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CSCI 264
Homework 2

Problem 5

In order to determine which points lie on the outside of a convex hull, the algorithm must have some way of comparing each point to every other point. It needs to know where every point is in relation to every other point in order to guarantee finding the extremes. The fastest way to establish a point's relationship with other points is to sort them according to a useful criteria that they all share, such as angle, y-value, or distance. Since any sorting method is at least $\Omega(n \log n)$, it demonstrates that it is impossible to compare every point against each other meaningfully faster than $n \log n$. Thus, every convex Hull algorithm must have $\Omega(n \log n)$ running time.