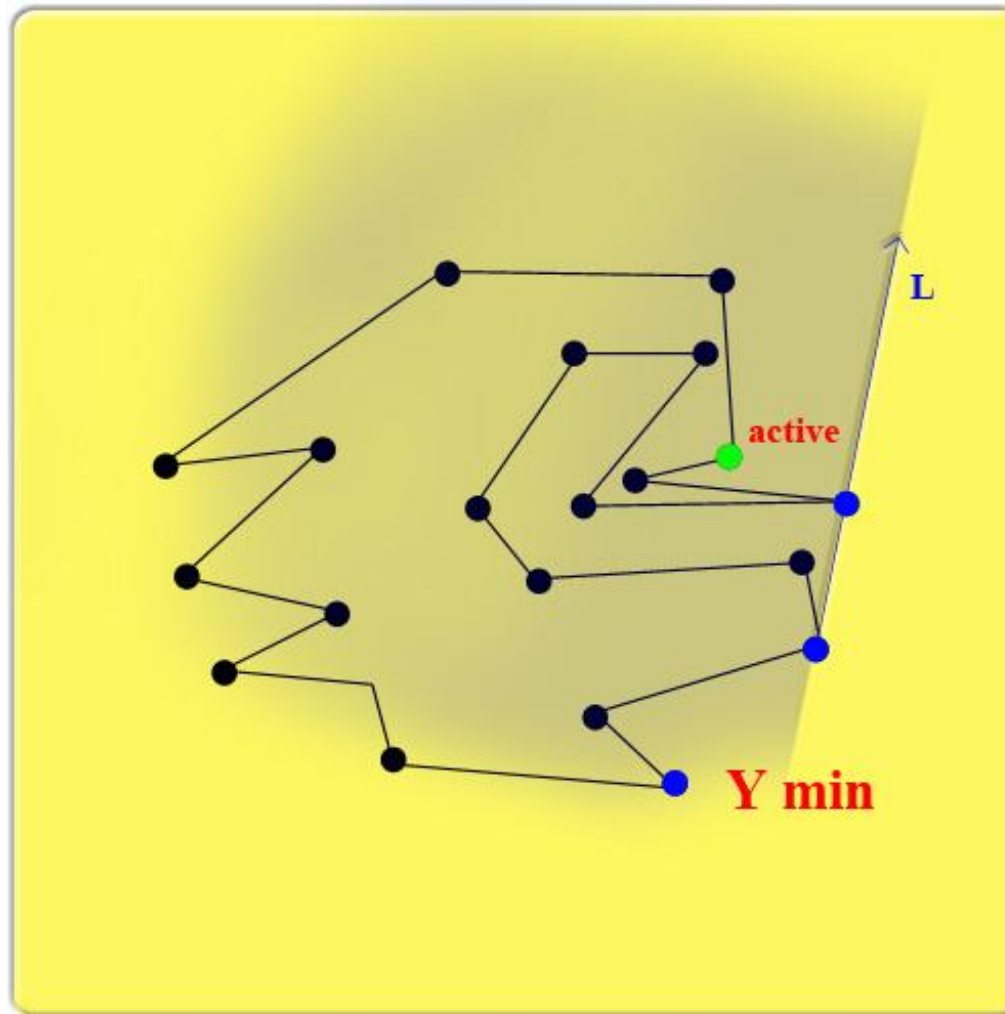
ALGORITHM IN STEPS



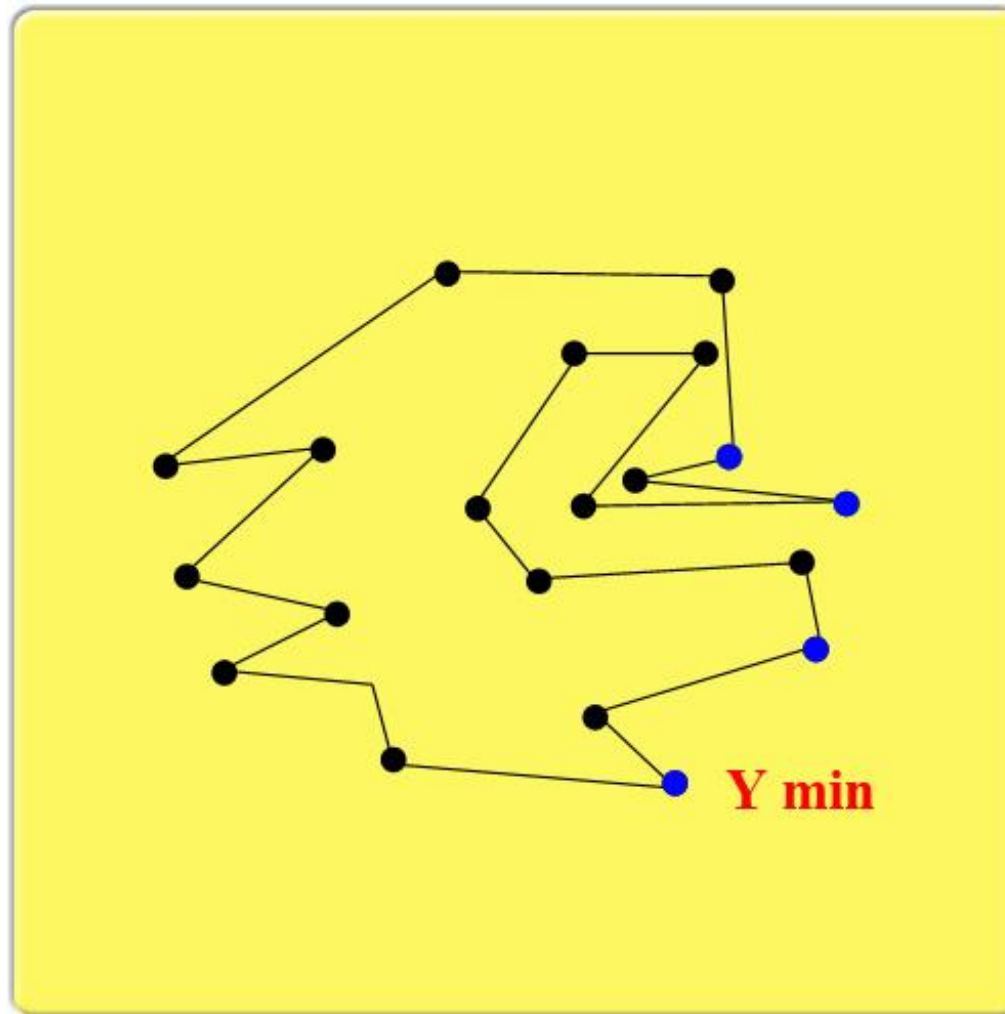
ALGORITHM IN STEPS



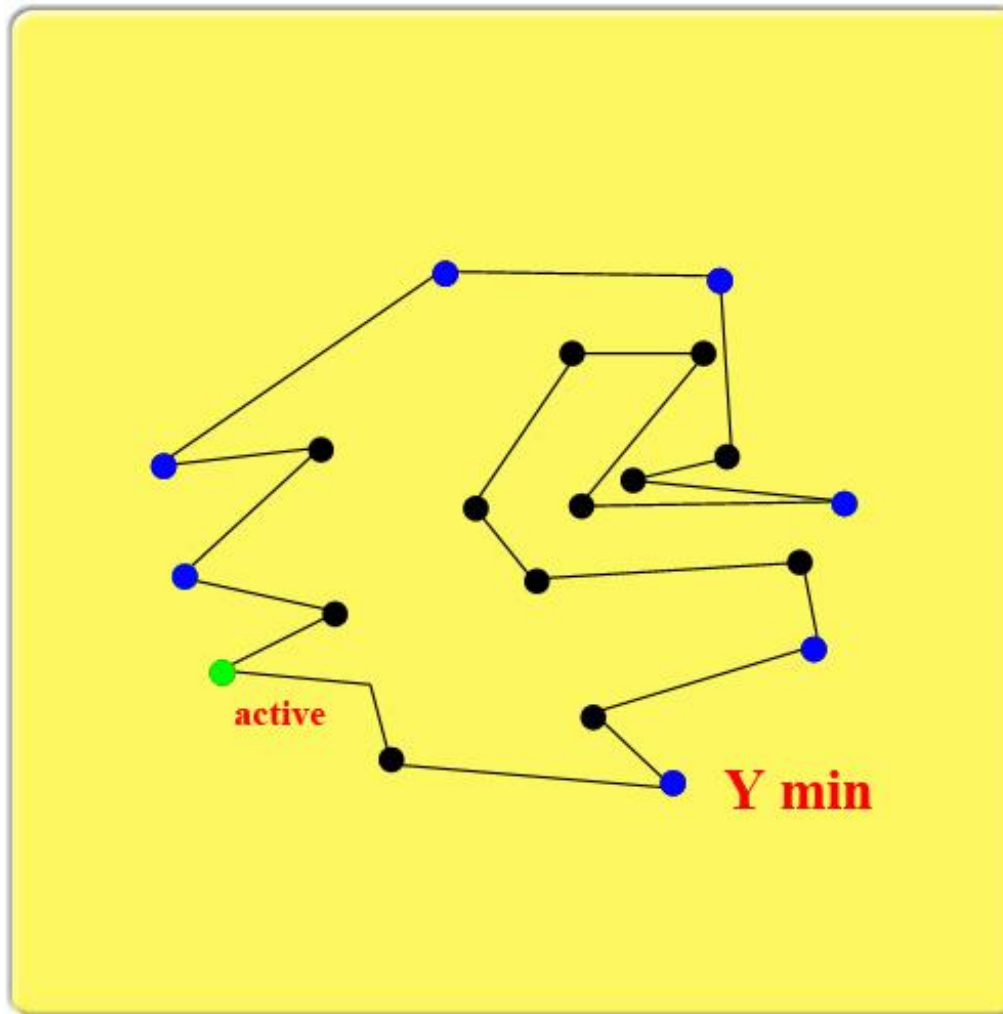
ALGORITHM IN STEPS



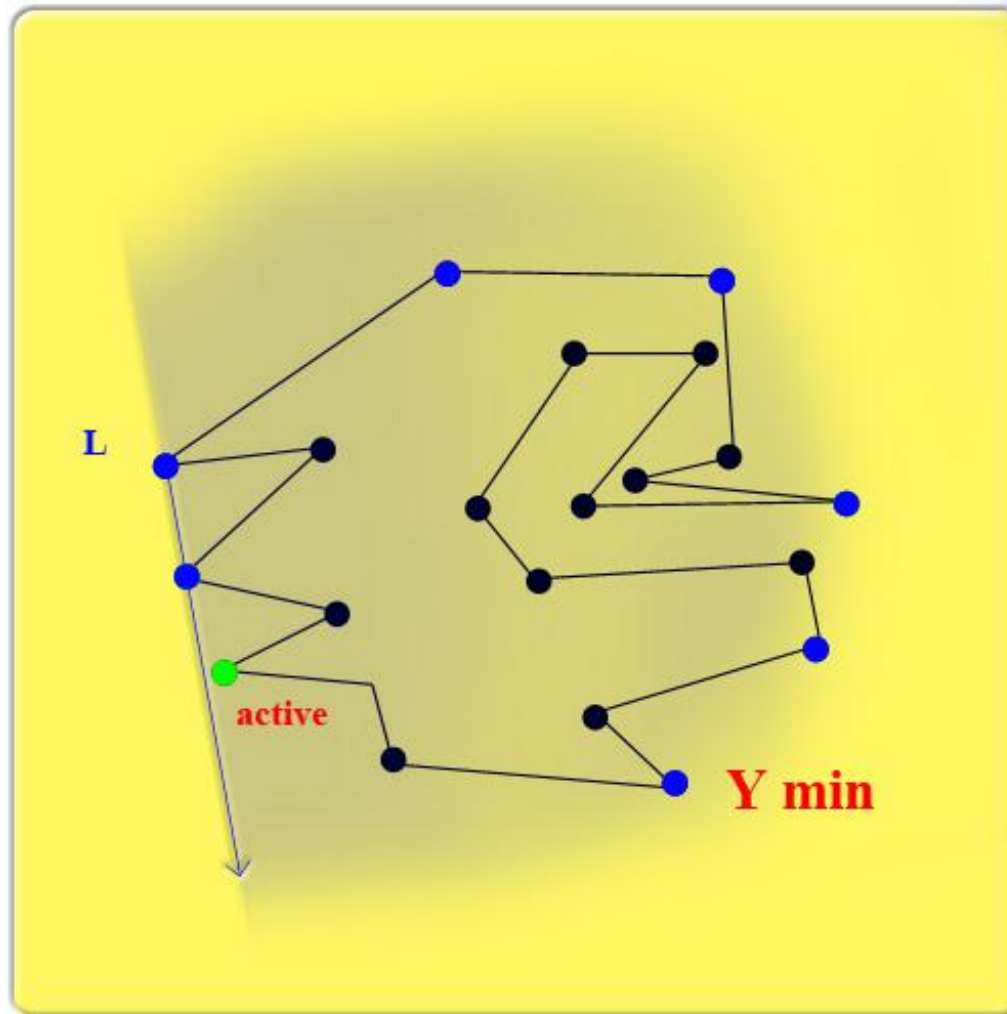
ALGORITHM IN STEPS



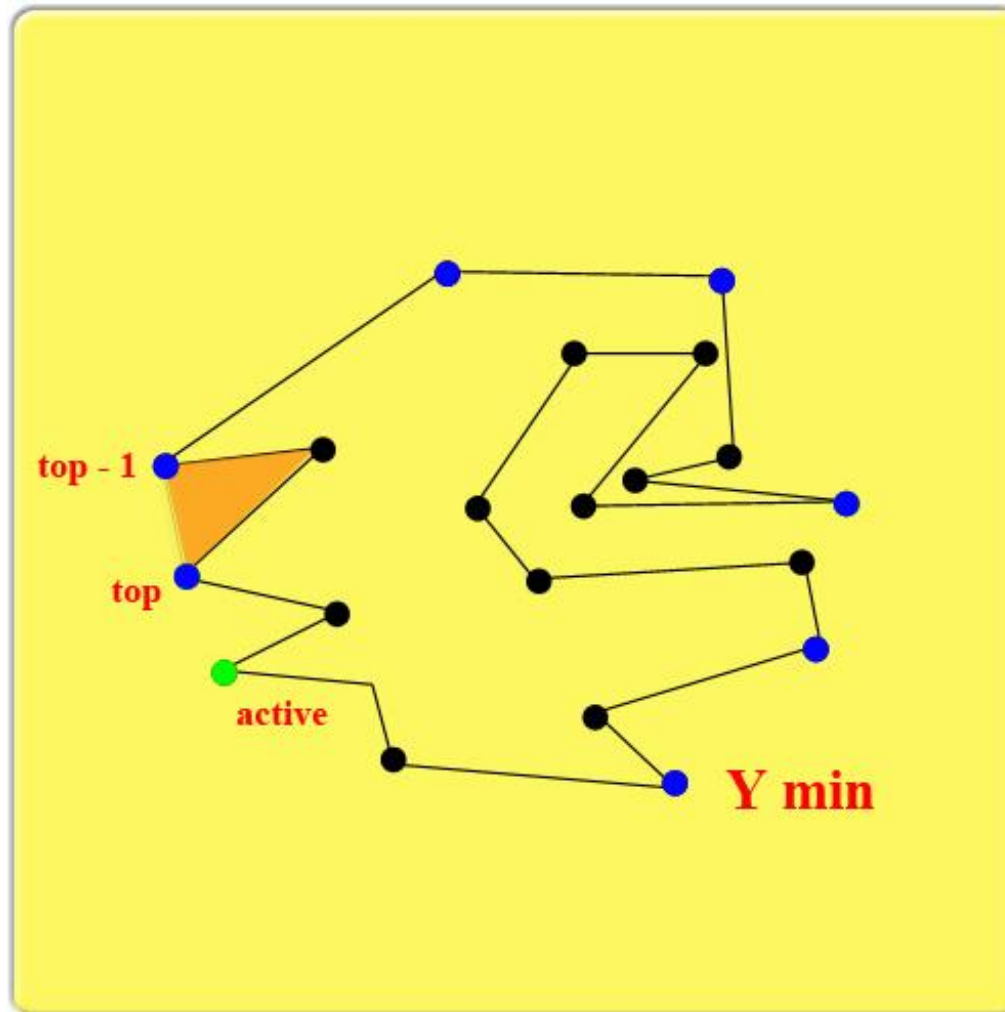
ALGORITHM IN STEPS



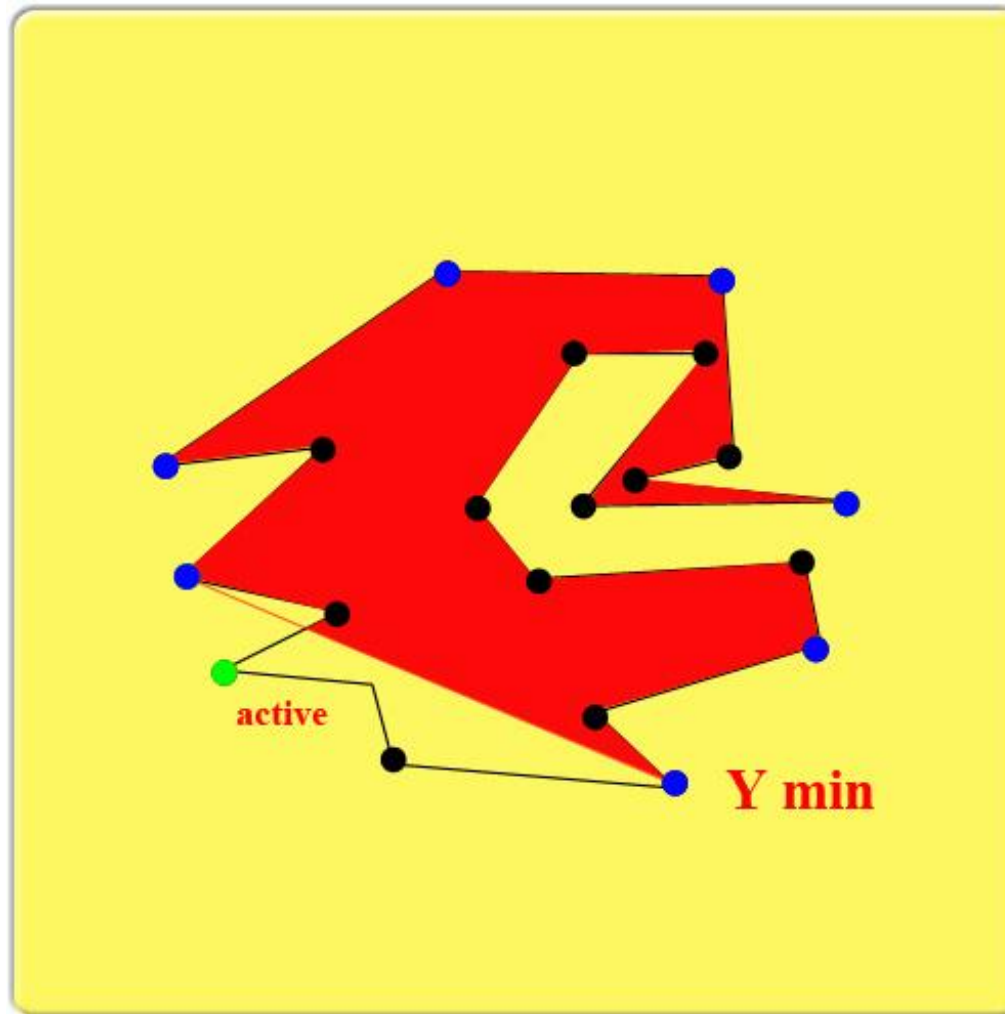
ALGORITHM IN STEPS



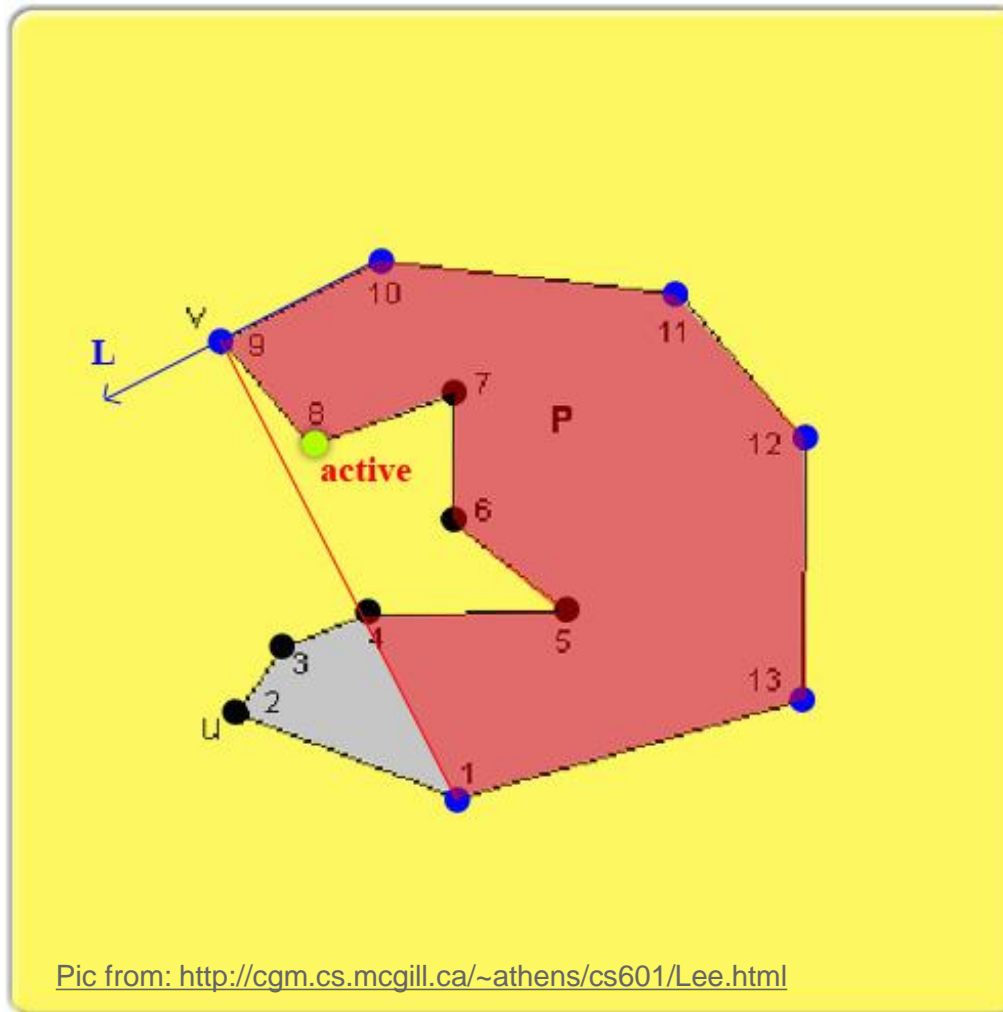
ALGORITHM IN STEPS



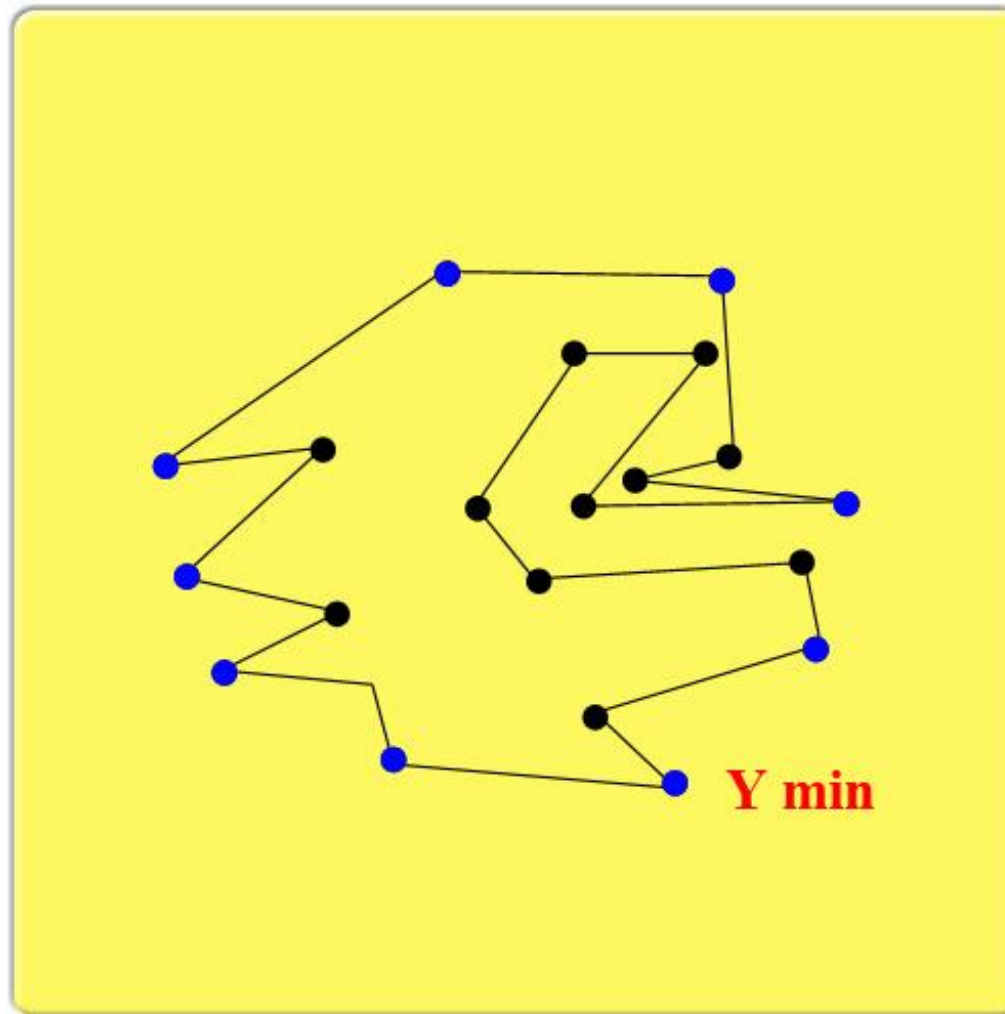
ALGORITHM IN STEPS



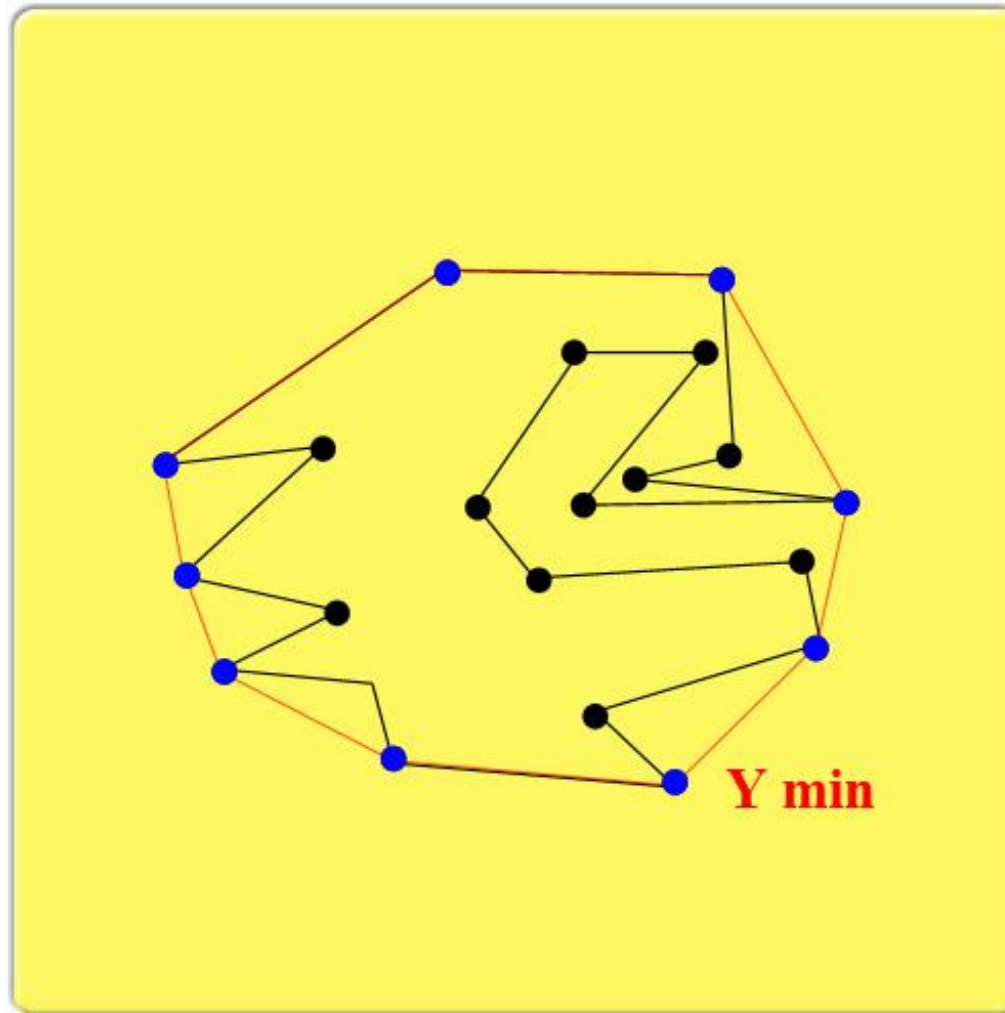
ALGORITHM IN STEPS



ALGORITHM IN STEPS



ALGORITHM IN STEPS



EXPLANATION OF ALGORITHM

1. Locate the vertex with minimum y-coordinate
2. Push it on the stack
3. Push the next vertex counterclockwise
4. Call the next vertex – active vertex (AV)
5. If the active vertex is NOT to the left of L
 - Delete the top element of the stack
 - If only Ymin is left, push the active vertex and get the next one
 - Recompute L
 - Go back to (5)

EXPLANATION OF ALGORITHM

6. If the AV is to the left of L
7. Case 1: AV is in the pocket of the top two vertices of the stack
 - Ignore the AV, make the next vertex active and go back to (5).
8. Case 2: AV is not in the pocket, but is inside the convex polygon of the stack
 - Ignore the active vertex, make the next vertex active and go back to (5)
9. Case 3: otherwise
 - Push the AV onto the stack
 - Recompute L and go back to (5)

COMPLEXITY

- Space - $O(n)$ - stack
- Time - $O(n)$
 - No sorting points
 - Input connected simple polyline

SOURCES

- ALOUPIS, Greg. Lee 1983. [online]. [cit. 2012-10-11]. Dostupné z: <http://cgm.cs.mcgill.ca/~athens/cs601/>
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