

Assignment no. 6

Title: Dynamic programming 1

Problem statement:

Implement the standard matrix chain multiplication problem

The dimensions of a chain of n matrices M_1, M_2, \dots, M_n that are to be multiplied, are given as a sequence $A = \langle a_0, a_1, a_2, \dots, a_{n+1} \rangle$. The dimension of the matrix M_i is $a_{i-1} \times a_i$. The goal is to find the most efficient way to multiply these matrices together such that the total number of element multiplications is minimum.

Tasks:

- Solve the problem using dynamic programming techniques.
- Print the sequence of multiplications by clearly placing parenthesis around the matrices.

Example:

Input: $A = \{10, 20, 30\}$

Output: 6000

Explanation: There are only two matrices of dimensions 10×20 and 20×30 . So, there is only one way to multiply the matrices, the cost of which is $10 * 20 * 30 = 6000$.

Input: $A = \{40, 20, 30, 10, 30\}$

Output: 26000

Explanation: $20 * 30 * 10 + 40 * 20 * 10 + 40 * 10 * 30 = 26000$.