TASK	MOBITEL	UTRKA	STUDENTSKO	BOB	ŠUMA	NORMA
input	standardni input (*stdin*)					
output	standardni output (*stdout*)					
time limit	1 second	1 second	1 second	1 second	2 seconds	3 seconds
memory limit	32 MB	64 MB	64 MB	64 MB	128 MB	64 MB
score	**50**	**80**	**100**	**120**	**140**	**160**
	total 650					

Problem translated from Croatian by: **Paula Gombar**

Grasshopper Marko was jumping happily all over the meadow. He wasn't being careful and his Nokia 3310 fell into a puddle. His mobile phone is now acting funny! The contacts got wet and the keyboard works in a completely unpredictable manner! All the numerical keys broke down. When we press one of them, the mobile phone acts as if we pressed **another key**. Luckily, there are **no two keys** that are **acting the same** so Marko can still **write all the letters**.

Grasshopper Marko was experimenting a bit and found out how each key acts. Now he wants to write a message to his girlfriend. Since he is just a grasshopper, you will do that for him.

To all those who don't remember how mobile phones with keys work, here is a short description.

1	2 abc	3 def
4 ghi	5 jkl	6 mno
7 pqrs	8 tuv	9 wxyz
*	0	#

Keyboard on a very old mobile phone.

The image shows keys with letters that we can get by pressing that key (on a working mobile phone that didn't fall into a puddle). For example, if we want to get letter 'a' we will press key 2 once, and if we want letter 'b' we will press the key 2 twice. If we want to write two letters from the same key consecutively, we have to press the pound key ('#') **exactly once**. For example, if we want to write the string "klor" we will press the keys in the following order: "55#555666777".

INPUT

The first line of input contains 9 integers. The first integer marks the behaviour of key '1', the second the behaviour of key '2', the third the behaviour of key '3', and so on.

Marko is not using keys '*' and '0' because he is a grasshopper. Key '#' can't get broken.

The second line of input contains a string consisting of only lowercase letters of the English alphabet. The length of the word won't exceed 100 characters.

OUTPUT

The first and only line of output must contain the sequence of keys you need to press in order to write Marko's message.

SAMPLE TESTS

input	**input**	**input**
2 3 4 5 6 7 8 9 1 klor	7 8 9 1 2 3 6 5 4 djevojka	9 8 7 6 5 4 3 2 1 skakavac
output	**output**	**output**
44#444555666	68662227778#885	33335585582228#888

Clarification of the first example: All of the keys are shifted one place to the right so the output differs a little bit from the example in the task statement.

Numerous local and international recreational runners were eager to take part in this year's Zagreb Marathon! It is an already traditional race 42 125 meters long. A curious statistical info is that this year every single contestant managed to complete the race, **except one**.

Since marathons are all about taking part, help the organizers figure out, based on the list of registered contestants and ranking list, the identity of the contestant that did not complete the race.

INPUT

The first line of input contains the integer $\mathbf{N}$ ($1 \leqslant \mathbf{N} \leqslant 10^5$), the number of contestants.
Each of the following $\mathbf{N}$ lines contains the names of registered contestants.
The additional $\mathbf{N}-1$ lines contain the names of contestants in the order which they completed the race.

The contestants' names will consist of at least one and at most twenty lowercase letters of the English alphabet.

The contestants' names won't necessarily be unique.

OUTPUT

The first and only line of output must contain the name of the contestant who didn't finish the race.

SCORING

In test cases worth 50% of total points, it will hold $1 \leqslant \mathbf{N} \leqslant 1\,000$.

SAMPLE TESTS

input	**input**	**input**
3 leo kiki eden eden kiki	5 marina josipa nikola vinko filipa josipa filipa marina nikola	4 mislav stanko mislav ana stanko ana mislav
output	**output**	**output**
leo	vinko	mislav

The annual student team competition in table tennis of students enrolled in University of Zagreb takes place next Saturday! Each team consists of **K** students. The excited students, **N** of them, are waiting in queue to register.

Krešo works at the registration desk. He doesn't really feel like doing his job so he decided not to allow students to choose a team. He decided that the first team will consist of the first **K** students standing in queue, the second team the following **K** students, the third one the following **K** students and so on... (**N** will be divisible by **K** so nobody is left hanging.)

Ante has estimated the skill of each player with an integer. He would like to have the **K** strongest players in the first team, the following **K** strongest in the second team and so on...

Krešo has just taken a break and Ante decided to shift the students standing in queue so that he achieves his goal. The way he shifts them is that he tells a student to step out of the queue and go back in queue after another student or to go to the front of the queue. It takes him one minute to do this.

It's possible that Krešo is going to return from his break any moment so Ante needs to achieve his goal as soon as possible. Help Ante determine **the minimal number of minutes** necessary for him to achieve his goal.

INPUT

The first line of input contains the integers **N** and **K** ($1 \leqslant \mathbf{K} \leqslant \mathbf{N} \leqslant 5\,000$). The integer **N** is going to divisible by **K**.
The second line contains **N** space separated integers $\mathbf{v_i}$ ($1 \leqslant \mathbf{v_i} \leqslant 10^9$), $\mathbf{i}^{\text{th}}$ number denotes the skill of the $\mathbf{i}^{\text{th}}$ player standing in queue.

All contestants are going to have distinct levels of skill.

OUTPUT

The first and only line of output must contain the minimal required number of minutes.

SCORING

In test cases worth 30% of total points, it will hold $\mathbf{N} \leqslant 20$.

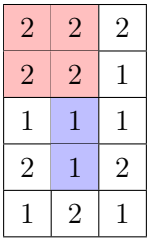
SAMPLE TESTS

input	**input**	**input**
4 1 9 12 5 13	6 2 16 2 1 7 5 10	6 3 7 9 8 3 6 5
output	**output**	**output**
1	1	3

Clarification of the third example: Ante should move the students with skill levels 5, 6 and 3 to the front of the queue. It takes him three minutes to do that.

Little Bob is a famous builder. He bought land and wants to build a house. Unfortunately, the problem is the land's terrain, it has a variable elevation.

The land is shaped like a **rectangle**, **N** meters wide and **M** meters long. It can be divided into **N**·**M** squares (see the image). Bob's house will be shaped like a **rectangle** that has sides **parallel** with the land's edges and its vertices **coincide** with the vertices of the squares. All the land covered by Bob's house must be of **equal elevation** to prevent it from collapsing.



The land divided into squares.
Two possible locations of house are marked with red and blue.

Calculate the number of ways Bob can build his house!

INPUT

The first line of input contains integers **N** and **M** ($1 \leqslant \mathbf{N}, \mathbf{M} \leqslant 1\,000$).
Each of the following **N lines** contains **M** integers $\mathbf{a_{ij}}$ ($1 \leqslant \mathbf{a_{ij}} \leqslant 10^9$), respectively the height of each square of land.

Warning: Please use faster input methods beacuse the amount of input is very large. (For example, use `scanf` instead of `cin` in C++ or `BufferedReader` instead of `Scanner` in Java.)

OUTPUT

The first and only line of output must contain the required number from the task statement.

SCORING

In test cases worth 20% of total points, it will hold **N**, **M** $\leqslant 50$.

In test cases worth 60% of total points, it will hold **N**, **M** $\leqslant 500$.

SAMPLE TESTS

input

```
5 3
2 2 2
2 2 1
1 1 1
2 1 2
1 2 1
```

output

```
27
```

input

```
4 3
1 1 1
1 1 1
2 2 2
2 2 2
```

output

```
36
```

Clarification of the first example: Some of the possible house locations are rectangles with opposite vertices in (0,0)-(1,1), (0,0)-(0,3) (height 2) i (2,0)-(2,2), (1,2)-(2,2) (height 1). The first number in the brackets represents the row number and the second one the column number (0-indexed).

Mirko lives in a big enchanted forest where trees are very tall and grow really quickly. That forest can be represented as an $\mathbf{N} \cdot \mathbf{N}$ matrix where each field contains one tree.

Mirko is very fond of the trees in the enchanted forest. He spent years observing them and for each tree measured how many meters it **grew in a year**. The trees grow **continuously**. In other words, if the tree grows 5 meters in a year, it will grow 2.5 meters in half a year.

Apart from trees, Mirko likes mushrooms from the enchanted forest. Sometimes, he eats suspicious colorful mushrooms and starts thinking about peculiar questions. Yesterday, this unfortunate thing happened and he wondered what would be the size of the **largest connected group of trees** that are all of **equal height** if the trees continue to grow at the same speed they're growing at that moment.

Mirko quickly measured the current height of all trees in the forest and asked you to answer his question.

Two trees are **adjacent** if their fields in the matrix share a common edge.
Two trees are **connected** if there is a sequence of adjacent trees that leads from the first to the second.
A group of trees is **connected** if every pair of trees in the group is **connected**.

INPUT

The first line of input contains the integer $\mathbf{N}$ ($1 \leqslant \mathbf{N} \leqslant 700$).

After the first line, $\mathbf{N}$ lines follow, each of them containing $\mathbf{N}$ integers.

The $\mathbf{i^{th}}$ line contains integers $\mathbf{h_{ij}}$ ($1 \leqslant \mathbf{h_{ij}} \leqslant 10^6$), the initial height of tree in the $\mathbf{i^{th}}$ row and $\mathbf{j^{th}}$ column, given in meters.

After that, $\mathbf{N}$ more lines follow with $\mathbf{N}$ integers.

The $\mathbf{i^{th}}$ line contains integers $\mathbf{v_{ij}}$ ($1 \leqslant \mathbf{v_{ij}} \leqslant 10^6$), the growth speed of the tree in the $\mathbf{i^{th}}$ row and $\mathbf{j^{th}}$ column, given in meters.

Warning: Please use faster input methods beacuse the amount of input is very large. (For example, use `scanf` instead of `cin` in C++ or `BufferedReader` instead of `Scanner` in Java.)

OUTPUT

The first and only line of output must contain the required number from the task.

SCORING

In test cases worth 30% of total points, it will hold $1 \leqslant \mathbf{N} \leqslant 70$.

SAMPLE TESTS

input

```
3
1 2 3
3 2 2
5 2 1
3 2 1
1 2 1
1 2 3
```

output

```
7
```

input

```
2
3 1
3 3
2 5
2 5
```

output

```
3
```

Clarification of the first example: after 8 months (two thirds of a year), the trees located at (0, 0), (0, 1) and (1, 0) will be 13/3 meters in height.

Mirko got an array of integers for his birthday from his grandmother Norma. As any other kid, he was hoping for some money, but got an array. Luckily, in his town there is a pawn shop that buys up arrays. The cost of an array of integers is **min**·**max**·**L** kunas, where **min** is the minimal integer in the array, **max** is the maximal and **L** is the array length. Mirko is going to sell a subsequence of consecutive numbers from his array. He calculated the average price of all such subsequences.

In order to check his result, he wants you to do the same. He will be pleased with only the last 9 digits of the sum of all prices, so you don't need to bother with large and real numbers.

INPUT

The first line of input contains an integer $\mathbf{N}$ ($1 \leqslant \mathbf{N} \leqslant 500\,000$).
Each of the following $\mathbf{N}$ lines contains a member of Mirko's array. The members of the array will be integers from the interval $[1, 10^8]$.

OUTPUT

The first and only line of output must contain an integer, the last 9 digits of the required sum from the task. You **don't need to output** the leading zeroes of that 9-digit integer.

SCORING

In test cases worth 40% of total points, it will hold $\mathbf{N} < 5\,000$.

SAMPLE TESTS

input	**input**	**input**
2 1 3	4 2 4 1 4	6 8 1 3 9 7 4
output	**output**	**output**
16	109	1042

Clarification of the first example: The array consists of two integers, 1 and 3. The possible subsequences Mirko can sell are (1), (3) and (1,3), their prices being 1, 9 and 6, respectively, which is 16 summed up. **Clarification of the second example:** The possible subsequences Mirko can sell are (2), (4), (1), (4), (2, 4), (4, 1), (1, 4), (2,4,1), (4,1,4) and (2,4,1,4). Their prices are 4, 16, 1, 16, 16, 8, 8, 12, 12 and 16, respectively, which is 109 summed up.