MATHEMATICAL GRAMMAR SCHOOL CUP
June, 25, 2015

TASK 1. EXPRESSION

Time limit: 1 sec

Memory limit: 64 MB

As you may already know, the set of regular bracket sequences *S* is recursively defined as follows:

1. $\varepsilon \in S$ (an empty string is a regular bracket-sequence)

2. *A*∈ *S* => (*A*) ∈ *S*, *[A]* ∈ *S*, *{A}*∈ *S* (bracketing: if A is a regular bracket-sequence, then (A), [A] and {A} are also regular bracket-sequences)

3. *A, B* ∈ *S* => *AB*∈ *S* (concatenation: if A and B are regular bracket-sequences, then AB is also a regular bracket-sequence)

For example, the sequence (()) is regular (i.e. (())∈ *S* according to rule 2 and the fact that ()∈ *S*; this, in turn, follows by rule 2 from the fact that $\varepsilon \in S$. The latter is simply rule 1.) Also, the sequences {({})}, ()[]{} and {[]}(){[]} are regular, but the sequences {[{{({, ()[{]} and {[]})([{}] are not.

You have given a string which looks like it could be a regular bracket-sequence. Some of the characters are missing, and could have been any character. Write a program EXPRESSION that calculates how many ways the missing characters in the string can be replaced by brackets so that the result is a regular bracket-sequence. This number can be very large, so output only its last 5 digits.

Input
The even integer number N (2 ≤ N ≤ 200), the length of the string, have to be entered from the first line of standard input. The second line contains the string. Missing characters are represented by the '?' symbol.

Output
Output on the standard output a single line with one number – the number of regular bracket sequences the string could have read.

Examples

Example 1	Example 2	Example 3
Input	**Input**	**Input**
4	10	18
[]{}	{?{[?}]?)?	???[???????]?????)
Output	**Output**	**Output**
1	3	58983

Example 1 - **Explanation**: There is only 1 regular bracket sequence from input string
Example 2 - **Explanation**: There are three matching regular bracket-sequences: {({[{}]})}, {}{[{}]()} and {[{[]}]()}.
Example 3 - **Explanation**: Output last five digits the number of regular bracket sequences the string could have read

Task 2 SUM

Time limit: 2 sec

Memory limit: 64 MB

Given an array, A, of N integers, remove exactly K of them from the array. Let MAX be the largest difference of any two remaining numbers in the array, and min the smallest such difference. Select the K integers to be removed from A in such a way that the sum MAX + min is the smallest possible.

Input

From first line of the standard input you can read two positive integers, **N** ($3 \leq N \leq 1\ 000\ 000$) and **K** ($1 \leq K \leq N - 2$). The second line of input contains **N** space-separated integers – the array **A** ($-5\ 000\ 000 \leq Ai \leq 5\ 000\ 000$).

Output

On the only line of the standard output bring out the smallest possible sum **MAX + min**.

Example

Input
6 2
-5 8 10 1 13 -1

Output
13

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TASK 3. SOLDIER

There is a rectangular table with *m* rows and *n* columns. The numbers from 1 to *mn* are written row by row in the table cells. A tin soldier is located in the cell in which the number *r* is written. The tin soldier can move in one step to an adjacent cell of the table upwards, downwards, left or right. Write a program **SOLDIER**, which computes the sum of the numbers in the cells to which the tin soldier can move by doing exactly *k* steps.

Input
The numbers *m*, *n*, *r* and *k* (1 <*m* <100, 1 <*n* <100, 1 <*k* <200) have to be entered from the first line in standard input separated by one space.

Output
Output on the standard output a single line with one number – the computed sum.

Examples

Example 1

Input
3 5 8 1
Output
32

Example 2

Input
5 3 9 1
Output
26

Example 3

Input
4 3 6 2
Output
32

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Example 1 – Explanation: output 32=3+7+9+13
Example 2 – Explanation: output 26=6+8+12
Example 3 – Explanation: output 32=2+4+8+6+12
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