Computational Geometry Project

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**Gift Wrapping Algorithm:**

The gift wrapping algorithm can be used to find the convex hull of a set of points in a plane. This has a wide range of applications in the field of computational geometry such as collision detection, triangulation , etc. The gift wrapping algorithm has a run time of O.

But if we know the number of output points on the convex hull then this is a output sensitive algorithm with a runtime of O(n\*h) where h is the number of points on the convex hull.

The Visualization shows the formation of the convex hull in which each step shows the formation of a single side of the convex edge. The red lines indicate the line between the set of 3 points (p,q,r) for which the orient is calculated.

**Pseudocode:**

1. Given a set S of n points in a plane:
2. Initialize set Convex\_Hull.
3. Find the leftmost point (left\_point) in the set
4. ConvexHull.add(left\_point)
5. Do while the first point is not revisited:
   1. For each point loop through every other point:
      1. Find a point for which Orient(p,q,r) is always negative, i.e. counter clockwise.
      2. p = q

**References:** I used the d3.js library for drawing shapes. I modified the implementation of Kirkpatricks algorithm. To girt wrapping from this repository: <https://github.com/rkaneriya/point-location>