1. Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $\langle 5, 10, 12, 5, 50, 6 \rangle$.

Simplified version of Ex. 15.2-1 of [CLRS] (2nd and 3rd eds)

2. **Longest Common Subsequence** A subsequence of a given sequence is just the given sequence with some elements (possibly none) left out. Given a sequence $s = s_1s_2\ldots s_n$, we say another sequence $r = r_1\ldots r_k$ is a subsequence of $s$ if there is a strictly increasing sequence $i_1, i_2, \ldots, i_k$ of indices such that for all $j = 1\ldots k$ we have $r_j = s_{i_j}$.

Given two sequences $x$ and $y$ we say that a sequence $r$ is a *common subsequence* if $r$ is a subsequence of both $x$ and $y$. In the **longest common subsequence** problem, we are given two sequences $x = x_1\ldots x_n$ and $y = y_1\ldots y_m$ and wish to find a maximum-length common subsequence of $x$ and $y$.

Give a $O(mn)$-time dynamic programming algorithm to solve the longest common subsequence problem.