Problem A. New Year

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

The New Year is approaching and Erdaulet decided to shopping at supermarket.
A supermarket can be represented as a connected graph of n stores and m corridors. Erdaulet was initially in store 1 and wrote down 1 in his notebook. He can move from one store to another along these corridors. Each time he visits a store that has not yet been recorded in his book, he writes it down. After he visits all the stores at least once, he will finish the purchase of gifts, and in his book will be written the rearrangement of stores $a_1, a_2, ..., a_n$.
Buying gifts is boring, but solving problems is interesting. Erdaulet wants to find out the lexicographically minimal permutation that he can get as a result of the purchase. To Erdaulet, this task seems simple, so he gave it to you.

Input

The first line contains two integers n and m ($1 \leqslant$ n, m $\leqslant 10^5$) - the number of vertices and edges in the graph, respectively.
The next m lines describe the undirected edges of the graph. The i-th of these lines contains two integers u_i and v_i ($1 \leqslant u_i, v_i \leqslant$ n) - the vertices connected by the i-th edge.
It is guaranteed that the graph is connected.

Output

Print the lexicographically smallest sequence $a_1, a_2, ..., a_n$ of those that Erdaulet can write.

Examples

standard input	standard output
3 2 1 2 1 3	1 2 3
5 5 1 4 3 4 5 4 3 2 1 5	1 4 3 2 5

Note

In the first example, one of the possible Erdaulet paths is the path $1 \to 2 \to 1 \to 3$. Bob in this case will write the sequence 1,2,3, which is the lexicographically smallest.
In the second example, Erdaulet can go the way $1 \to 4 \to 3 \to 2 \to 3 \to 4 \to 1 \to 5$. Then he writes the sequence 1,4,3,2,5, which is the lexicographically smallest.

Problem B. Ping pong

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	4 megabytes

Kbtu's server was crashed!
And you do not know anything except the "ping"command, because we know that you weren't preparing for Computer Networks) You started to ping the server and for each ping, received the number of pings in the last 3000 milliseconds. Unfortunately, these records were lost, but you remember when and how many times the server pinged. Restore the answer for each ping.

Input

Each test case will have at most 100000 calls to ping. 1 <= N <= 100000.
Each call to ping will have 1 <= t <= 1000000000.
It is guaranteed that every call to ping uses a **strictly larger** value of t than before.

Output

in single line print N numbers, answers for each ping.

Example

standard input	standard output
4 1 3 3000 3002	1 2 3 3

Note

For 1st ping at time 1, you get 1ping - [1]
For 2nd ping at time 3, last pings are 2 - [1, 3]
For 3rd ping at time 3000, there are 3pings - [1, 3, 3000]
So for the last ping at time 3002, the response is 3pings - [3, 3000, 3002]

Problem C. Trucks

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

For sure, the love mobiles will roll again on this summer's street parade. Each year, the organisers decide on a fixed order for the decorated trucks. Experience taught them to keep free a side street to be able to bring the trucks into order.

The side street is so narrow that no two cars can pass each other. Thus, the love mobile that enters the side street last must necessarily leave the side street first. Because the trucks and the ravers move up closely, a truck cannot drive back and re-enter the side street or the approach street.

You are given the order in which the love mobiles arrive. Write a program that decides if the love mobiles can be brought into the order that the organisers want them to be.

Input

The first line contains a single number n, the number of love mobiles. The second line contains the numbers 1 to n in an arbitrary order. All the numbers are separated by single spaces. These numbers indicate the order in which the trucks arrive in the approach street. No more than 1000 love mobiles participate in the street parade.

Output

Your program has to output a line containing a single word "yes"if the love mobiles can be re-ordered with the help of the side street, and a single word "no"in the opposite case.

Examples

standard input	standard output
5 5 1 2 4 3	yes
5 2 1 4 5 3	no

Problem D. Duck Islands

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

Jonathan became a king of Duck Islands recently. He is very happy now, but being a king impose a lot of obligations on him. One of them is to connect all initially disconnected islands with bridges, such that for every pair of islands in his kingdom there is a path between them. The cost of the bridge between islands i and j is $d_i + d_j$, where d_i and d_j are the number of ducks in the islands i and j respectively. Jonathan wants to minimize the total expence of bridge building. He is not good at math, so he asked your help to find amount of money he will spend.

Input

The first line of the input contains the only integer n - number of islands in Jonathan's Duck Kingdom ($1 \leqslant n \leqslant 500$).

The next line contains n integers d_i - the number of ducks in the i_{th} island ($1 \leqslant d_i \leqslant 10^5$).

Output

Print the only integer c - amount of money that Jonathan will spend to connect islands in his kingdom.

Examples

standard input	standard output
5 2 5 4 2 8	27
5 5 5 5 5 5	40

Note

In the first example you can construct four bridges between islands 1 and 2, 3 and 4, 4 and 5, 1 and 4.

In the second sample you can construct any bridges you want.

Problem E. Standard problem about soccer

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

Kakyoin loves football and he goes to the final of World Cup. At the stadium, he noticed that there are n rows, each of which places a distinct number of people. The price of the ticket depends on the row. If there are k ($k > 0$) free seats in the row, then the price of one ticket will be equal to k. What is the maximum amount of money a stadium management can get if there are x people in line?

Input

The first line consists of n and x ($1 \leq n$, $x \leq 10^5$). n denotes the number of seating rows in the stadium and x denotes the number of football fans waiting in the line to get a ticket for the match. Next line consists of n space separated integers a_1, a_2, a_3, ... a_n where a_i ($1 \leq a_i \leq 10^5$) denotes the number of empty seats initially in the i-th row.

Output

Print the answer.

Examples

standard input	standard output
3 10 6 8 9	67
2 4 9 10	36

Note

The answer may exceed the maximum value of an int, use long long.

Problem F. Christmas Gifts

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

Christmas is coming! Everyone is preparing gifts for their families. The Damir's family is also preparing for this. The Damir's family has many children, so the parents decided to buy n various gifts. Parents decided to number these gifts as a_i. They began to hang them in Christmas socks in the form of a Christmas tree, following this plan:
hang the first gift to the top, and the following:
if the gift number a_i is greater than the number of the present gift, then go lower and to the right,
if the gift number a_i is less than the number of the present gift, then go lower and to the left.
and so on until the last gift is hung.

As you know, Damir is the smallest among the whole family. Therefore, parents for the holiday allowed him to pick up his gift first. Damir knew that his gift was number k, but he thought that all the gifts below his gift were also intended for him, although this is not true. Now, parents are confused and want to find out what gifts Damir wanted to pick up for himself.

Input

The first line contains one integers n ($1 \leqslant n \leqslant 10^3$) - the number of gifts.
The second line contains n integers a_i. ($1 \leqslant a_i \leqslant 10^3$)
The third line contains one integer k ($1 \leqslant k \leqslant 10^3$).
It is guaranteed that the array has number k.

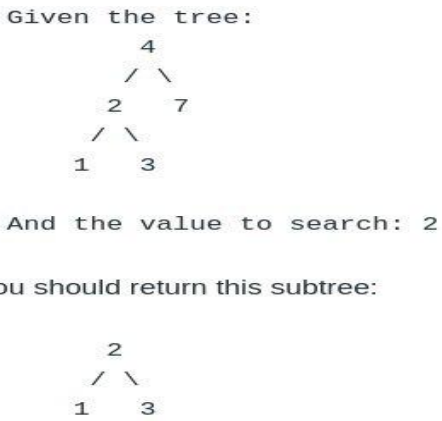
Output

You should output this subtree as this law:
Print current root
If you have left son, go there
If you have right son, go right
and so on , until you donot print all subtree

Example

standard input	standard output
5 4 2 7 1 3 2	2 1 3

Note



Problem G. Office

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

Aidar is the director of the office and he has a lot of employees in his office. All employees have their own numbers, Aidar has the number 1.

Every employee except the director has a boss. Some employees may have more than one boss. And there can be no such thing if the employee is the boss, he cannot simultaneously be his employee.

Aidar wants to make a new system in his office. He does not want the employee to go into the office before his bosses. Therefore, find the order in which the boss enters the office before his employee

Input

In the first line given two integers n, m, ($2 \leq n, m \leq 100000$

The next m lines given two integers u and v that means u is the boss of v

Output

Output the single line n integers the order of employees

Example

standard input	standard output
5 5 1 2 1 3 3 2 2 4 4 5	1 3 2 4 5

Problem H. Suffix-Prefix equality

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

Sanzhar loves, when string prefix and suffix are equal. He have a two strings, and he wants to concat this strings, to make a string with longest prefix that equals to the suffix.

Input

The two lines of input contains two strings s and t ($1 \leq s, t \leq 10^5$).

Output

Print the length of the substring.

Examples

standard input	standard output
aerguno kaergun	6
ulsvnxe olsxeul	2

Note

For example, for the input *abbc* and *bcbb*, the answer is 2, because in the *bcbbabbc* string prefix and suffix of length 2 is equal.

Problem I. Phone List

Input file:	standard input
Output file:	standard output
Time limit:	1.5 seconds
Memory limit:	256 megabytes

Arman works in a call center. He is now creating new phone numbers and when he creates these numbers he wants people to not have a problem with connections.

He has a number of cities and a list of phone numbers in each city and wants to make sure that all people have no connection problems. We say people have connection problems when the phone number of a person is in the suffix of another person when they are in the same city.

For example, if Arman has a phone number of 119 and Adina has 1119, so 119 is in the suffix 1119, there may be problems with connections. Arman asks you to help him determine if there are problems with connections in each city, print yes if there is problem, otherwise no

Input

The first line of input gives a single integer, 1 <= t <= 40, the number of cities. Each test case starts with n, the number of phone numbers, on a separate line, 1 <= n <= 10000. Then follows n lines with one unique phone number on each line. A phone number is a sequence of at most ten digits.

Output

For each test case, output "YES"if there are connection problems, or "NO"otherwise.

Example

standard input	standard output
2 3 119 99952679 25426119 5 311 04321 044321 54321 64389	NO YES

Problem J. Try Again

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

You are given undirected graph with n vertices, m edges, and q queries. Initially all vertices are black. There are two types of queries.

1. 1 v - Change the color of vertex v to red.

2. 2 v - Output the distance to the nearest red vertex to v, or -1 is there is no such vertex.

Input

First line contains three integers $1 \leq n, m \leq 5000, 1 \leq q \leq 10^5$. Next q lines contain queries as described in the statement.

Output

Output answer to queries of type 2.

Example

standard input	standard output
5 4 7 1 2 2 3 3 4 4 5 2 1 1 1 2 1 2 2 2 5 1 3 2 5	-1 0 1 4 2