Problem A. Password

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Thomas received a new password from his employee. Since Thomas always checks the information, he ask you to check if the password is correct.

It is known that the password is correct only if it occurs AT LEAST K times on a piece of paper that the Bank Director gave to Thomas.

Input

The first line contains a string S and an integer K (3<=S.size()<=100000; 1<=K<=10000), where S is a new password. The second line contains a string T (3<=T<=100000), a string on a piece of paper.

Output

Print "YES"if password is correct, otherwise print "NO"

Examples

standard input	standard output
hello 2 helloThomashelloArthurhelloJohnhello	YES
kbtu 4 kbtuIsTheBestPlaceInTheWorld	NO

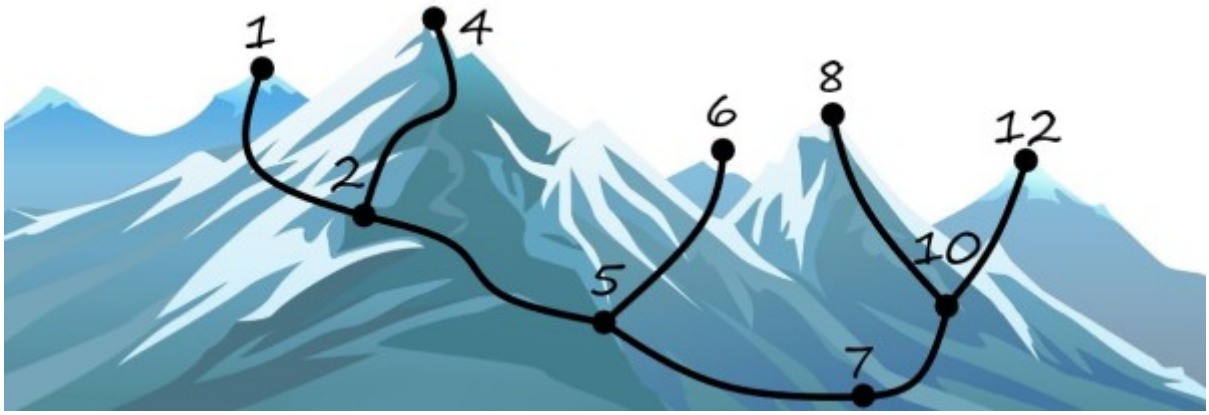
Problem B. Mountains

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

You are going to hike in the mountains. You have on a piece of paper written directions (left or right), in which direction you need to turn on each of the branches of the path, following which you can reach the peak. In the mountains there are several peaks and you have recorded the path to each peak. Since you are a guide, you need to check the day before the hike which of the recorded paths is available. All paths start at one point at the foothills.

You are given all the paths in the mountains that are available in the form of a BST and the paths to the peaks that are written on a piece of paper. You need to tell which of the paths written on the piece of paper is available.

The peak is located after the last branch in the path. It is also possible that there is the peak after another peak.



Input

Given the number N, M $(1 \leq N, M \leq 10^5)$-the number of branches in the available path in the mountains and the number of paths written on a piece of paper. In the next line N integers describe the BST. The following M lines describe the paths $p_1, p_2, p_3 ... p_m$ written on a piece of paper. The path p_i $(2 \leq |p_i| \leq 100)$is presented in the form of "$RRLLRLR$", which means to reach the peak you need to turn right at the beginning, then right again, then left, left, right, left, right. Peak located after last turn and it is possible that.

Output

You need to print M lines where i^{th} line should be "YES" if the path p_i to the peak is available, otherwise "NO".

Example

standard input	standard output
9 4 7 10 12 8 5 6 2 1 4 LLL LRR RL RR	YES NO YES YES

Problem C. Travelling

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Arman loves to travel. Arman has two cars, one large and one small.

There are roads and there are police officers. A police officer permits anyone to ride between two cities. If he is allowed to drive a big car, then only he can ride between two cities, if a small car is the same, and he can even allow both cars to ride between two cities.

There are 3 types of permissions

1. *big*
2. *small*
3. *both*

We believe that both cars have an infinite amount of gasoline. In every city there is a big and small car. A large car spends x liters per 1 kilometer and a small car spends y liters. Arman begins with a city and ends his journey in a city. You need to find the minimum amount of liters that Arman can spend if he must visit all the cities. All cities are connected

Input

The first line contain two integers n, m ($1 \leq n,m \leq 1000$) — the number of cities and the number of roads between cities The next line contain two integers x and y the amount of liters spent by a large and small car The next m lines contain one string and two integers, the type of permission and three integers a, b, c that means there is road between cities a and b with c kilometers.

Output

Output the single line the sum of the liters that spends Arman

Example

standard input	standard output
7 6 4 3 both 2 7 4 both 1 7 2 big 4 6 1 big 3 7 3 small 5 6 1 both 5 7 10	79

Problem D. Maximal Subsequence

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	64 megabytes

On algorithm exam there are some students who failed this subject before. The teacher noticed that all N retakeers are sitting in the same row, where i student's failed times equal to a_i. Teacher understand that this happens very rare and now he was very interested in finding such subsequencce of stuents that a_l, a_{l+1}, ..., a_r ($1 \leqslant l \leqslant r \leqslant n$) with the maximum arithmetic mean $\frac{1}{l-r+1}$ for $\sum_{i=l}^{r} a_i$.
Since teacher must to watch so students do not cheat, he asked you help him finding such subsequence of students.
If there is some such subsequence of students, find with maximal length.

Input

The first line is an integer - N, the number of elements in array, $1 \leqslant N \leqslant 10^5$.
The second line contains N integers a_i. ($1 \leqslant a_i \leqslant 10^9$)

Output

Print one integer - length of maximal subsequence, that satisfy given condition.

Example

standard input	standard output
5 6 1 6 6 0	2

Note

[3,4] subsequence is the maximal in our array.

Problem E. Find Prefix

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Aibyn has the dictionary and the list of words in dictionary and he also has the list of words in his book as far as Aibyn always solves problems with prefix sums, prefix array, prefix function and he wants to find for each word in the book in how many prefixes it appears in the dictionary

Input

The first line contains N, Q: the number words in dictionary and the number of words in the book.

N lines follow, with words (of dictionary) consisting of lowercase letters. The sum of their lengths won't be greater than 10^6

Q lines follow, with words (queries) consisting of lowercase letters. The sum of their lengths won't be greater than 10^6

Output

For each query print the number of words in dictionary which have actual word in book as prefix.

Example

standard input	standard output
12 6 bulldog dog dogged doggedly doggerel dogma dogmatic dogmatism dogs catastroph catastroph doctor cat dog dogg do doctrinography dogge	2 8 3 9 0 3

Problem F. Sanae-san

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

You are given undirected graph with n vertices and m edges. It's guaranteed that there are no loops or multiple edges. Determine if it is possible to partition vertices into k sets so that all following conditions are satisfied:

1. Every vertex belongs to exactly one set

2. All sets are non-empty

3. For all pairs of vertices x, y, where x and y belong to different sets there must be no edge between x and y.

4. For all pairs of vertices x, y where x and y belong to the same set, y must be reachable from x using only vertices of set containing x and y.

Input

First line contains three integers $1 \leq n, m, k \leq 10^5$. Next m lines contain two integers $1 \leq x, y \leq n, (x \neq y)$ that describe edge between x and y.

Output

Output 'YES' if such partition is possible and 'NO' otherwise.

Example

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

Problem G. Facebook problem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

In a facebook, users are connected with other users. The system looks like a giant connected graph. In this task, you are required to answer the total number of people connected at T nodes away from each other (T distance connectivity). For example: Two users directly connected are at 1 distance connectivity. While the two users having a common contact without having direct connectivity, are at 2 distance connectivity.

Input

First line contains, two integers N and E, where N is number the nodes and E is number of edges. Next E lines will contain U and V (two integer numbers) meaning that node U and node V are connected to each other in undirected fashion. Next you see line that contains single integer, m, which is number of queries. Next m lines, each have two inputs, one as source node(you are on) and other as a required T distance connectivity which should be used to process query.

Output

You have to find number of nodes at a distance T

Example

standard input	standard output
9 10 1 2 2 3 1 7 2 4 3 4 4 7 7 8 9 7 7 6 5 6 3 4 2 5 3 2 1	4 4 3

Problem H. Number of Island

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Given a 2d char array of '1's (land) and '0's (water), count the number of islands. An island is surrounded by water and is formed by connecting adjacent lands horizontally or vertically. You may assume all four edges of the grid are all surrounded by water.

Input

In the first line given n and m, size of array. 1 <= n,m <= 100 In the next n line contain m character '0' or '1'.

Output

Single number, count the number of island.

Examples

standard input	standard output
4 5 11110 11010 11000 00000	1
4 5 11000 11000 00100 00011	3

Problem I. Santa Jonathan

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Christmas is coming! It means that each child living in the Duck Islands must receive long-awaited gift. All children from the same island wish rubber duck of the same color (colors are distinct among all islands). During one flight Santa Jonathan can deliver gifts only of one color and the number of gifts that he can deliver at a time is restricted by the capacity of his bag. Santa Jonathan appreciates his time very much, so he want to do no more than f flights. Please, help him find the least possible capacity of bag to deliver all gifts during no more than f flights.

Input

The first line of the input contains two integers n and f - number of islands in the Duck Kingdom and number of flights ($1 \leqslant n \leqslant f \leqslant 10^5$).

The second line of the input contains n integers c_i - number of children in the i_{th} island ($1 \leqslant c_i \leqslant 10^4$).

Output

Please, find the least posible capacity of the bag that satisfies all conditions.

Examples

standard input	standard output
3 6 10 10 10	5
5 7 10 34 14 6 20	17

Problem J. Good number

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Jonathan likes to play with numbers. Once he decided that usual numbers are boring and started to play with their binary representation instead. Jonathan crosses out one-zero pair in this binary string if and only if 1 is left neighbour of 0, or all bits between them are crossed out. Jonathan calls number good if all bits are crossed out. Jonathan has n numbers, please help him determine whether each of them good or not, because he want to sleep since he has prepared for the algorithmic contest all night.

Input

The first line of the input contains the only integer n - amount of numbers ($1 \leqslant n \leqslant 10^5$).

Each of the next n lines contains integer d_i - i_{th} number from Jonathan's list. ($1 \leqslant d_i \leqslant 10^{18}$).

Output

Print YES on the i_{th} line if d_i is good. Otherwise print NO.

Examples

standard input	standard output
2 2 3	YES NO
5 9 10 11 12 13	NO YES NO YES NO