Visibility graph:
- Nodes are corner points of all obstacles, start and target
- An edge between a pair of nodes \((a,b)\) exists if and only if \(a\) and \(b\) can see another, i.e. if the line \([a,b]\) is not interrupted by an obstacle. Edges of polygons are edges in the visibility graph, too.
Visibility graph:
- Edge costs correspond to the Euclidean distance
- Shortest path search in the visibility graph (e.g. with Dijkstra) delivers shortest path between start and target
For extended objects which are invariant to point reflection:

- Pick centroid of the object and expand all obstacles by the corresponding Minkowski-sum
- Like that the path finding of the extended object can be reduced to the path finding of a point: the shortest path of a circle through the obstacles is equivalent to the shortest path of the center of the circle through the expanded obstacles.
- Problem: Circles have infinite many angles which means that the visibility graph is not computable precisely.
- Solution: Approximate the circle with a polygon which is invariant to point reflection (e.g. hexagon, octagon)
Not computable, but obvious solution:
Annotation:
The triangle is not invariant to point reflection-
If approximated with a circle, there would be no path to the target.
Approach from robotics (motion planning) which may be too expensive for MMOs:

- Choose reference point in the polygon, e.g. a corner.
- Calculate Minkowski difference of the polygon (relating to the reference point) to every polygon (=Minkowski sum of the object point reflected by the reference point)
- Like that the polygon itself „shrinks“ to a point, obstacles „grow“ (see also robotic work space-> configuration space (C-Space, e.g. all positions of a roboter in a room), C-obstacles, free space)
- Move point to the target through free space.
Now the shortest path to the target is again the shortest path in the visibility graph.
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Path finding of such a triangle is thus not solvable with the rather coarse approximation of a circle. But it is possible using the Minkowski difference, which though depends on the shape and can be computationally intensive for a high variety of shapes in a game.
Addition: if another corner of the triangle is chosen as reference point, it looks like this:
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Addition:

Comparison: The orange path was the shortest path found previously. As we can see, it is the same, so the shortest path does not depend on the reference point chosen.