

P2) Divide : in half

Base Case: 1 or 2 lines

return both

Conquer: Compare pointers in subsets

if slopes are of same orientation then compare magnitudes of slopes

if the steeper line is visible over the other lines range of visibility then add steeper line and toss other line advance pointers

else add both, advance pointers

if signs are different then

advance pointer of the set with the smaller sloped line

~~repeat until~~ return new subset

repeat until solution is achieved

Runtime: $O(n \log n)$

recursively dividing sets in half $O(\log n)$

iterating over each subset in merge step $O(n)$

Comparing $O(1)$

merge is called within recursive steps, function, $O(\log n) \times O(n) = O(n \log n)$

Proof: BC: for 2 lines
both are visible

IS: we only want lines that are visible
by repetitively splitting sets in half down
to the base case of two lines, we will be able
to compare lines and decide which to keep and
which not to keep.

1. if a line has the same signed slope as another,
~~but~~ and steeper slope, we know that if it is
visible over the domain that the other line
is visible then this line must be visible, so we
add it to the next set
2. if a line has a less steep slope than the other
as long as the other line does not cover it's
domain then we can add both because both will
be visible
3. if two lines have differently oriented slopes,
then they are both visible and we can add
them both to the next set.

This is what the algorithm does so it must
be correct