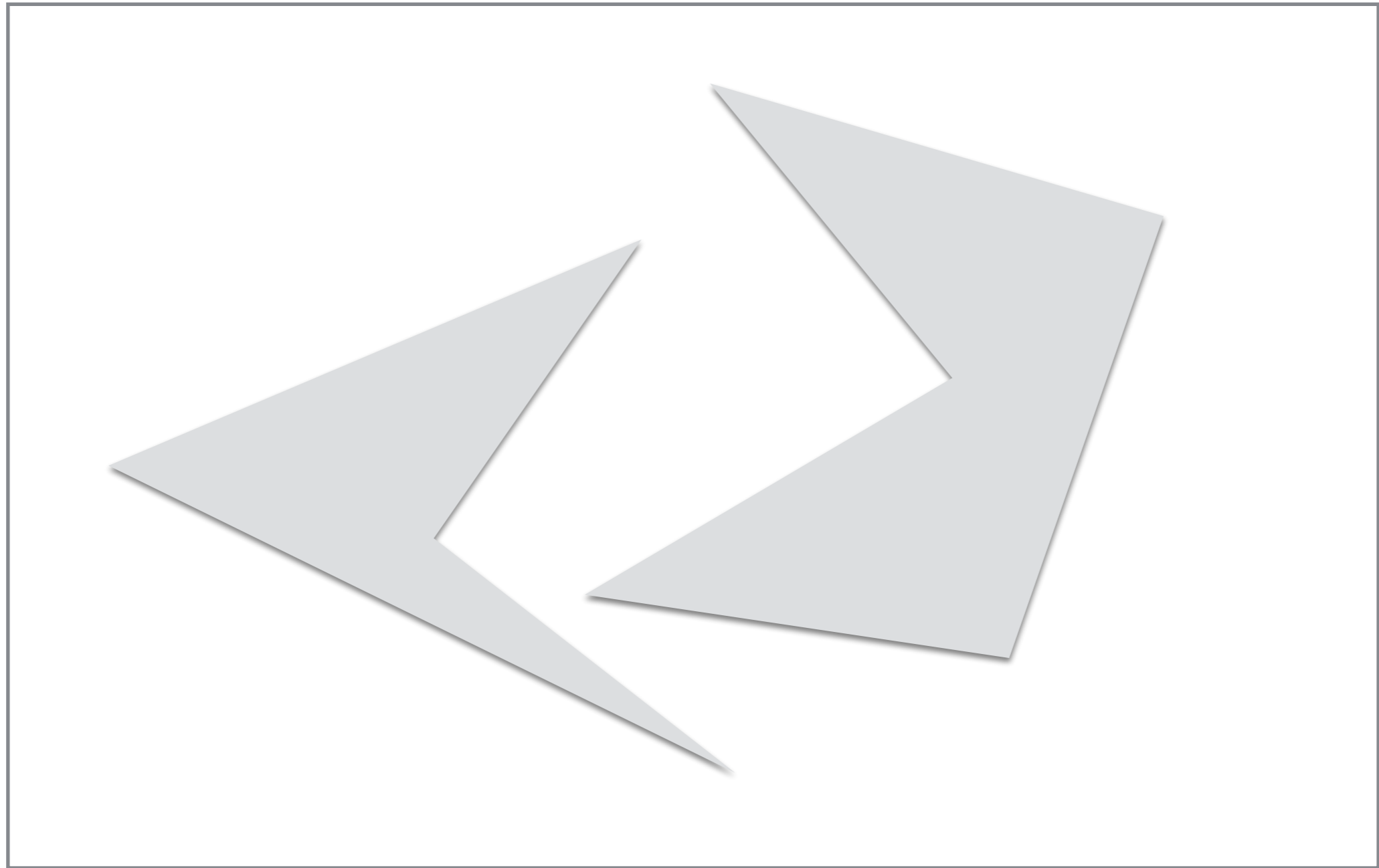


Computational Geometry
csci3250
Laura Toma
Bowdoin College

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



Show that the trapezoid map is **not** optimal by giving a scene where it does not give the optimal (shortest) path

- Consider a scene where the total size of the obstacles is n . Come up with an example that triggers smallest/largest number of edges in VG (up to a constant factor).

n = complexity of obstacles
(total number of edges)

- Come up with a straightforward algorithm to compute VG and analyze it

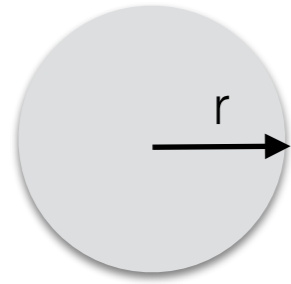
n = complexity of obstacles
(total number of edges)

- How long does it take to run Dijkstra's algorithm on VG?

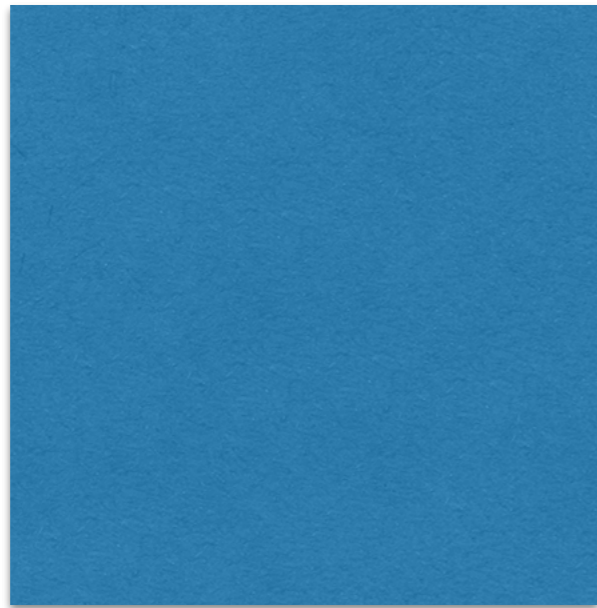
- Consider a rectangular robot. Draw a small set of obstacles such that their C-obstacles overlap.

- 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 radius r in 2D. Show the extended obstacle corresponding to a rectangle.



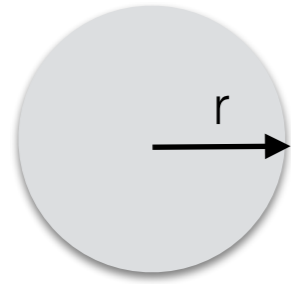
robot



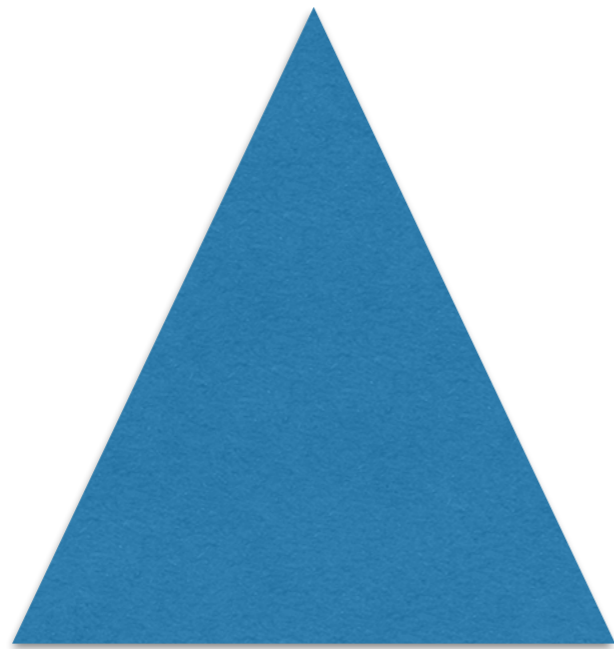
obstacle

extended obstacle

Consider a disk robot of radius r in 2D. Show the extended obstacle corresponding to a triangle.



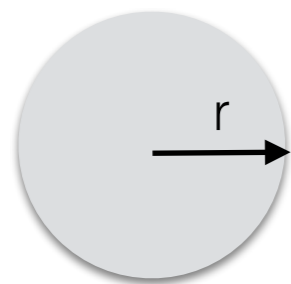
robot



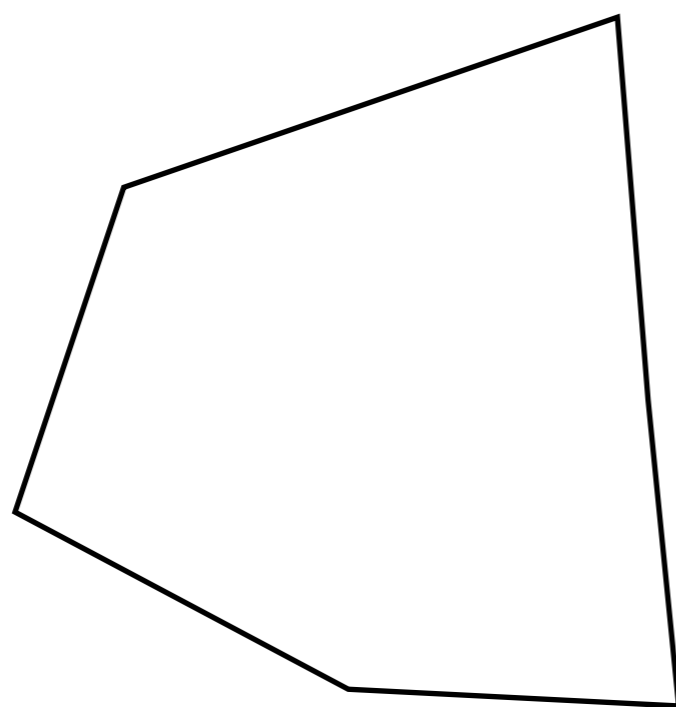
obstacle

extended obstacle

Consider a disk robot of radius r in 2D. Show the extended obstacle corresponding to a convex polygon, as below.



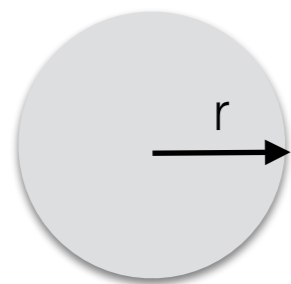
robot



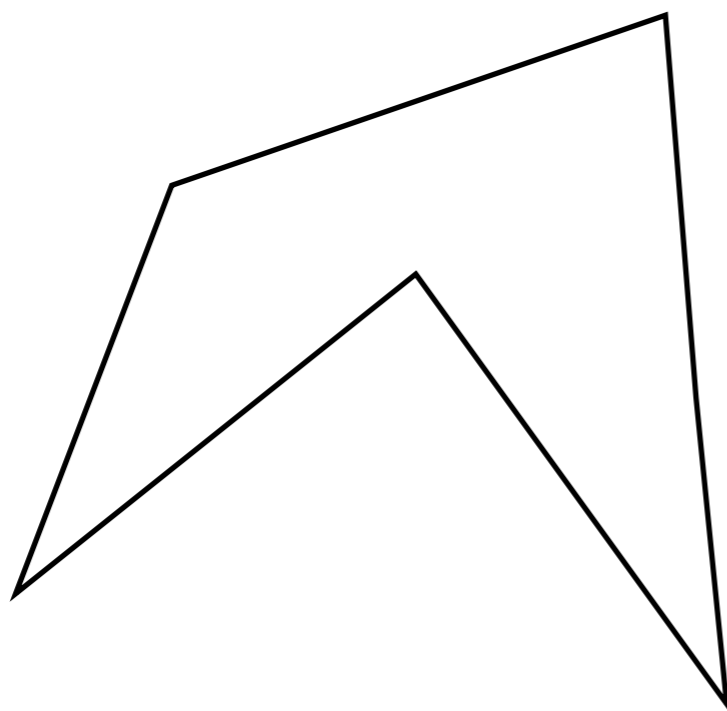
obstacle

extended obstacle

Consider a disk robot of radius r in 2D. Show the extended obstacle corresponding to the obstacle below



robot



obstacle

extended obstacle