ICPC SOUTH PACIFIC REGIONALS (DIVISION 2)

JANUARY 23, 2021

Contest Problems

This contest contains thirteen problems over 28 pages. Good luck.

For problems that state "*Your answer should have an absolute or relative error of less than* 10^{-9}", your answer, x, will be compared to the correct answer, y. If $|x-y| < 10^{-9}$ or $\frac{|x-y|}{|y|} < 10^{-9}$, then your answer will be considered correct.

Definition 1

For problems that ask for a result modulo m:
If the correct answer to the problem is the integer b, then you should display the unique value a such that:

- $0 \le a < m$
  and
- $(a - b)$ is a multiple of m.

Definition 2

A string $s_1 s_2 \cdots s_n$ is lexicographically smaller than $t_1 t_2 \cdots t_\ell$ if

- there exists $k \le \min(n, \ell)$ such that $s_i = t_i$ for all $1 \le i < k$ and $s_k < t_k$
  or
- $s_i = t_i$ for all $1 \le i \le \min(n, \ell)$ and $n < \ell$.

Definition 3

- Uppercase letters are the uppercase English letters $(A, B, \ldots, Z)$.
- Lowercase letters are the lowercase English letters $(a, b, \ldots, z)$.

Definition 4

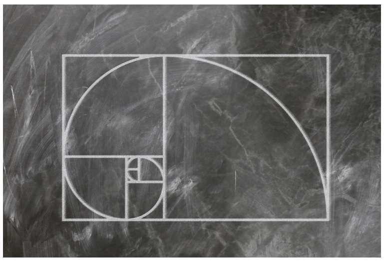
Unless otherwise specified, the distance between two points (x_0, y_0) and (x_1, y_1) is defined as its Euclidean distance:

$$\sqrt{(x_0 - x_1)^2 + (y_0 - y_1)^2}.$$

Definition 5

A positive number is a number that is strictly greater than 0, while a negative number is strictly less than 0. This means that zero is neither negative nor positive. A number is nonpositive if it is not positive and a number is nonnegative if it is not negative.

Problem A
Advanced Interviewing: FizzBuzzNacci
Time limit: 2 seconds



Timothy is interviewing at a big tech company called ICPC (International Cool Programming Corporation). He has been asked to program "FizzBuzz". However, it is a variant of FizzBuzz that he has not seen on Stack Overflow before, and he is starting to panic. You must help him!

In this version of FizzBuzz, an integer N is given. For this N, the FizzBuzz string contains exactly N parts, each of which is either `fizz` or `buzz`. The first part should be `fizz` if the number 1 is a Fibonacci number, or `buzz` otherwise. Likewise, the i-th part should be `fizz` if the number i is a Fibonacci number, or `buzz` otherwise. The first 8 Fibonacci numbers are $0, 1, 1, 2, 3, 5, 8$, and 13 (all other Fibonacci numbers are larger than 13).

Given N, find the FizzBuzz string.

Tip: Read the input from stdin and print the output to stdout. For example, you can use `cin/cout` for C++, `Scanner/System.out` for Java, `input/print` for Python.

Input

The input consists of a single line containing a single integer N ($1 \leq N \leq 10$), which is the integer given by the interviewer.

Output

Display the FizzBuzz string.

Sample Input 1	Sample Output 1
3	fizzfizzfizz

Sample Input 2	Sample Output 2
6	fizzfizzfizzbuzzfizzbuzz

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Problem B
Biggest Integer
Time limit: 3 seconds

Annabelle's team loves big integers. Currently, she has a number and would like to make it bigger. She will do this by taking a digit and inserting it somewhere into her original number.

For example, if her original number is 7853 and she is inserting a 6, then she can make the following numbers: *6*7853, 7*6*853, 78*6*53, 785*6*3, 7853*6*. The largest of these is 78653, so she will choose this.

Given Annabelle's original number and the digit she wishes to insert, what is the largest number she can make?

> Tip: Remember to look at the scoreboard frequently. Typically, the easier problems will be solved by more teams. So if a whole bunch of people have solved a problem, go take a look at it! Note that the scoreboard is frozen during the last hour of the contest, so you will not be able to see other contestant's verdicts in that time (but you will see your own).

Input
The input consists of a single line containing two integers d ($0 \leq d \leq 9$), which is the digit she would like to insert, and F ($1 \leq F \leq 10^{200\,000}$), which is Annabelle's original number.

Output
Display the largest number that Annabelle can make.

Sample Input 1	Sample Output 1
`6 7853`	`78653`

Sample Input 2	Sample Output 2
`1 111111111`	`1111111111`

Sample Input 3	Sample Output 3
`9 123456789012345678901234567890`	`9123456789012345678901234567890`

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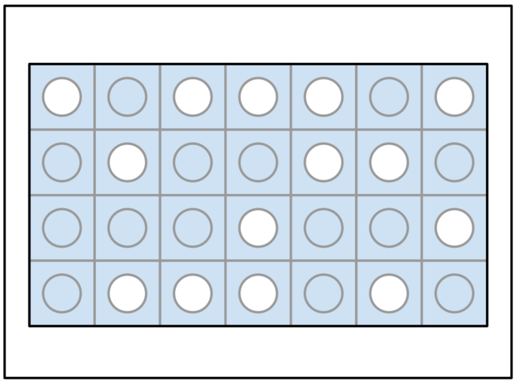
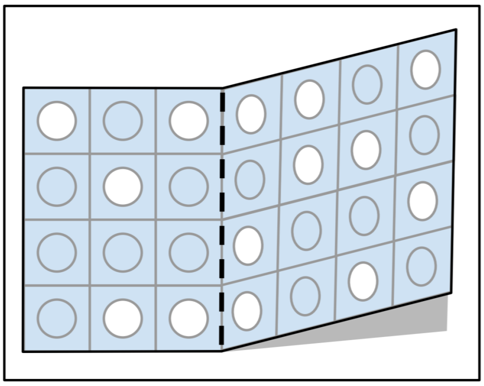
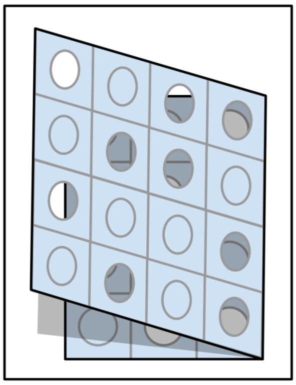
Problem C
Card Folding
Time limit: 2 seconds

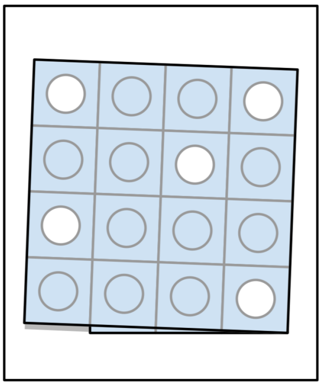
In the prehistoric era of computing, programs were represented as *punch cards*. A punch card is an $R \times C$ grid of cells. A cell has a tiny piece of paper that can be removed to make a hole. Each cell of the grid is either a hole or not.

Savine is trying to program a punch card machine. Unfortunately, she does not have the ability to punch any new holes. Luckily, she already has a punch card with holes punched in it. Her plan is to fold the punch card vertically between two columns of the grid in such a way that the rightmost column is folded to the left. After folding, some of the cells of the grid will line up. For example, say Savine has a punch card with 7 columns. If she folds between columns 3 and 4, then the cells in columns 3 and 4 will line up, the cells in columns 2 and 5 will line up, the cells in columns 1 and 6 will line up, and the cells in column 7 will overhang to the left of column 1, not lining up with any cells in the original punchcard. This new punchcard has 4 columns (from left to right: the 7 column, the (1,6) column, the (2,6) column, and the (3,4) column). There is a hole in this new punchcard only if both of the lined up cells were holes in the original punchcard.


(1)


(2)


(3)


(4)

Given the original punchcard and the column where she is planning on doing the fold, what will the new punchcard look like?

Input

The first line of input contains three integers R ($1 \leq R \leq 50\,000$), which is the number of rows, C ($2 \leq C \leq 10^5$ and $R \times C \leq 10^5$), which is the number of columns, and Y ($1 \leq Y \leq C - 1$), which indicates that Savine plans to fold the punch between column Y and column $Y + 1$.

The next R lines describe the punch card. Each of these lines contains a string of length C containing only the characters 'o' and 'x'. An 'o' represents a cell with a hole and an 'x' represents a cell without a hole.

Output

Display the folded punch card.

Sample Input 1	Sample Output 1
4 7 3 oxooooxo xoxxoox xxxoxxo xoooxox	oxxo xxox oxxx xxxo

Sample Input 2	Sample Output 2
3 3 1 oxx xox xxo	xx xx ox

Sample Input 3	Sample Output 3
3 3 2 oxx xox xxo	ox xx xx

Sample Input 4	Sample Output 4
2 3 1 oox xoo	xo ox

Problem D
Dank Invader
Time limit: 20 seconds

D-Unit the Dank Invader has landed on a peculiar planet. This planet has a series of platforms going from left to right of varying heights. D-Unit must visit a sequence of platforms from left to right, with strictly increasing height.

After D-Unit has finished, they look at the set of platforms they visited. If there are no platforms that D-Unit could have added to the visited platforms that would have maintained the strictly increasing requirement, then D-Unit successfully completed a *dank walk*.

For example, if the platforms are of height $[11, 12, 13, 15, 14]$, and D-Unit visited $12, 13, 14$, then this is not a dank walk since they could have also visited the platform of height 11. Similarly, $11, 13, 14$ is not a dank walk because they could have visited the platform of height 12. Visiting $11, 12, 13, 14$ is a dank walk (even though the platform of height 15 is higher than 14, D-Unit's path would not be left to right).

What is the minimum number of platforms that D-Unit can visit among all dank walks?

Input

The first line of input contains a single integer N ($1 \leq N \leq 10\,000$), which is the number of platforms.

The second line contains N integers, H_i ($1 \leq H_i \leq 10^9$), each denoting the height of the i-th platform.

Output

Display the minimum number of platforms that D-Unit can visit among all dank walks.

Sample Input 1	Sample Output 1
3 1 3 2	2

Sample Input 2	Sample Output 2
5 2 5 1 2 3	2

Sample Input 3	Sample Output 3
6 1 2 3 4 2 5	3

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Problem E
Extended Encryption
Time limit: 2 seconds

Lucy needs to send a note to her significant other. However, she knows there is a chance that the teacher will intercept the note, so she must shuffle the message before she sends it. First, she adds Xs to the end of the message until its length is a multiple of k. She then splits the message into k substrings of equal lengths, and then interleaves those together by taking the first letter of each part, then the second letter of each part, and so on.

For example, if the message is ILOVEYOU and $k = 3$, she adds an X to the end (making the message ILOVEYOUX). She then she splits the message into ILO, VEY, and OUX and interleaves them together to arrive at IVOLEUOYX.

Given k and the message, what is the shuffled message?

Input

The input consists of a single line containing a string s ($1 \leq |s| \leq 1\,000$), which is the secret message, and an integer k ($1 \leq k \leq |s|$), which is how many substrings the message will be split into. s only contains uppercase letters.

Output

Display the shuffled message.

Sample Input 1	Sample Output 1
ILOVEYOU 3	IVOLEUOYX

Sample Input 2	Sample Output 2
ILOVEYOU 2	IELYOOVU

Sample Input 3	Sample Output 3
SOUTHPACIFICPROGRAMMINGCONTEST 7	SPIGINXOACRNTXUCPAGEXTIRMCSXHFOMOTX

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International Collegiate Programming Contest

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Problem F
Flavours Galore!
Time limit: 5 seconds

Kiki is trying to make a tall tower of scoops of ice cream using various flavours. She always eats ice cream from the top down, and she does not mind if there are multiple scoops of the same flavour in the tower. However, she only accepts some flavours directly on top of other flavours. This is because Kiki finds that some flavours taste bad if you eat them immediately after certain other flavours.

For example, suppose she has three flavours to choose from, x, y, and z where x is acceptable on top of y and y is acceptable on top of z. In this case, no other pairs of flavours are acceptable ((x, x), (x, z), (y, x), (y, y), (z, x), (z, y), and (z, z)). All of the following are ice creams (in top down order) Kiki might make: x, y, z, xy, yz, xyz, or an empty ice cream.

How many scoops are in the tallest ice cream that Kiki can make?

Input

The first line of input contains an integer F ($1 \leq F \leq 10^5$), which is the total number of flavours. The second line of input contains an integer P ($0 \leq P \leq 10^5$), which is the number of pairs of flavours such that one is acceptable on top of the other.

The following n lines of input describe which flavours are acceptable on top of which other flavours. Each line contains two integers x ($1 \leq x \leq F$) and y ($1 \leq y \leq F$), which represent that flavour x is acceptable on top of flavour y. Each of these lines are distinct. Note that $x = y$ is possible.

Output

Display the number of scoops in the tallest ice cream possible, or -1 if the number can be arbitrarily large.

Sample Input 1	Sample Output 1
3 3 1 2 2 3 3 1	-1

Sample Input 2	Sample Output 2
3 2 1 2 2 3	3

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Problem G
Golden Grove
Time limit: 4 seconds

Gwen is the governor of Golden Grove. She has decided to reward her citizens with coins based on their productivity. All n citizens have a productivity value. Gwen numbers the citizens from 1 to n. Their productivity numbers are $p_1, p_2, \ldots, p_n$. Person 1 receives no coins. For everyone else, Gwen compares p_i and p_{i-1}. If $p_i \geq p_{i-1}$, then person i receives $p_i - p_{i-1}$ gold coins. If $p_i < p_{i-1}$, then person i receives $p_{i-1} - p_i$ silver coins.

Gwen must buy enough coins to give out to all citizens. She will buy exactly k gold coins and k silver coins (for some value of k). This means that if more gold coins are needed, then there will be wasted silver coins. Similarly, if more silver coins are needed, there will be wasted gold coins. Gwen wants to waste as few coins as possible (she does not care if the wasted coins are gold or silver). She notices that the order in which she numbers the citizens affects the number of wasted coins.

For example, if the citizens have productivity values of $\{11, 15, 17, 22\}$, and Gwen numbers them such that $p_1 = 15, p_2 = 22, p_3 = 17, p_4 = 11$, then person 1 receives no coins, person 2 receives seven gold coins $(22-15)$, person 3 receives five silver coins $(22-17)$, and person 4 receives six silver coins $(17-11)$. In total, Gwen needs to give out seven gold coins and eleven silver coins, so she must purchase $k = 11$ gold and silver coins. This wastes four gold coins. However, if Gwen arranges them such that $p_1 = 15, p_2 = 22, p_3 = 11, p_4 = 17$, then a total of 13 golden coins and 11 silver coins are needed, so there would only be two wasted coins (with $k = 13$).

Given the productivity values of all citizens, determine the minimum number of wasted coins among all possible numberings of citizens.

Input

The first line of input contains a single integer n ($1 \leq n \leq 200\,000$), which is the number of citizens in Golden Grove.

The next n lines describe the citizens' productivity. Each of these lines contains a single integer p ($1 \leq p \leq 10^9$), which is the productivity value of this citizen.

Output

Display the minimum number of wasted coins among all possible numberings of citizens.

Sample Input 1	Sample Output 1
4 11 15 17 22	2

Sample Input 2	Sample Output 2
3 2 1 2	0

Sample Input 3

```
2
1
1000000
```

Sample Output 3

```
999999
```

Problem H
High School Maths
Time limit: 5 seconds

Mr. Locke teaches maths at the local high school. One day, Mr. Locke asks his two best students what their favourite numbers are. He wants to surprise the students with a gift for being such good students, so he decides to give them each one rectangular card whose area is their favourite number.

The teacher goes to the craft store. The store has papers of width $2, 3, 4, \ldots$ (but not of width 1). The store has a sale on now: when purchasing paper with width W, it costs exactly $\$W$ no matter what the length is! The length must be an integer. Mr. Locke has two options: he could purchase two pieces of paper, each with the appropriate area, or he could purchase one piece of paper and cut it into two rectangles, each with the appropriate area. These two rectangles must also have integer side lengths. If Mr. Locke decides to cut the paper, he will cut the paper exactly once, and that cut must be a straight line that splits the paper into two rectangles.

For example, if the two favourite numbers are 10 and 25, then Mr. Locke could purchase a piece of paper with width 5 and length 7 (costing him \$5), then he can cut the paper into two rectangles of area 10 (5×2) and 25 (5×5).

What is the minimum amount of money the teacher can spend to get the two rectangular cards?

> Tip: Pay attention to the bounds given in the statement. Your algorithm must be fast enough and correct for every case. In this problem, x and y are up to 10^{10}, so even doing a simple for loop from 0 to x will be too slow! Also, if you are using C++ or Java, notice that 10^{10} is too big for a 32-bit integer, so you must use a 64-bit integer type. Also make sure your program works for the lower bounds ($x = y = 2$ in this problem).

Input

The input consists of a single line containing two integers x ($2 \leq x \leq 10^{10}$) and y ($2 \leq y \leq 10^{10}$), which are the two students' favourite numbers.

Output

Display the minimum amount of money the teacher can spend.

Sample Input 1	Sample Output 1
`10 25`	`5`

Sample Input 2	Sample Output 2
`12 17`	`19`

Sample Input 3	Sample Output 3
`10 15`	`5`

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Problem I
Iguana Date
Time limit: 2 seconds

Iggy the Iguana is back! This time, he brought his date, Ignia, with him to the corn maze. The corn maze is a square grid where some of the cells are blocked off with impassable corn plants and others are cleared out. Iggy and Ignia can only travel in and through cells that are cleared out. They can move to a cell in any of the four cardinal directions (north, south, east, and west).

The corn maze they chose for their date is special in that every cell that is cleared out can be reached from the start (the top-left of the maze) through exactly one direct path (without revisiting cells).

Iggy and Ignia start in the top-left cell. They stay in that cell for one minute, then move to an adjacent cell. Every minute Iggy and Ignia will move to an adjacent cell. When they reach the bottom-right cell, they stay there for one minute and then leave the maze and their date ends. Both of the iguanas are having a wonderful time and do not want the fun times to end. Therefore, they will choose a path through the maze (possibly revisiting cells) that makes their date last as long as possible. However, Iggy and Ignia do not want to get lost forever, so they will never enter a cell from the same direction more than once.

How long can Iggy and Ignia make their date last?

Input

The first line of input contains a single integer n ($2 \leq n \leq 100$), which is the length of each side of the square grid representing the maze.

The next n lines describe the grid. Each of these lines contains a string of length n containing only the characters '`.`' and '`#`'. A '`.`' represents a cell that is cleared out and which Iggy and Ignia can travel through, and a '`#`' represents a cell blocked off with corn plants.

Output

Display the length of Iggy and Ignia's date.

Sample Input 1	Sample Output 1
3 ... .#. #..	7

Sample Input 2	Sample Output 2
4 ..#. #... ..## #...	15

Sample Input 3	Sample Output 3
4 ..## #.#. .... #.#.	13

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Problem J
Judging the Judging Servers
Time limit: 7 seconds

To prepare for future growth of the number of contests and contestants, ICPC wants to upgrade its online judging capabilities. You have been hired for this job and your first task is to analyse the current systems and set appropriate service-level objectives. ICPC provides you with logs created by judging servers and expected levels of responsiveness. You have to determine how well the current systems meet these expectations.

Judging systems handle a sequence of problem attempts. An attempt starts when a contestant submits a program for judging and finishes when the system responds with a verdict. The log files show these two times for each attempt. The response time for an attempt is the difference between the two associated times.

Responsiveness is measured regularly, once every t time units, and always considers the immediately preceding time interval of d units. More precisely,

- there are a total of n measurements;
- the k-th measurement ($1 \leq k \leq n$) is performed at time kt, and
- it concerns all attempts which have received a verdict at a time x where $kt - d \leq x < kt$.

A measurement indicates sufficient responsiveness if either (i) there are no attempts in the corresponding time interval, or (ii) there are attempts and the p-th percentile of the response times for the corresponding attempts is at most r time units. The p-th percentile of a non-empty collection of (not necessarily distinct) numbers is the smallest number s such that at least p percent of all numbers in the collection are less than or equal to s.

Determine how many measurements indicate sufficient responsiveness.

Input

The first line of the input contains five integers n ($1 \leq n \leq 10^6$), t ($1 \leq nt \leq 10^9$), d ($1 \leq d \leq 10^9$), p ($1 \leq p \leq 100$) and r ($1 \leq r \leq 10^9$) with the meaning described above. The second line of the input contains an integer m, where m ($1 \leq m \leq 250\,000$) is the number of attempts. The remaining $2m$ lines of the input each contain a log entry.

A log entry consists of two integers a and b followed by a character c, where a ($1 \leq a \leq 10^9$) is the timestamp of the log entry, b ($1 \leq b \leq m$) is the attempt number, and c ($c \in \{\texttt{S}, \texttt{R}\}$) indicates whether the program has been submitted for judging ($c = \texttt{S}$) or the system has responded with a verdict ($c = \texttt{R}$).

Log entries are sorted in non-decreasing order of their timestamps. For each attempt, the log contains exactly one `S` entry and, having a greater timestamp, exactly one `R` entry. Submission entries in the log have consecutive attempt numbers.

Output

Output the number of measurements that indicate sufficient responsiveness.

Sample Input 1

```
2 10 15 50 3
4
1 1 S
1 2 S
4 3 S
4 2 R
5 1 R
10 3 R
10 4 S
11 4 R
```

Sample Output 1

```
1
```

Sample Input 2

```
10 100 50 50 1
3
548 1 S
548 2 S
549 1 R
550 2 R
898 3 S
900 3 R
```

Sample Output 2

```
9
```

Sample Input 3

```
1 100 1000 51 5
2
1 1 S
2 1 R
3 2 S
9 2 R
```

Sample Output 3

```
0
```

Problem K
Keeping Social Distance
Time limit: 2 seconds

To stay safe, parks and other areas have put social distancing rules in place. You have been people-watching from a distance at a park and want to calculate how well people are social distancing. To do so, you will calculate the "Social Distance Factor" of the people at the park.

The Social Distance Factor is defined as the minimum distance between any two people that are not in the same group. Each person at the park belongs to exactly one group and each group can contain either one or two people.

For example, say there are 3 people at the park, Alice, Bart, and Cathy and their locations are $(0, 0)$, $(3, 2)$, and $(4, 1)$, respectively. If all three people were in groups by themselves, the Social Distance Factor would be $\sqrt{2}$ because the distance between Bart and Cathy is $\sqrt{(3-4)^2 + (2-1)^2} = \sqrt{2}$. But, if Bart and Cathy were in a group together, the Social Distance Factor would be $\sqrt{13}$ because the distance between Alice and Bart is $\sqrt{(0-3)^2 + (0-2)^2} = \sqrt{13}$. Note that although Bart and Cathy are closer together, this distance does not count because they are in a group together.

You do not know which people are in groups together. So, you have decided to consider all of the possible ways that the people in the park could be in groups. What is the maximum Social Distance Factor among all possible group assignments?

Input

The first line of the input contains a single integer n ($3 \leq n \leq 100$), which is the number of people at the park.

The next n lines describe the locations of the people at the park. Each line contains exactly two integers x ($-10\,000 \leq x \leq 10\,000$) and y ($-10\,000 \leq y \leq 10\,000$), which are the coordinates of the person at the park. No two people are at the same location.

Output

Display the maximum possible Social Distance Factor squared.

Sample Input 1	Sample Output 1
3 0 0 3 2 4 1	13

Sample Input 2	Sample Output 2
4 1 1 5 5 2 2 4 4	8

Sample Input 3	Sample Output 3
3 -1 3 3 4 -2 -1	17

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Problem L
Loudest Integer
Time limit: 2 seconds

Max is yelling out a series of integers, digit by digit. Each integer contains exactly 9 digits. Max yells each possible digit (0 through 9) at a different volume. The volume of an integer is defined as the average volume of every digit in the integer. The loudest integer has the largest volume. Which integer is the loudest integer? If there is a tie, the loudest is the integer that is yelled first.

Input

The first line of input contains an integer n ($1 \leq n \leq 1\,000$), the total number of integers that Max yells.

The following line of input contains 10 integers which describe the volume of each digit. The first is the volume of digit 0, the second is the volume of digit 1, and so on. Each volume is in the inclusive range from 0 to 100.

The final n lines of input describe the integers that Max is yelling in sequence. Each line contains a single integer k ($10^8 \leq k < 10^9$), which is an integer Max is yelling (that is, the number of digits is exactly 9 and has no leading zeroes).

Output

Display the loudest integer.

Sample Input 1	Sample Output 1
2 2 9 2 2 2 2 2 2 2 2 222222222 122222222	122222222

Sample Input 2	Sample Output 2
3 21 22 23 24 25 26 11 11 11 11 123456789 789012345 234567890	789012345

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Problem M
Mountain Waterfall
Time limit: 1 second

Leo is on holiday and has been enjoying watching water fall downhill. The hills that Leo has been watching have large rocks on them. The water splits and flows left and right when it hits a large rock. It tends to make an interesting vista.

A hill that Leo watches can be described by a 2-dimensional grid of squares with R rows and C columns. Some squares contain rocks (denoted by the character 'o'), others contain water (denoted by the character '*'), and the rest are empty (denoted by the character '.'). Water always flows to the cells directly under it unless it hits a rock. If it hits a rock, the flow splits and goes both left and right. The first row, last row, first column, and last column are always completely filled with rocks.

For example, consider this hill:

```
ooooooo      ooooooo
o*....o      o***..o
ooo...o  →   ooo*..o
o.....o      o..*..o
o.....o      o*****o
ooooooo      ooooooo
```

First, the water will split left and right, since there is a rock under it. It can only flow right, however, since there is a rock to the left. This continues until it can flow down again. Once it hits to bottom, it flows both left and right.

Given the initial configuration of the hill, where will the water flow?

> Tip: Make sure your output is *exactly* what is expected. Even one non-whitespace character wrong will give you a Wrong Answer! (we try our best to not penalize teams who only differ by whitespace). Make sure you use the Sample Input and Sample Output provided and ensure your code produces exactly what is expected.

Input

The first line of input contains two integers R ($3 \le R \le 50$), which is the number of rows, and C ($3 \le C \le 50$), which is the number of columns.

The next R lines describe the hill. Each of these lines contains a string of length C containing only the characters '.', 'o', and '*'. A '.' represents an empty cell, a 'o' represents a cell with a rock, and a 'x' represents a cell with water. The topmost row, bottomost row, leftmost column, and rightmost column only contain 'o'.

Output

Display a grid of characters showing where water will flow.

Sample Input 1

```
6 7
ooooooo
o*....o
ooo...o
o.....o
o.....o
ooooooo
```

Sample Output 1

```
ooooooo
o***..o
ooo*..o
o..*..o
o*****o
ooooooo
```

Sample Input 2

```
5 5
ooooo
o.*.o
o.o.o
oo.oo
ooooo
```

Sample Output 2

```
ooooo
o***o
o*o*o
oo.oo
ooooo
```

Sample Input 3

```
3 3
ooo
o.o
ooo
```

Sample Output 3

```
ooo
o.o
ooo
```

Sample Input 4

```
5 5
ooooo
o..*o
ooooo
o*..o
ooooo
```

Sample Output 4

```
ooooo
o***o
ooooo
o***o
ooooo
```