#include<bits/stdc++.h>

using namespace std;

int func(vector<int> &v, int i, int k, vector<vector<int>> &dp, vector<vector<int>> &r)

{

if(i == k)return 0;

int mn = 1e9;

if(dp[i][k] != -1)return dp[i][k];

for(int j = i; j < k; j++)

{

int x = (func(v,i,j,dp, r)+func(v,j+1,k,dp, r) + v[i-1]\*v[j]\*v[k]);

if(x < mn)

{

mn = x;

r[i][k] = j;

}

}

return dp[i][k] = mn;

}

int main()

{

cout << "Enter the number of dimensions: \n";

int n; cin >> n;

cout << "Enter the dimensions:\n";

vector<int> v(n);

for(auto &i: v)cin >> i;

vector<vector<int>> dp(n, vector<int>(n, -1)), r(n, vector<int>(n));

cout << "Min cost for matrix chain is: " << func(v, 1, n-1, dp, r) << endl;

stack<int> s;

int a = n - 1;

while(r[1][a] != 0)

{

s.push(a);

a = r[1][a];

}

cout << "The way is: ";

cout << 1 << " ";

while(!s.empty())

{

cout << s.top() << " ";

s.pop();

}

cout << endl;

}

