Codeforces Round #319 (Div. 2)

A. Multiplication Table

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Let's consider a table consisting of n rows and n columns. The cell located at the intersection of i-th row and j-th column contains number $i \times j$. The rows and columns are numbered starting from 1.

You are given a positive integer x. Your task is to count the number of cells in a table that contain number x.

Input
The single line contains numbers n and x ($1 \le n \le 10^5$, $1 \le x \le 10^9$) — the size of the table and the number that we are looking for in the table.

Output
Print a single number: the number of times x occurs in the table.

Examples

input
10 5
output
2

input
6 12
output
4

input
5 13
output
0

Note
A table for the second sample test is given below. The occurrences of number 12 are marked bold.

B. Modulo Sum

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a sequence of numbers $a_1, a_2, \ldots, a_n$, and a number m.

Check if it is possible to choose a non-empty subsequence a_{i_j} such that the sum of numbers in this subsequence is divisible by m.

Input

The first line contains two numbers, n and m ($1 \le n \le 10^6$, $2 \le m \le 10^3$) — the size of the original sequence and the number such that sum should be divisible by it.

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le 10^9$).

Output

In the single line print either "YES" (without the quotes) if there exists the sought subsequence, or "NO" (without the quotes), if such subsequence doesn't exist.

Examples

input
3 5 1 2 3
output
YES

input
1 6 5
output
NO

input
4 6 3 1 1 3
output
YES

input
6 6 5 5 5 5 5 5
output
YES

Note

In the first sample test you can choose numbers 2 and 3, the sum of which is divisible by 5.

In the second sample test the single non-empty subsequence of numbers is a single number 5. Number 5 is not divisible by 6, that is, the sought subsequence doesn't exist.

In the third sample test you need to choose two numbers 3 on the ends.

In the fourth sample test you can take the whole subsequence.

C. Vasya and Petya's Game

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Vasya and Petya are playing a simple game. Vasya thought of number x between 1 and n, and Petya tries to guess the number.

Petya can ask questions like: "Is the unknown number divisible by number y?".

The game is played by the following rules: first Petya asks **all** the questions that interest him (also, he can ask no questions), and then Vasya responds to each question with a 'yes' or a 'no'. After receiving all the answers Petya should determine the number that Vasya thought of.

Unfortunately, Petya is not familiar with the number theory. Help him find the minimum number of questions he should ask to make a guaranteed guess of Vasya's number, and the numbers y_i, he should ask the questions about.

Input

A single line contains number n ($1 \le n \le 10^3$).

Output

Print the length of the sequence of questions k ($0 \le k \le n$), followed by k numbers — the questions y_i ($1 \le y_i \le n$).

If there are several correct sequences of questions of the minimum length, you are allowed to print any of them.

Examples

input
4

output
3 2 4 3

input
6

output
4 2 4 3 5

Note

The sequence from the answer to the first sample test is actually correct.

If the unknown number is not divisible by one of the sequence numbers, it is equal to 1.

If the unknown number is divisible by 4, it is 4.

If the unknown number is divisible by 3, then the unknown number is 3.

Otherwise, it is equal to 2. Therefore, the sequence of questions allows you to guess the unknown number. It can be shown that there is no correct sequence of questions of length 2 or shorter.

D. Invariance of Tree

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

A tree of size n is an undirected connected graph consisting of n vertices without cycles.

Consider some tree with n vertices. We call a tree *invariant* relative to permutation $p = p_1 p_2 \ldots p_n$, if for any two vertices of the tree u and v the condition holds: "vertices u and v are connected by an edge if and only if vertices p_u and p_v are connected by an edge".

You are given permutation p of size n. Find some tree size n, invariant relative to the given permutation.

Input

The first line contains number n ($1 \le n \le 10^5$) — the size of the permutation (also equal to the size of the sought tree).

The second line contains permutation p_i ($1 \le p_i \le n$).

Output

If the sought tree does not exist, print "NO" (without the quotes).

Otherwise, print "YES", and then print $n - 1$ lines, each of which contains two integers — the numbers of vertices connected by an edge of the tree you found. The vertices are numbered from 1, the order of the edges and the order of the vertices within the edges does not matter.

If there are multiple solutions, output any of them.

Examples

input
4 4 3 2 1
output
YES 4 1 4 2 1 3

input
3 3 1 2
output
NO

Note

In the first sample test a permutation transforms edge (4, 1) into edge (1, 4), edge (4, 2) into edge (1, 3) and edge (1, 3) into edge (4, 2). These edges all appear in the resulting tree.

It can be shown that in the second sample test no tree satisfies the given condition.

E. Points on Plane

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

On a plane are n points (x_i, y_i) with integer coordinates between 0 and 10^6. The distance between the two points with numbers a and b is said to be the following value: $\operatorname{dist}(a, b) = |x_a - x_b| + |y_a - y_b|$ (the distance calculated by such formula is called *Manhattan distance*).

We call a hamiltonian path to be some permutation p_i of numbers from 1 to n. We say that the length of this path is value $\sum_{i=1}^{n-1} \operatorname{dist}(p_i, p_{i+1})$.

Find some hamiltonian path with a length of no more than 25×10^8. Note that you do not have to minimize the path length.

Input

The first line contains integer n ($1 \le n \le 10^6$).

The $i + 1$-th line contains the coordinates of the i-th point: x_i and y_i ($0 \le x_i, y_i \le 10^6$).

It is guaranteed that no two points coincide.

Output

Print the permutation of numbers p_i from 1 to n — the sought Hamiltonian path. The permutation must meet the inequality $\sum_{i=1}^{n-1} \operatorname{dist}(p_i, p_{i+1}) \le 25 \times 10^8$.

If there are multiple possible answers, print any of them.

It is guaranteed that the answer exists.

Examples

input
5 0 7 8 10 3 4 5 0 9 12
output
4 3 1 2 5

Note

In the sample test the total distance is:

$\operatorname{dist}(4, 3) + \operatorname{dist}(3, 1) + \operatorname{dist}(1, 2) + \operatorname{dist}(2, 5) =$

$(|5 - 3| + |0 - 4|) + (|3 - 0| + |4 - 7|) + (|0 - 8| + |7 - 10|) + (|8 - 9| + |10 - 12|) = 2 + 4 + 3 + 3 + 8 + 3 + 1 + 2 = 26$