Data Structures and Algorithms Practice Questions

1. Given a sorted array of integers, write an algorithm to find the first pair of integers that add up to a given target sum. The array is guaranteed to have at least one such pair.

2. Implement a recursive function to find the nth Fibonacci number, where n is a non-negative integer.

3. You are given a stack of integers and a target integer. Write a function to determine whether it is possible to reach the target integer by popping and adding integers from the stack, and if so, return the sequence of pops and additions that achieves the target.

4. Given a binary search tree, write an algorithm to find the lowest common ancestor of two nodes with given values.

5. Write a function to find the minimum window in a string that contains all characters of a given pattern. The function should return the start and end indices of the window.

6. You are given a graph and two nodes. Write an algorithm to determine whether there exists a path between the two nodes.

7. Implement a dynamic programming solution to find the maximum contiguous subarray sum in a given array of integers.

8. Write a function to merge two sorted linked lists into a single sorted linked list.

9. Given a set of intervals, write an algorithm to merge overlapping intervals and return the resulting set of non-overlapping intervals.

10. You are given a matrix of integers and a target integer. Write a function to determine whether it is possible to find a path in the matrix from the top-left corner to the bottom-right corner, where each step moves either right or down, and the sum of the integers along the path is equal to the target integer. I hope you find these problems challenging and helpful for practicing Data Structures and Algorithms!