Assignment: Divide & Conquer

January 22, 2024

1. Perform matrix multiplication using Divide & Conquer.

2. Let $x_1, x_2, \ldots, x_n$ be a set of integers.
Give an $O(n)$ divide-and-conquer algorithm to find the largest possible sum of a subsequence of consecutive items in the list.

Example:
input: 10, -20, 3, 4, 5, -1, -1, 12, -3, 1
output: 3 + 4 + 5 + -1 + -1 + 12 = 22

Hint_1: Assume you can solve the problem for a list of $n-1$ or fewer items.

Hint_2: As in counting inversions, try to do more than just solve the problem on the induction step: what other information do you need to go from a solution on a list of $n-1$ elements to a solution on a list of one additional element?