

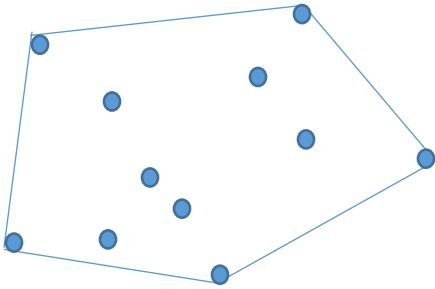
Data Structure Lab

Assignment-2

Date of Assignment: 03-July-2017

Date of Submission: 09-August-2017

In this assignment, we will learn about convex hull. Given a set of pegs, you create a shape by stretching a rubber band around the pegs. This is a convex polygon, named convex hull. See the figure below:



A simple polygon is convex if, given any two points on its boundary or in its interior, all points on the line segment drawn between them are contained in the polygon's boundary or interior. Formally, the convex hull of S is the smallest convex polygon that contains all the points of S .

How do you find a convex hull from a set of n points in 2-D plane?

1. let p_0 be the point in Q with the minimum y -coordinate, or the leftmost such point in case of a tie
2. let $\langle p_1, p_2, \dots, p_m \rangle$ be the remaining points in Q , sorted by polar angle in counterclockwise order around p_0 (if more than one point has the same angle, remove all but the one that is farthest from p_0)
3. PUSH(p_0, S)
4. PUSH(p_1, S)
5. PUSH(p_2, S)
6. for $i \leftarrow 3$ to m
7. while the angle formed by points NEXT-TO-TOP(S), TOP(S), and p_i makes a non-left turn
8. POP(S)
9. PUSH(p_i, S)
10. return S

Write a C (C++/Java/Python not allowed) program to find the convex hull of n points. First read the number of test cases T . For each testcase, read n , the number of points. Subsequently read n points.