Codeforces Round #243 (Div. 2)

A. Sereja and Mugs

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Sereja showed an interesting game to his friends. The game goes like that. Initially, there is a table with an empty cup and n water mugs on it. Then all players take turns to move. During a move, a player takes a non-empty mug of water and pours all water from it into the cup. If the cup overfills, then we assume that this player lost.

As soon as Sereja's friends heard of the game, they wanted to play it. Sereja, on the other hand, wanted to find out whether his friends can play the game in such a way that there are no losers. You are given the volumes of all mugs and the cup. Also, you know that Sereja has $(n - 1)$ friends. Determine if Sereja's friends can play the game so that nobody loses.

Input

The first line contains integers n and s $(2 \le n \le 100; 1 \le s \le 1000)$ — the number of mugs and the volume of the cup. The next line contains n integers $a_1, a_2, \ldots, a_n$ $(1 \le a_i \le 10)$. Number a_i means the volume of the i-th mug.

Output

In a single line, print "YES" (without the quotes) if his friends can play in the described manner, and "NO" (without the quotes) otherwise.

Examples

input
3 4 1 1 1
output
YES

input
3 4 3 1 3
output
YES

input
3 4 4 4 4
output
NO

B. Sereja and Mirroring

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Let's assume that we are given a matrix b of size $x \times y$, let's determine the operation of mirroring matrix b. The mirroring of matrix b is a $2x \times y$ matrix c which has the following properties:

- the upper half of matrix c (rows with numbers from 1 to x) exactly matches b;
- the lower half of matrix c (rows with numbers from $x + 1$ to $2x$) is symmetric to the upper one; the symmetry line is the line that separates two halves (the line that goes in the middle, between rows x and $x + 1$).

Sereja has an $n \times m$ matrix a. He wants to find such matrix b, that it can be transformed into matrix a, if we'll perform on it **several** (possibly zero) mirrorings. What minimum number of rows can such matrix contain?

Input

The first line contains two integers, n and m $(1 \le n, m \le 100)$. Each of the next n lines contains m integers — the elements of matrix a. The i-th line contains integers $a_{i1}, a_{i2}, \ldots, a_{im}$ $(0 \le a_{ij} \le 1)$ — the i-th row of the matrix a.

Output

In the single line, print the answer to the problem — the minimum number of rows of matrix b.

Examples

input
4 3 0 0 1 1 1 0 1 1 0 0 0 1
output
2

input
3 3 0 0 0 0 0 0 0 0 0
output
3

input
8 1 0 1 1 0 0 1 1 0
output
2

Note

In the first test sample the answer is a 2×3 matrix b:

001
110

If we perform a mirroring operation with this matrix, we get the matrix a that is given in the input:

001
110
110
001

C. Sereja and Swaps

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

As usual, Sereja has array a, its elements are integers: $a[1], a[2], ..., a[n]$. Let's introduce notation:

$$f(a, l, r) = \sum_{i=l}^{r} a[i]; \quad m(a) = \max_{1 \le l \le r \le n} f(a, l, r).$$

A swap operation is the following sequence of actions:

- choose two indexes i, j $(i \neq j)$;
- perform assignments $tmp = a[i], a[i] = a[j], a[j] = tmp$.

What maximum value of function $m(a)$ can Sereja get if he is allowed to perform at most k swap operations?

Input

The first line contains two integers n and k $(1 \le n \le 200; 1 \le k \le 10)$. The next line contains n integers $a[1], a[2], ..., a[n]$ $(-1000 \le a[i] \le 1000)$.

Output

In a single line print the maximum value of $m(a)$ that Sereja can get if he is allowed to perform at most k swap operations.

Examples

input
10 2 10 -1 2 2 2 2 2 2 -1 10
output
32

input
5 10 -1 -1 -1 -1 -1
output
-1

D. Sereja and Table

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Sereja has an $n \times m$ rectangular table a, each cell of the table contains a zero or a number one. Sereja wants his table to meet the following requirement: each connected component of the same values forms a rectangle with sides parallel to the sides of the table. Rectangles should be filled with cells, that is, if a component form a rectangle of size $h \times w$, then the component must contain exactly hw cells.

A connected component of the same values is a set of cells of the table that meet the following conditions:

- every two cells of the set have the same value;
- the cells of the set form a connected region on the table (two cells are connected if they are adjacent in some row or some column of the table);
- it is impossible to add any cell to the set unless we violate the two previous conditions.

Can Sereja change the values of at most k cells of the table so that the table met the described requirement? What minimum number of table cells should he change in this case?

Input

The first line contains integers n, m and k ($1 \le n, m \le 100$; $1 \le k \le 10$). Next n lines describe the table a: the i-th of them contains m integers $a_{i1}, a_{i2}, \ldots, a_{im}$ ($0 \le a_{i,j} \le 1$) — the values in the cells of the i-th row.

Output

Print -1, if it is impossible to meet the requirement. Otherwise, print the minimum number of cells which should be changed.

Examples

input
5 5 2 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1
output
1

input
3 4 1 1 0 0 0 0 1 1 1 1 1 1 0
output
-1

input
3 4 1 1 0 0 1 0 1 1 0 1 0 0 1
output
0

E. Sereja and Two Sequences

time limit per test: 4 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

Sereja has two sequences $a_1, a_2, \ldots, a_n$ and $b_1, b_2, \ldots, b_m$, consisting of integers. One day Sereja got bored and he decided two play with them. The rules of the game was very simple. Sereja makes several moves, in one move he can perform one of the following actions:

1. Choose several (at least one) first elements of sequence a (non-empty prefix of a), choose several (at least one) first elements of sequence b (non-empty prefix of b); the element of sequence a with the maximum index among the chosen ones must be equal to the element of sequence b with the maximum index among the chosen ones; remove the chosen elements from the sequences.
2. Remove all elements of both sequences.

The first action is worth e energy units and adds one dollar to Sereja's electronic account. The second action is worth the number of energy units equal to the number of elements Sereja removed from the sequences before performing this action. After Sereja performed the second action, he gets all the money that he earned on his electronic account during the game.

Initially Sereja has s energy units and no money on his account. What maximum number of money can Sereja get? Note, the amount of Seraja's energy mustn't be negative at any time moment.

Input

The first line contains integers n, m, s, e ($1 \le n, m \le 10^5$; $1 \le s \le 3 \cdot 10^5$; $10^3 \le e \le 10^4$). The second line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^5$). The third line contains m integers $b_1, b_2, \ldots, b_m$ ($1 \le b_i \le 10^5$).

Output

Print a single integer — maximum number of money in dollars that Sereja can get.

Examples

input
5 5 100000 1000 1 2 3 4 5 3 2 4 5 1
output
3

input
3 4 3006 1000 1 2 3 1 2 4 3
output
2