

2004 Paper 13 Question 1

Data Structures and Algorithms

- (a) Describe an efficient algorithm to determine whether two finite line segments in a plane intersect. You may assume that the end points of each line are given as x - y coordinates. [8 marks]
- (b) Describe in detail an efficient algorithm to find the convex hull of a set of points lying on a plane. Show that the complexity of the Graham scan used in the algorithm is $O(n)$ and that the algorithm as a whole has complexity $O(n \log n)$. [8 marks]
- (c) Discuss how it is possible to eliminate many of the points before the convex hull algorithm is entered. [4 marks]