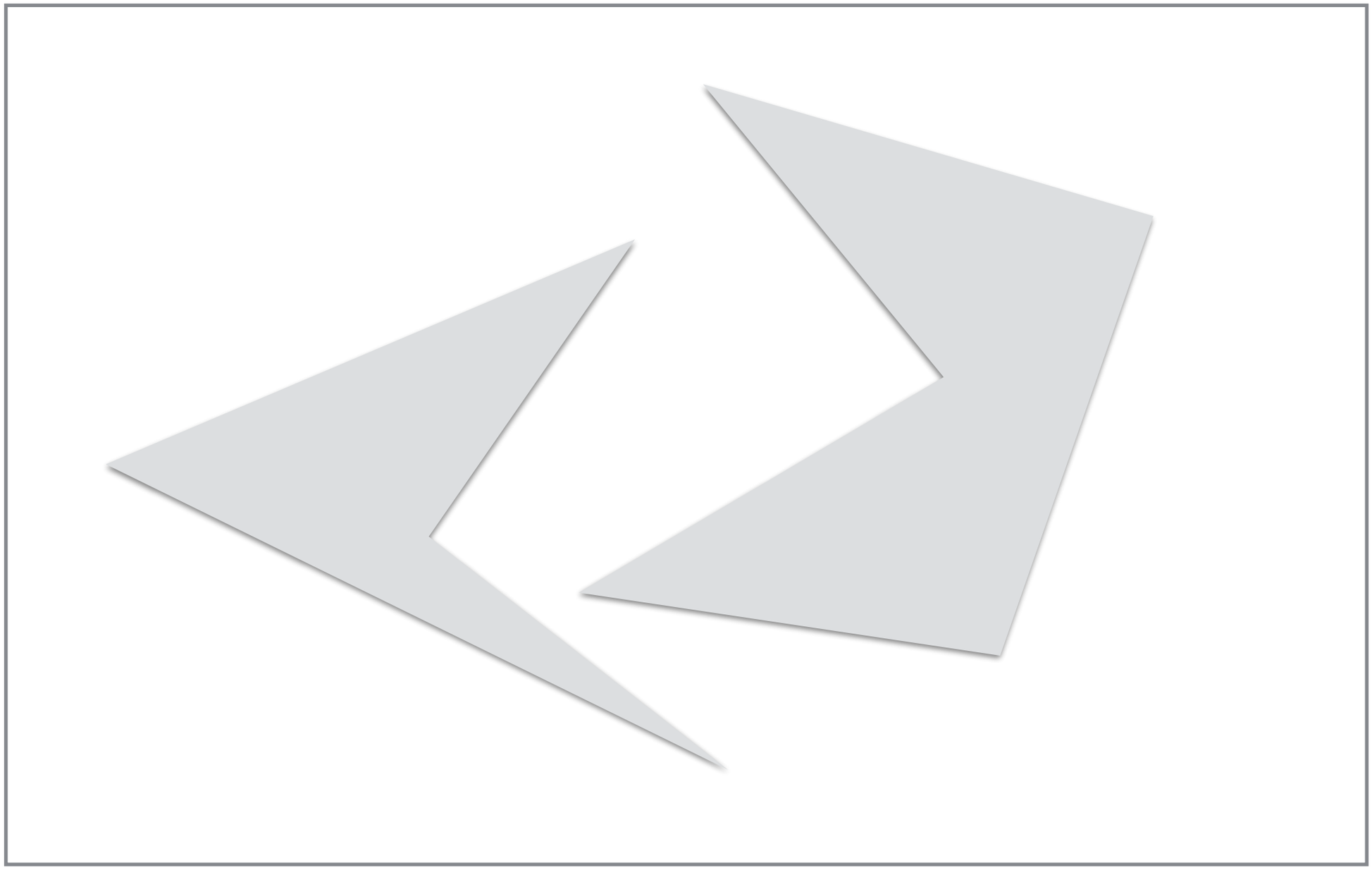
Draw the trapezoid decomposition of free space and the corresponding roadmap.



- Show an example showing that BFS in the roadmap corresponding to a trapezoid decomposition does not give optimal paths.

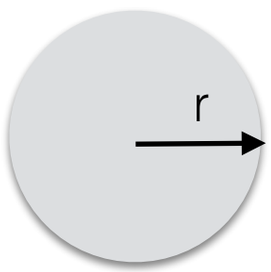
- We saw that the size of the VG can be quadratic. What type of scenes would have small/large VG?

- Describe a naive algorithm for building a VG and give its running time.

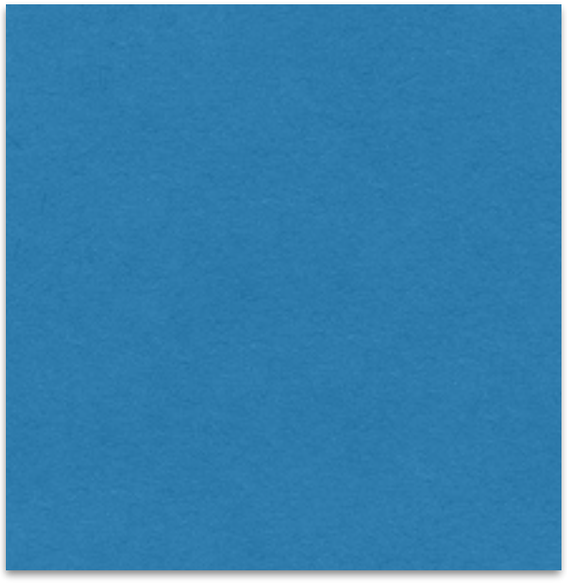
- Consider a rectangular robot. Draw a small set of obstacles such that their C-obstacles overlap.

- Consider a rectangular robot. Draw a scene of obstacles such that free physical space is not disconnected, but the the free C-space is disconnected.

- Consider a disk robot of radios r in 2D. Show the extended obstacle corresponding to a: triangle, rectangles, convex polygon, non-convex polygon.

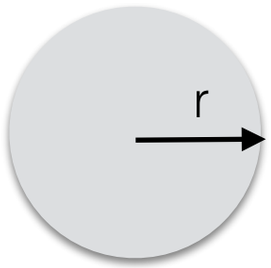


robot

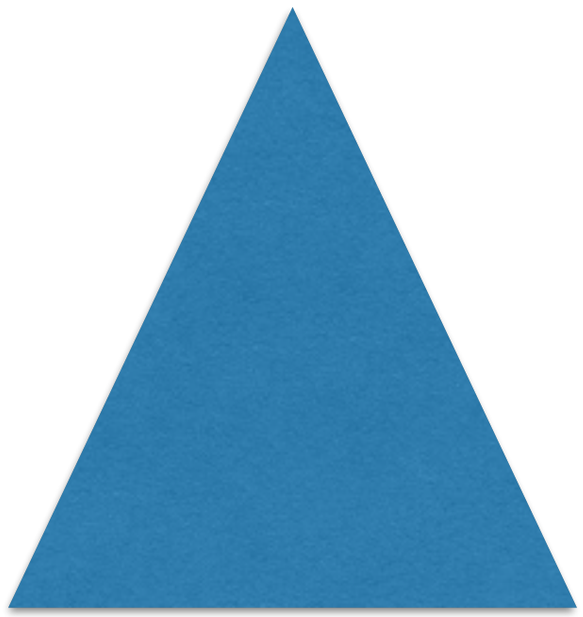


obstacle

extended obstacle

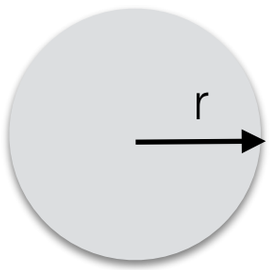


robot

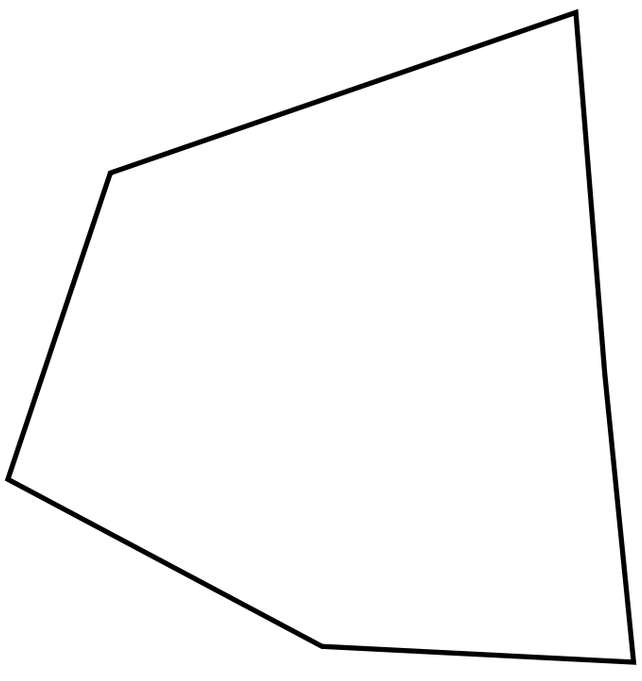


obstacle

extended obstacle

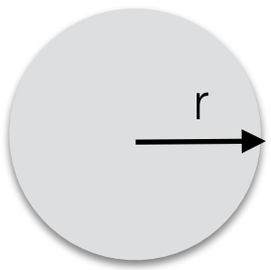


robot

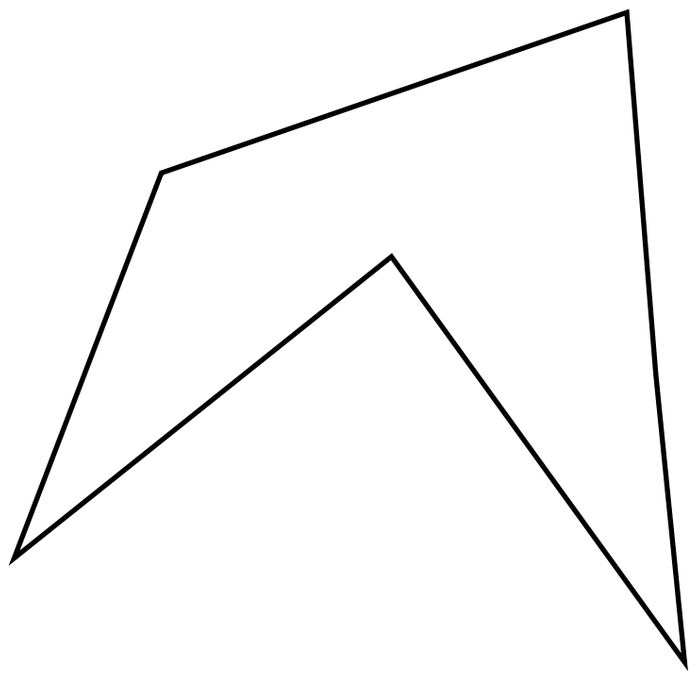


obstacle

extended obstacle



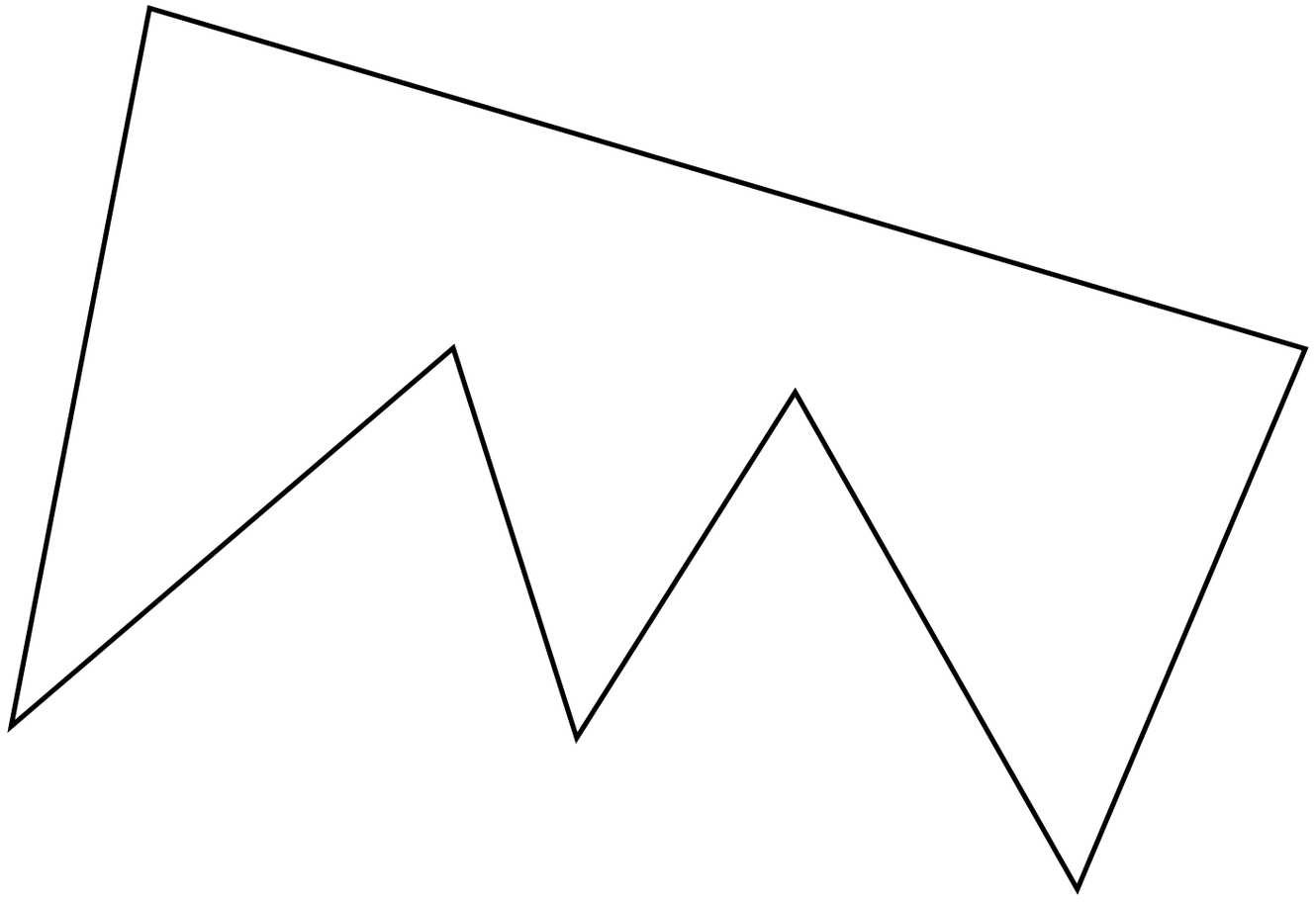
robot



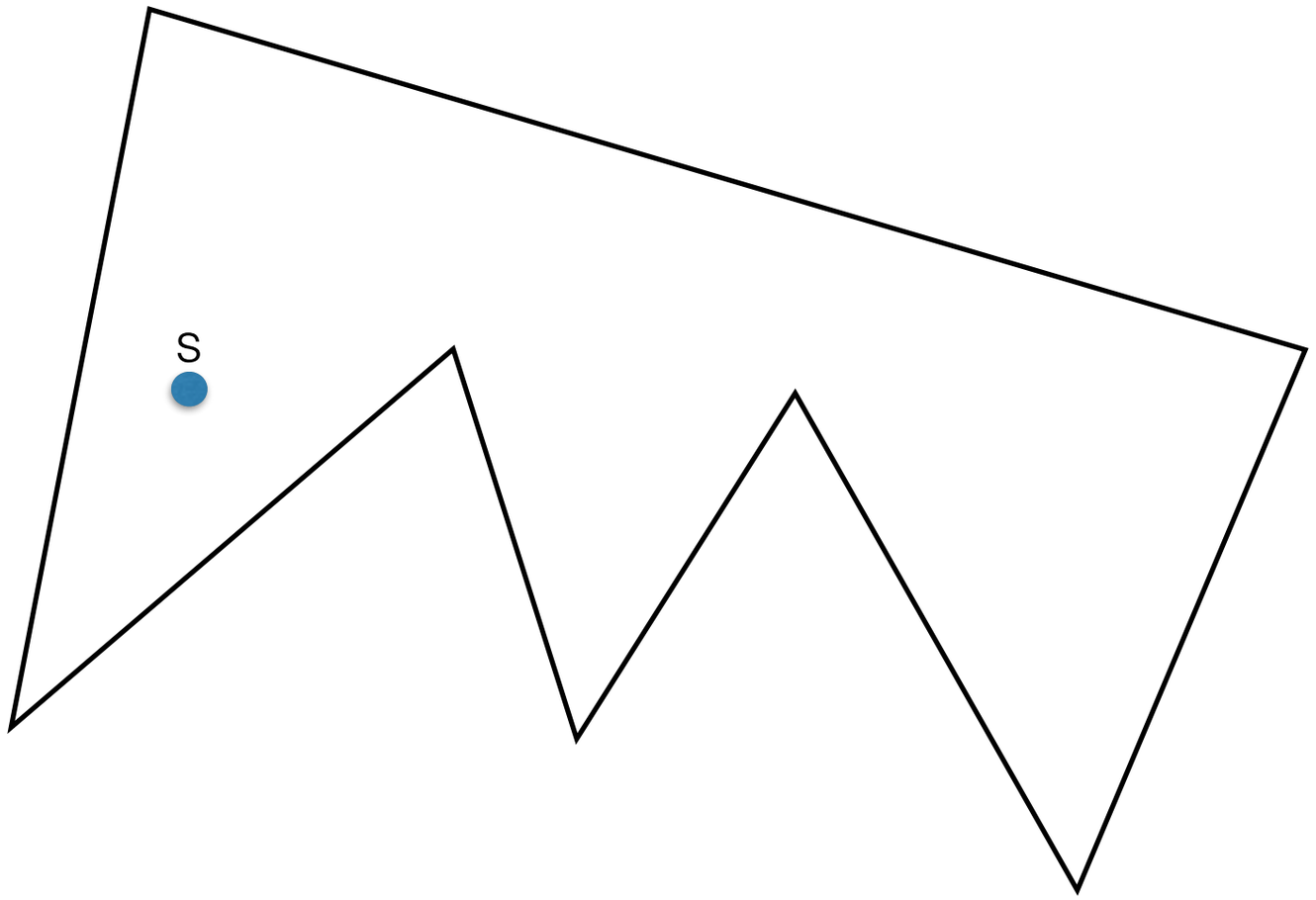
obstacle

extended obstacle

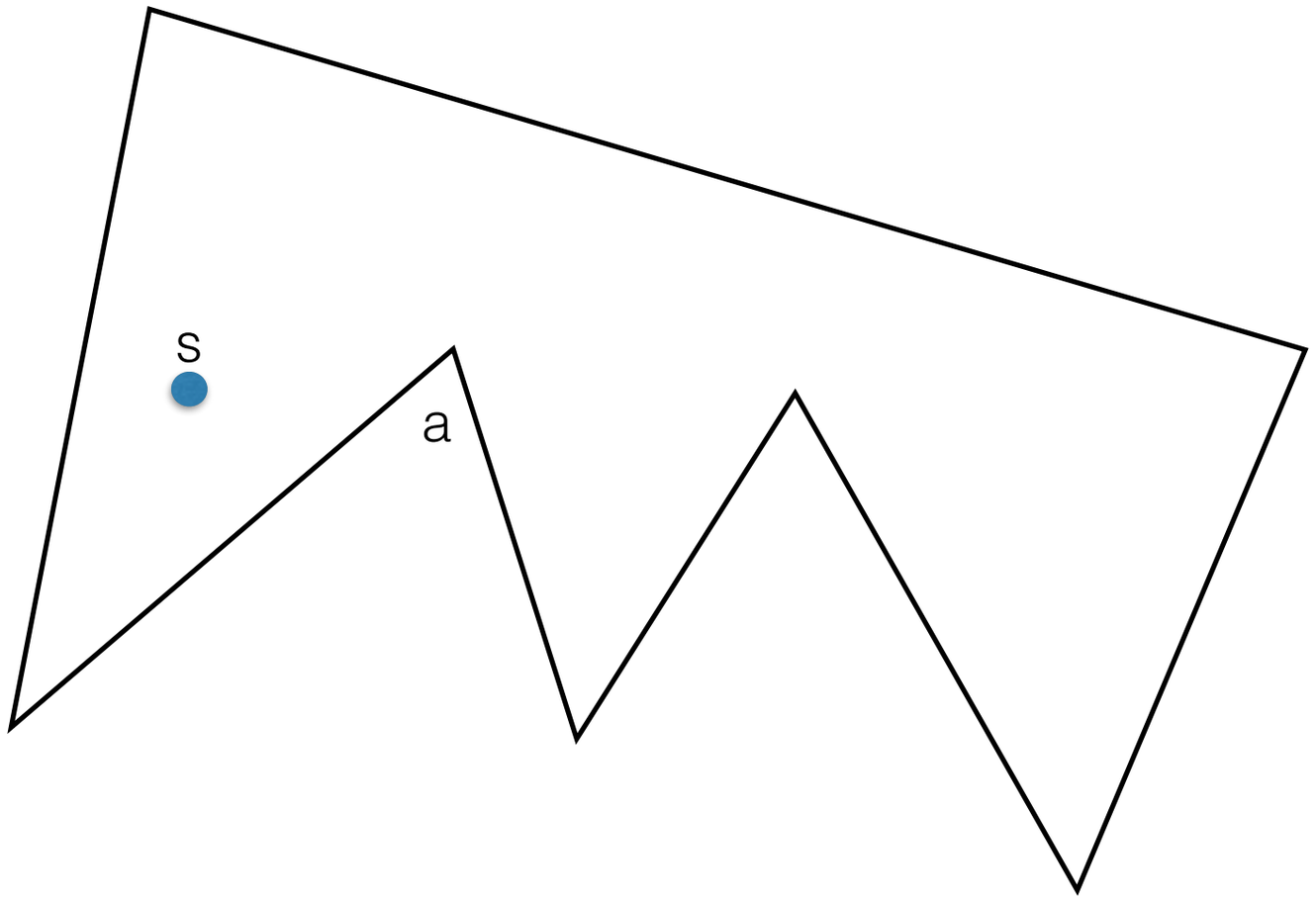
Consider arbitrary two points inside this polygon, and draw the shortest path between them.
What can you claim about the shortest path inside a polygon?



Consider a point s as below.
Draw the region of the polygon that contains all points p such that the shortest path from s to p consists of the straight line segment sp.



Consider a point s as below.
Draw the region of the polygon that contains all points p such that the shortest path from s to p consists of the straight line segment sa plus the straight line segment ap.



Consider a point s as below.
Draw the shortest path map of s.