Data Structures and Algorithms

(a) Outline how you would determine whether the next line segment turns left or right during the Graham scan phase of the standard method of computing the convex hull of a set of points in a plane. [5 marks]

(b) Describe in detail an efficient algorithm to determine how often the substring ABRACADABRA occurs in a vector of $10^6$ characters. Your algorithm should be as efficient as possible. [10 marks]

(c) Roughly estimate how many character comparisons would be made when your algorithm for part (b) is applied to a vector containing $10^6$ characters uniformly distributed from the 26 letters A to Z. [5 marks]