Programming assignment 5

Matrix-chain multiplication

Given a chain $A_1, A_2, \ldots, A_n$ of n matrices, where matrix A_n has dimension $p_{i-1} \times p_i$, find the order of matrix multiplications minimizing the scalar multiplications to compute the product.

Input

In the first line, an integer *N* is given which is the number of matrices (1 *N* 100).

In the next line, *N* + 1 integers are given where the *i*th integer is.

Output

In the first line, print the minimum scalar multiplications to compute the product.

In the next line, print an optimal parenthesization of $A_1, A_2, \ldots, A_n$.

When printing it, just print the parenthesis, and the number of matrix without 'A', and every parenthesis and number must be separated by a space.

[Example]

Input	Output
6 30 35 15 5 10 20 25	15125 ((1 (2 3)) ((4 5) 6))

Description

1. File name must be MatrixChainMultiplication.cpp

2. Make the comment of student ID, name and class in the first line of the source code.

ex) 2014601028_Honggildong_A or 2014601028_홍길동_A

3. Please keep the source code that you have submitted for unexpected accident.