TASK	**SKOCIMIS**	**PTICE**	**MRAVOJED**	**JEZ**	**SKAKAVAC**	**KRTICA**
input	standard input					
output	standard output					
time limit	1 second	1 second	1 second	1 second	4 seconds	3 seconds
memory limit	32 MB	32 MB	32 MB	32 MB	35 MB	128 MB
points	**30**	**40**	**70**	**100**	**120**	**140**
	500					

Three kangaroos are playing in the desert. They are playing on a number line, each occupying a different integer. In a single move, one of the outer kangaroos jumps into the space between the other two. At no point may two kangaroos occupy the same position.

Help them play as long as possible.

INPUT

Three integers A, B and C ($0 < A < B < C < 100$), the initial positions of the kangaroos.

OUTPUT

Output the largest number of moves the kangaroos can make.

EXAMPLES

input 2 3 5 **output** 1	**input** 3 5 9 **output** 3

Adrian, Bruno and Goran wanted to join the bird lovers' club. However, they did not know that all applicants must pass an entrance exam. The exam consists of N questions, each with three possible answers: A, B and C.

Unfortunately, they couldn't tell a bird from a whale so they are trying to guess the correct answers. Each of the three boys has a theory of what set of answers will work best:

Adrian claims that the best sequence is: A, B, C, A, B, C, A, B, C, A, B, C ...

Bruno is convinced that this is better: B, A, B, C, B, A, B, C, B, A, B, C ...

Goran laughs at them and will use this sequence: C, C, A, A, B, B, C, C, A, A, B, B ...

Write a program that, given the correct answers to the exam, determines who of the three was right – **whose sequence contains the most correct answers**.

INPUT

The first line contains an integer N ($1 \leq N \leq 100$), the number of questions on the exam.

The second line contains a string of N letters 'A', 'B' and 'C'. These are, in order, the correct answers to the questions in the exam.

OUTPUT

On the first line, output M, the largest number of correct answers one of the three boys gets.

After that, output the names of the boys (in alphabetical order) whose sequences result in M correct answers.

EXAMPLES

input	input
5 BAACC	9 AAAABBBBB
output	**output**
3 Bruno	4 Adrian Bruno Goran

Archeologists recently found the remains of Greco-Roman architecture. The location can be modeled as a grid of R·C square cells. For each of the cells, archeologists have determined if some building was there or if the cell has always been empty.

After examining the artifacts in detail, they concluded that the location contains **two buildings** from different periods in time, and that the **floor plans of both buildings are of square shape**.

Because the buildings were from different periods in time, it is possible that their floor plans overlap. Determine the possible location and size (length of the side of the square occupied by the floor plan) for each building.

INPUT

The first line contains two integers R (1 ≤ R ≤ 100) and C (1 ≤ C ≤ 100), the size of the location.

Each of the next R lines contains a strong of C characters '.' (dot) or 'x' (lowercase letter). The character '.' means that nothing was found in that cell, while 'x' indicates that there was a building there.

OUTPUT

For each of the two buildings, output on a single line the row and column of its upper left corner, and the size of the building.

Note: The test data will guarantee that a solution always exists, although it may not necessarily be unique.

EXAMPLES

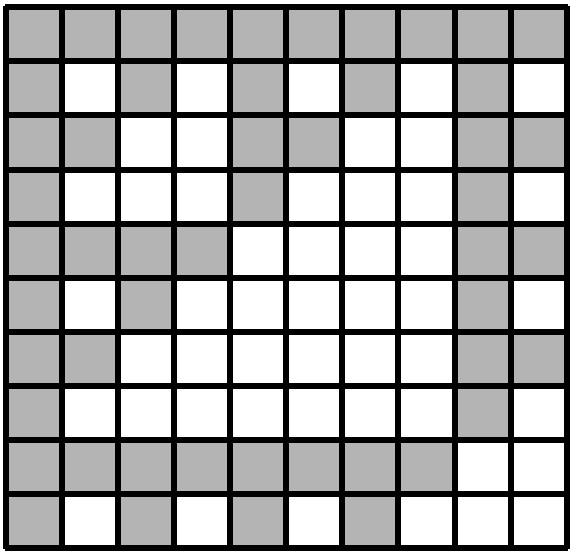
input	input	input
3 3 xx. xxx ... **output** 1 1 2 2 3 1	4 6 xx.... xx.xxx ...xxx ...xxx **output** 1 1 2 2 4 3	5 5 ..... xxx.. xxxx. xxxx. .xxx. **output** 2 1 3 3 2 3

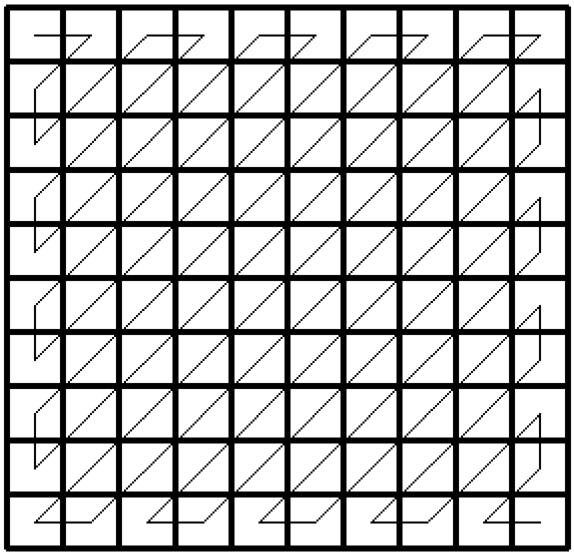
Luka found a very unusual game board in his attic. Surprisingly, it consists of R·C square cells. The rows are numbered 0 to R−1 top to bottom and the columns 0 to C−1 left to right.

What makes the board unusual is the way in which the cells are coloured. Each cell is either grey or white:

- white, if the row and column numbers of the cell, when represented in binary, have at least one digit 1 in the same position. For example, the cell (4, 5) would be white.
- grey, otherwise. For example, the cell (2, 5) would be grey.

The following image shows a board of size 10·10.





Luka's hedgehog likes walking on this unusual board and does it in an unusual way. The hedgehog starts his walk in the cell (0, 0) and continues in the zig-zag pattern as in the second image above. While the hedgehog is walking, Luka counts **how many grey squares** it visited.

After visiting K squares, the hedgehog gets tired and falls asleep. Luka then goes to bed too, happy that he was able count the grey squares.

Knowing the dimensions of the board and the number K beforehand, however, it is possible to write a program that calculates the result faster. This is your task.

INPUT

The first line contains two integers R (1 ≤ R ≤ 1 000 000) and C (1 ≤ C ≤ 1 000 000), the dimensions of the board.

The second line contains the integer K (1 ≤ K ≤ R·C), the total number of squares the hedgehog visits. Note that this number may not fit in a 32-bit integer.

OUTPUT

Output the number of grey cells the hedgehog visits.

GRADING

In test cases worth 50% of points, K will be less than 1 000 000.

EXAMPLES

input	input	input
10 10 6	3 5 11	10 10 100
output	**output**	**output**
5	8	51

A grasshopper is in a flower field. The field contains N·N flowers arranged in N rows and N columns. For each flower in the field, we know how many petals it has.

The grasshopper is initially on the flower in row R and column C. Its goal is to visit as many flowers as possible while obeying these rules:

1. It can only jump into an adjacent row or column. If it jumps into the adjacent row, it must jump at least two columns, and if it jumps into the adjacent column, it must jump at least two rows.

   In other words, it can jump from flower (r_1, c_1) to flower (r_2, c_2) if:

   - $|r_1-r_2| = 1$ and $|c_1-c_2| > 1$ or
   - $|c_1-c_2| = 1$ and $|r_1-r_2| > 1$
2. The number of petals on the next flower must be strictly larger than the number of petals on the previous flower.

Write a program that calculates the largest number of flowers the grasshopper can visit.

INPUT

The first line contains the integer N ($1 \le N \le 1500$), the size of the field.

The second line contains integers R ($1 \le R \le N$) and C ($1 \le C \le N$), the grasshopper's initial position.

The next N lines contain N positive integers separated by spaces, each less than 1 000 000, the numbers of petals on the flowers.

OUTPUT

Output a single integer – the largest number of flowers the grasshopper can visit.

GRADING

In test data worth 50% of points, N will be at most 100.

In test data worth 80% of points, N will be at most 1000.

EXAMPLES

input

```
4
1 1
1 2 3 4
2 3 4 5
3 4 5 6
4 5 6 7
```

output

```
4
```

input

```
5
3 3
20 16 25 17 12
11 13 13 30 17
15 29 10 26 11
27 19 14 24 22
23 21 28 18 13
```

output

```
21
```

Moles are tidy and hard-working animals. Our mole likes to keep its underground residence in utmost order, so that everyone living there knows where to find things.

To achieve this, the mole connected rooms with tunnels so that there is a single unique way to get from one room to any other room. The distance between two rooms is the number of halls passed on the way from one to the other.

Despite all the effort, some of the mole's guests are complaining that it takes too long to walk between certain pairs of rooms.

The mole decided to reconstruct her residence, closing one tunnel and opening a new one, so that the **distance between the farthest two rooms** is the **smallest possible**, but so that it is still possible to reach every room from every other room.

Write a program which determines the distance between the farthest two rooms after reconstruction, which tunnel to close and which to open.

INPUT

The first line contains an integer N ($1 \leq N \leq 300\ 000$), the number of rooms. The rooms are numbered 1 to N.

Each of the next $N-1$ lines contains two integers, the numbers of rooms a tunnel connects.

OUTPUT

Output on separate lines, in order:

- The distance between the two farthest rooms after reconstruction.
- A pair of integers representing a previously existing tunnel, which should be closed.
- A pair of integers, the rooms between which a new tunnel should be opened.

Note: The solution will not necessarily be unique. Output any reconstruction plan which achieves the smallest distance between the farthest two rooms.

GRADING

In test cases worth 40% of points, N will be less than 30.

In test cases worth 70% of points, N will be less than 3000.

Additionally, if the first line of your output is correct and the other two are missing or incorrect, you will receive about 70% of the value of that test case.

EXAMPLES

input 4 1 2 2 3 3 4 **output** 2 3 4 4 2	**input** 7 1 3 2 3 2 7 4 3 7 5 3 6 **output** 3 2 3 7 3