Design and Analysis of Algorithms

Problem #1
You are given a list of unique numbers that were sorted in ascending order but then rotated. For example, [15, 22, 5, 6, 9, 10]. Write an $O(\log n)$ algorithm to find the "rotation point" which is the index of the smallest number in the list given that list does not contain any duplicates.

Problem #2
Given two DNA sequences:
Sequence 1: “AGGTAB”
Sequence 2: “GTXAYB”

a) Construct a Longest Common Subsequence (LCS) table to find the maximum length and value.

b) Write the algorithm to find the Longest Common Subsequence (LCS)

Problem #3
A network is represented as an undirected graph $G = (V, E)$; Where, $V$ representing computers in the network and $E$ representing the connections between them. A malware infection is detected at time $t_0$ in a node $v_0 \in V$. At each time step $t_{i+1}$, the malware spreads to all computers directly connected to any infected computer. Write an algorithm to compute the minimum number of time steps $T$ required for the malware to propagate to every node in the graph.