



CROATIAN NATIONALS 2009
Dubrovnik, March 22 - 26

PASCAL/C/C++
Senior category, competition day 2

TASK	MIKRO	YOUTUBE	STAKOR
input	standard input		
output	standard output		
time limit (per test case)	2 seconds	1 second	4 seconds
memory limit (heap+stack)	64 MB		
points	50	70	80
	200		



In the national biology competition, Mirko won a brand new microscope and now spends his free time exploring the micro-world.

In one of his experiments, Mirko is studying the movement of bacteria in a sample of water from the stream near his building. He noticed that bacteria move in a very specific way.

A drop of water can be modelled by an infinite square grid. For each bacterium, we know the coordinates of the unit square it is in and the direction it is moving in. The direction is a number between 1 and 8 as in the figure below.

1	2	3
8	B	4
7	6	5

All bacteria move at the same time, at discrete time points, each in its own direction. Sometimes multiple bacteria find themselves in the same square. We say that a meeting of rank K took place at time T if some K bacteria found themselves in the same square exactly T moves after the beginning of the experiment.

Mirko is intrigued by meetings of high rank so he wants to predict which meeting will have **the highest rank** and **when** it will happen. If there will be multiple such meetings of the highest rank, he is interested only in the time of the first meeting.

INPUT

The first line contains an integer N ($1 \leq N \leq 5000$), the number of bacteria.

Each of the following N lines contains three integers X , Y and D ($-1\,000\,000 \leq X, Y \leq 1\,000\,000$), ($1 \leq D \leq 8$), the starting coordinates and direction of one bacteria. X -coordinates increase from left to right, y -coordinates increase upwards.

No two bacteria will initially share the same coordinates.

The input will guarantee that at least one meeting will occur.

OUTPUT

On the first line, output the highest rank of all meetings.

On the second line, output the time of the first meeting of this highest rank.



EXAMPLES

input 4 2 2 2 2 3 6 5 1 2 5 9 6 output 2 4	input 5 1 1 1 -6 0 3 -2 0 2 1 7 7 -6 4 4 output 3 4
----------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------



N students are bored in computer class so they watch funny video clips on YouTube.

The site contains K popular clips, numbered 1 through N. When a video clip is watched, a list of similar video clips is displayed on the side.

Every student picks a video clip from the main page and starts watching it. After exactly one minute every student gets bored of his or her video clip, so he opens the **first** video clip from the list of similar clips on the side (even if he already watched that clip).

Write a program that determines for each student which video clip he will be watching **during the M-th minute** of the class.

INPUT

The first line contains three integers N, K and M ($1 \leq N, K \leq 100\,000$) ($1 < M \leq 1\,000\,000\,000$), the numbers of students, video clips and minutes.

The second line contains N integers, each between 1 and K, the indices of video clips the students start watching.

The third line contains K integers, each between 1 and K, the index of the first similar clip for each video clip.

OUTPUT

Output N integers, the indices of video clips that students will be watching during the M-th minute.

EXAMPLES

input 4 5 2 1 2 4 3 5 5 1 2 3 output 5 5 2 1	input 2 6 5 1 6 2 3 4 1 4 5 output 1 2
---------------------------------------------------------------------------------------	---------------------------------------------------------------------------------

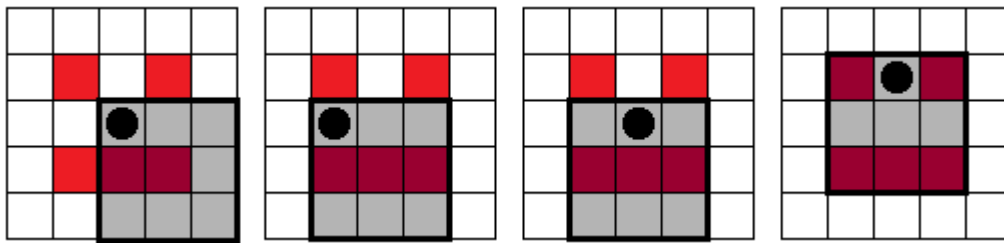


Mad scientist Matija is experimenting with lab rats. He put one lab rat into a cage, the bottom of which is a grid of $N \times N$ square cells. Each square is coloured white or red. The rows are numbered 1 through N from top to bottom; columns are numbered left to right.

The rat can move in the four basic directions (left, right, up and down), but is afraid of red, so it will never step into a red cell.

After having spent some time in the cage and learned where it can move, Matija covered the rat in a box of size $K \times K$, with sides of the box parallel to the sides of the cage. Even though it is now walking in the dark, thanks to its astounding memory, the rat still only enters white cells.

While the rat moves under the box, it is not possible to see it. From outside you can only see when the box moves, which happens when the rat pushes against an edge of the box. When that happens, the box moves in the direction in which the rat pushes.



The solution to the first example. The black circle is the rat, while the grey rectangle represents the box.

Matija made note of the initial position of the box and the directions in which it moved. Write a program that calculates the **smallest number of times the rat might have moved** to cause the box to move like it did.

INPUT

The first line contains two integers N and K ($2 \leq K \leq 10$, $K < N \leq 100$) – the dimensions of the cage and of the box.

Each of the following N lines contains a string of N characters, each of them either 'w' or 'r', the colour of one cell.

The next line contains two integers R and C ($1 \leq R, C \leq N-K+1$), the row and column of the upper-left corner of the box in its initial position.

The next line contains an integer M ($1 \leq M \leq 1000000$), the number of times the box moves.

The next line contains a string of P letters, the directions in which the box moved. Each letter is one of 'L', 'R', 'U' and 'D'.

OUTPUT

Output the smallest possible number of times the rat might have moved.

SCORING

In test cases worth 50 points, P will be less than 10000.



EXAMPLES

input 5 3 wwwww wrwrw wwwww wrrrw wwwww 3 3 2 LU output 3	input 5 3 wwwww wwrrw wrrww wwwww wwwww 3 1 4 URRU output 10	input 6 4 wwwwwr wwrrrr wrwwww wrrrrw wwwwrw wwwww 1 1 4 DRUR output 18
----------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------

In the second example, the rat could have initially been in cell (3, 1) and then moved up, down, down, right, right, right, up, right, up, up.

In the third example, the rat could have initially been in cell (4, 1) and then moved down, up, up, up, right, right, down, right, right, left, left, up, up, down, down, right, right, right.