**Incremental Hull Finding Algorithm**

Add the points one at a time.
At each step update the Hull to incorporate the next point.

First Hull is a triangle (3 points).

Let $H_j$ be the Hull after after $j$ points.
Let $P$ be $(j+1)$th point.

Case 1: $P$ is either inside or on $H_j$. Then $H_{j+1} \leftarrow H_j$ \hspace{1cm} \(\text{--- O}(j)\) time.

Case 2: $P$ is not inside $H_j$. Then find two tangent points from $P$ to $H_j$. Replace all points between the two tangent points by $P$. \hspace{1cm} \(\text{--- O}(j)\) time

Total Time complexity: $3+4+5+\ldots+k = O(k^2)$ where $k$ is the total number of points in the Hull. In the worst case $k = n$.
So the total complexity is $O(n^2)$.

**Tangent Line:** The line touching the convex surface at exactly one point.
**Tangent Point:** The point at which tangent line touches the convex surface.

How to Find a Tangent point to a convex polygon. Let $P_i$ is the $i$-th point.

\[
\text{IsTangentPoint}(i, P) \\
\quad \text{// i is the index of the point in the Polygon.} \\
\quad \text{return } \text{isLeftOn}(P_{i-1}, P_i, P) \oplus \text{isLeftOn}(P_i, P_{i+1}, P)
\]

NOTE: Because of the cyclic nature of the polygon, when $i = 0$, $P_{i-1}$ is $P_{n-1}$. and when $i = n-1$, $P_{i+1}$ is $P_0$. 