

Algorithm Analysis - CSE 102

Want to distill away detail fluff to determine the
Essence of Algorithms Performance O, Θ, Ω - notations
Prove Algorithms Correct / Incorrect through Formal Methods

Algorithm - Computational Process for solving Problems

Analysis : Correctness Proof

Quantity Time & Memory Requirement
Design for new problems / applications

The Convex Hull Problem

Given : Set of Points

Result : Convex Hull : Smallest convex polygon containing all points
Which of Given points is one of the outermost / perimeter points

Gift Wrapping Approach :

- 1 Start @ Extreme (lowest, topmost, etc)
 - 2 Extend out line (as sheet of wrapping paper)
 - 3 Rotate 'Paper' Around Points & pull tight
- All points paper catches are part of convex hull

From start, compute angles to all other pts, smallest → first 'snag'
Repeat until start is returned to

Time Complexity : $O(n^2)$ for n given points

Divide & Conquer :

Split Points into 2 partitions

Solve for each partition

Tangent Connecting Parts is on convex hull