More Dynamic Programming

1. You are given a sequence of positive integers $a_1, \ldots, a_n$. Find a strictly increasing subsequence whose *sum* is as large as possible.

   (a) Consider the following sequence:

   $$[8,\ 1,\ 2,\ 3,\ 10].$$

   What is the Longest Increasing Subsequence, and what is the largest sum increasing subsequence?

   (b) Let $S[i]$ be the maximum sum of an increasing subsequence that ends at position i. Compute $S[i]$ for every position in the example above.

   (c) Write a recurrence for $S[i]$, with an appropriate base case and using any smaller values $S[1], \ldots S[i-1]$ as needed.

   (d) Convert your recurrence into a dynamic program. In what order do you compute your entries?