CS 370: Introduction to Computational Geometry

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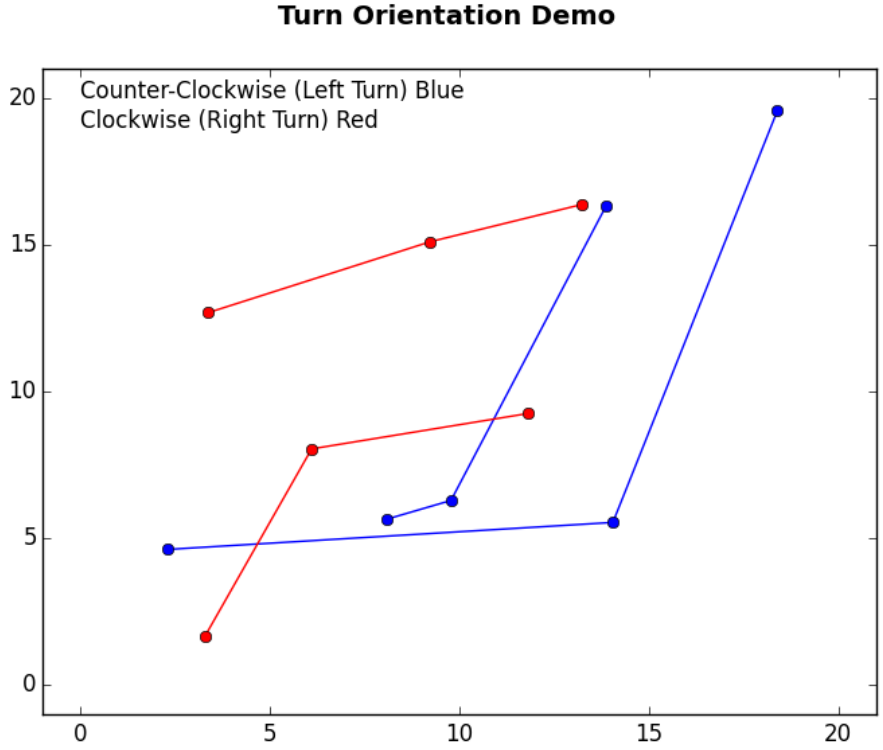
0.1 Turn Orientation

A key recurring theme in computation is the problem of floating point error. A common tool in the geometry toolbox is the idea of **turn orientation**, that is, whether a set of three points makes a clockwise (right), or counter-clockwise (left) turn. In a naive implementation of determining orientation of a turn, the angle of the line formed is calculated using some form of division and arcos. This can lead to loss of precision due to floating point numbers.

A better way to deal with line orientation is to take the determinant of the three points and if the determinant is larger than some ϵ, the points make a clockwise turn. If the determinant falls within $-\epsilon$ to ϵ, we say the points are colinear, and if the determinant is smaller than ϵ, the points make a counter-clockwise turn. This implementation is faster in the sense it does not use division, and more robust.



0.2 Convex Hull