TASK	POT	ESEJ	MOLEKULE	SLON	NEKAMELEONI	DOMINO
input	standard input (*stdin*)					
output	standard output (*stdout*)					
time limit	1 seconds	1 second	1 second	1 second	3 seconds	4 seconds
memory limit	64 MB	64 MB	64 MB	64 MB	512 MB	512 MB
score	**50**	**80**	**100**	**120**	**140**	**160**
	total 650					

The teacher has sent an e-mail to her students with the following task:
"Write a programme that will determine and output the value of X if given the statement:

$$X = number_1^{pot_1} + number_2^{pot_2} + ... + number_N^{pot_N}$$

and it holds that $number_1$, $number_2$ to $number_N$ are integers, and pot_1, pot_2 to pot_N one-digit integers." Unfortunately, when the teacher downloaded the task to her computer, the text formatting was lost so the task transformed into a sum of N integers:

$$X = P_1 + P_2 + ... + P_N$$

For example, without text formatting, the original task in the form of $X = 21^2 + 125^3$ became a task in the form of $X = 212 + 1253$. Help the teacher by writing a programme that will, for given N integers from P_1 to P_N determine and output the value of X from the original task.
Please note: We know that it holds $a^N = a \cdot a \cdot ... \cdot a$ (N times).

INPUT

The first line of input contains the integer N ($1 \leqslant N \leqslant 10$), the number of the addends from the task. Each of the following N lines contains the integer P_i ($10 \leqslant P_i \leqslant 9999, i = 1 ... N$) from the task.

OUTPUT

The first and only line of output must contain the value of X ($X \leqslant 1\,000\,000\,000$) from the original task.

SAMPLE TESTS

input	**input**	**input**
2 212 1253	5 23 17 43 52 22	3 213 102 45
output	**output**	**output**
1953566	102	10385

Clarification of the first example: $21^2 + 125^3 = 441 + 1953125 = 1953566$.

The impending doom called final examination is approaching this year's high school seniors: one of the compulsory tasks is going to be writing an essay in their mother tongue. Mirko is under the impression that certain political parties are going to keep their promises, those regarding informatization and digitalization, which is why he thinks that this year's essays are going to be marked by a computer, instead of a human.
To test his doubts, Mirko is going to write an essay that doesn't necessarily make sense at all, but should pass the automatic basic conditions check. The essay passes the check if:

- it contains at least A, and at most B words;
- every word contains at least one, and at most 15 letters;
- the used vocabulary is large enough, in other words, the essay contains at least $\frac{B}{2}$ **different** words.

Mirko was up late last night watching Big Brother, so he is asking you to write such an essay instead of him. The essay should be output in a single line, using only lowercase letters of the English alphabet and spaces (therefore, without punctuation such as dots, commas and such). The words used can, but need not be, words from the English (or any) language.

INPUT

The first and only line of input contains the integers A and B ($1 \leqslant A \leqslant B \leqslant 100\,000$) from the task.

OUTPUT

The first and only line of output must contain any essay that meets the rules from the task.

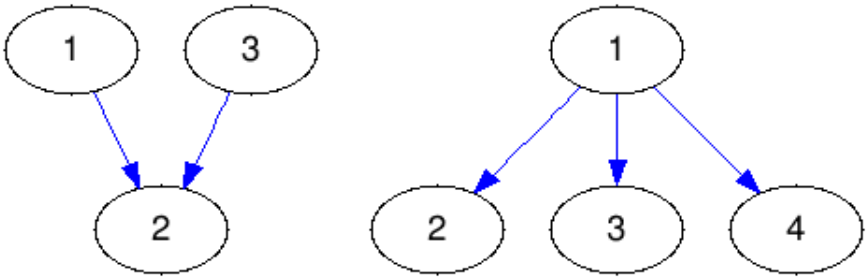
SAMPLE TESTS

Please note: each of the lower outputs is written in one line, but is broken into several lines because of the lack of space.

ulaz	**ulaz**	**ulaz**
2 7	26 30	19 19
izlaz	**izlaz**	**izlaz**
this shakespeare fella is good	the teacher told us that we did not need to read that but it was too loud to hear so can i still get points for this	the consequences of the conceptual discourse in the aforementioned novella seemingly reflect the paradigmatic tendencies of the stylistical classification

Scientists in a chemical lab in Croatia have been studying the chemical bonds between different molecules. They have a special interest in a group of molecules of the chemical compound nitro hydrogen laminate.
The compound consists of N molecules bound together by $N-1$ covalent bonds and all the molecules are directly or indirectly **tied together** with bonds in a single structure.

The scientists want to modify the compound in a way that all the covalent bonds are transformed into **directed** covalent bonds. Because of the instability of the newly created compound, each molecule will have a large number of impulses coming out of it and travelling to other molecules using the **directed** bonds. An impulse can travel using the directed covalent bond only in the direction of the bond itself.



The instability of the compound is defined as the **largest** possible number of bonds a **single** impulse can use to travel. The scientists want to direct the compound's covalent bonds in a way that the newly created compound is as stable as possible. In other words, their goal is to create a compound with the **minimal longest path** an impulse can take during its travel.

Help the scientists determine the direction of each covalent bond in the compound.

INPUT

The first line of input contains the integer N ($2 \leqslant N \leqslant 100\,000$).
Each of the $N-1$ lines contains the integers a_i and b_i ($1 \leqslant a_i, b_i \leqslant N$) that denote that molecules a_i and b_i are connected with a covalent bond.

OUTPUT

Output $N-1$ lines, where each line must contain 1 if the covalent bond is going to be directed from a_i to b_i, otherwise it contains 0.
If there are multiple possible solutions, output any.

SCORING

In test cases worth at least 30% of total points, it will hold $N \leqslant 20$.

SAMPLE TESTS

ulaz	**ulaz**
3 1 2 2 3	4 2 1 1 3 4 1
izlaz	**izlaz**
1 0	0 1 0

Clarification of the first sample: The example corresponds to the left image from the task. The longest path an impulse can take is 1. Notice that 0 1 is also a correct solution.
Clarification of the second sample: The example corresponds to the right image from the task.

A student called Slon is very mischievous in school. He is always bored in class and he is always making a mess. The teacher wanted to calm him down and "tame" him, so he has given him a difficult mathematical problem.

The teacher gives Slon an arithmetic expression A, the integer P and M. Slon has to answer the following question: "What is the **minimal non-negative** value of variable x in expression A so that the remainder of dividing A with M is equal to P?". The solution will always **exist**.

Additionally, it will hold that, if we apply the **laws of distribution** on expression A, variable x will not multiply variable x (formally, the expression is a polynomial of the first degree in variable x).

Examples of valid expressions A: $5 + x * (3 + 2)$, $x + 3 * x + 4 * (5 + 3 * (2 + x - 2 * x))$.
Examples of invalid expressions A: $5 * (3 + x * (3 + x))$, $x * (x + x * (1 + x))$.

INPUT

The first line of input contains the expression A ($1 \leqslant |A| \leqslant 100\,000$).
The second line of input contains two integers P ($0 \leqslant P \leqslant M - 1$) i M ($1 \leqslant M \leqslant 1\,000\,000$).
The arithmetic expression A will only consists of characters +, -, *, (,), x and digits from 0 to 9.
The brackets will always be paired, the operators +, - and * will always be applied to exactly two values (there will not be an expression (-5) or (4+-5)) and all multiplications will be explicit (there will not be an expression 4(5) or 2(x)).

OUTPUT

The first and only line of output must contain the minimal non-negative value of variable x.

SAMPLE TESTS

input	**input**	**input**
5+3+x 9 10	20+3+x 0 5	3*(x+(x+4)*5) 1 7
output	**output**	**output**
1	2	1

Clarification of the first example: The remainder of dividing $5 + 3 + x$ with 10 for $x = 0$ is 8, and the remainder of division for $x = 1$ is 9, which is the solution.

"Hey! I have an awesome task with chameleons, 5^{th} task for Saturday's competition."
"Go ahead..."

(...)

"That's too difficult, I have an easier one, they won't even solve that one."
"You are given an array of N integers from the interval $[1, K]$. You need to process M queries. The first type of query requires you to change a number in the array to a different value, and the second type of query requires you to determine the length of the shortest **contiguous subarray** of the current array that contains all numbers from 1 to K."
"Hm, I can do it in $O(N^6)$. What's the limit for N?"

INPUT

The first line of input contains the integers N, K and M ($1 \leqslant N, M \leqslant 100\,000, 1 \leqslant K \leqslant 50$). The second line of input contains N integers separated by space, the integers from the array. After that, M queries follow, each in one of the following two forms:

- "1 p v" - change the value of the p^{th} number into v ($1 \leqslant p \leqslant N, 1 \leqslant v \leqslant K$)
- "2" - what is the length of the shortest contiguous subarray of the array containing all the integers from 1 to K

OUTPUT

The output must consist of the answers to the queries of the second type, each in its own line.
If the required subarray doesn't exist, output -1.

SCORING

In test cases worth 30% of total points, it will hold $1 \leqslant N, M \leqslant 5\,000$.

SAMPLE TESTS

ulaz

```
4 3 5
2 3 1 2
2
1 3 3
2
1 1 1
2
```

izlaz

```
3
-1
4
```

ulaz

```
6 3 6
1 2 3 2 1 1
2
1 2 1
2
1 4 1
1 6 2
2
```

izlaz

```
3
3
4
```

Mirko received an $N \times N$ table for his birthday, where a non-negative integer is written in each field of the table. Unfortunately, the written numbers are too large for Mirko's taste, so he will place **K dominoes** on top of the table that will cover the fields that are too large.
More precisely, Mirko places the dominoes according to the following rules:

- each domino covers two fields of the table that are adjacent in a row or in a column,
- the dominoes do not overlap (but can touch),
- the sum of all visible (uncovered) fields needs to be as small as possible.

It is your task to determine the required minimal sum of visible fields. The test data will be such that it will always be possible to place K dominoes without overlapping..

INPUT

The first line of input contains the integers N ($1 \leqslant N \leqslant 2000$), the dimensions of the table, and K ($1 \leqslant K \leqslant 8$), the number of dominoes. Each of the following N lines contains N integers from the interval $[0, 1000]$. These $N \times N$ numbers describe Mirko's table.

OUTPUT

The first and only line of output must contain the minimal sum of visible fields after covering the table with dominoes.

SCORING

In test cases worth 70 points, it will hold $K \leqslant 5$.

SAMPLE TESTS

ulaz

```
3 1
2 7 6
9 5 1
4 3 8
```

izlaz

```
31
```

ulaz

```
4 2
1 2 4 0
4 0 5 4
0 3 5 1
1 0 4 1
```

izlaz

```
17
```

Clarification of the first example: We place the domino so it covers fields with numbers 9 and 5.
Clarification of the second example: We place the dominoes so they cover fields [4, 5] and [5, 4] in the third column.