Merge hull

1. Partition the given set \( S \) of \( n \) points into two (almost equal) halves, say \( S_1 \) and \( S_2 \).

2. Recursively compute the convex hulls \( \text{CH}(S_1) \) and \( \text{CH}(S_2) \).

3. Combine or merge \( \text{CH}(S_1) \) and \( \text{CH}(S_2) \) into \( \text{CH}(S) \).

\[
T(n) = 2T\left(\frac{n}{2}\right) + O(n) + O(\log n)
\]

\[
\Rightarrow T(n) = O(n \log n)
\]
points of support?

H.W. Exercise

Use Graham Scan somehow to merge in $O(n)$ time.
Insertion Hull

Start with any 3 points that define a \( \triangle \)

Insert the next point until we have exhausted all \( n \) points

If the next point falls within the \( C^i \) (Convex hull of first \( i \) points)
then \[
\]
else construct \( C^{i+1} \) by finding the two tangents

To maintain an ordered sequence, we can use a Binary search tree (balanced).

\( \underline{1.} \) All operations can be done in \( O(\log n) \) time per point.

\( \underline{2.} \) Find the tangents