Problem A.

In math, a perfect number is a positive integer that is equal to the sum of its proper divisors, excluding itself. Proper divisors of a positive integer are all the positive divisors of that integer except for the integer itself. For example, 6 is a perfect number because $6 = 1 + 2 + 3$, where 1,2 and 3 are proper divisors of 6. Given a positive integer n, list all the perfect numbers from 1 to n.

Input

Input will consist of a single integer - n

Output

List all the perfect numbers from 1 to n, separated by space.

Example

test	answer
30	6 28

Problem B.

Given a natural number n (> 1), find the product of all its distinct prime factors.

Input

The input consists of a single line - the value of n.

Output

The output should contain a single line. Print the product of n's distinct prime factors

Examples

test	answer
6	6
12	6
3	3

Problem C.

Given a $n \times m$ matrix A consisting of positive integers, and an integer k, find a sub-matrix of A whose sum of elements equals k.

If there are multiple sub-matrices, print any one of them.

Input

The first line of the input consists of three integers n, m, and k, denoting the number of rows of the matrix, the number of columns of the matrix, and the target sum respectively.

Then n lines follow, each line consists of m integers - each line represents a row in the matrix.

Output

The first line of the output should consist of two integers r, c denoting the number of rows and the number of columns of the sub-matrix.

Then r lines should follow, each line consists of c integers - each line represents a row in the sub-matrix

Examples

test	answer
4 5 28 2 4 5 1 3 3 9 7 4 1 5 2 8 9 2 1 1 1 1 1	3 2 9 7 2 8 1 1

Explanation

In the given matrix
2 4 5 1 3
3 **9 7** 4 1
5 **2 8** 9 2
1 **1 1** 1 1
The part highlighted in bold is a sub-matrix with the sum 28.

Problem D.

Given 2 non-empty sets A_1 and A_2 which are subsets of N (Natural number set). Find the union, intersection and set difference of A_1 and A_2.

Input

Input will consist of 4 lines. The first and third lines denote the cardinality of the sets A_1 and A_2 respectively. The second and fourth lines contain the elements of A_1 and A_2 respectively, in the **sorted order**.

Output

Output should consist of 6 lines. The first, third and fifth lines should contain the cardinality of $A_1 \cup A_2$, $A_1 \cap A_2$ and $A_1 \setminus A_2$ respectively. The second, fourth and sixth lines should contain the elements of $A_1 \cup A_2$, $A_1 \cap A_2$ and $A_1 \setminus A_2$ respectively in the **sorted order**.

Example

test	answer
4 1 2 3 4 5 2 4 6 8 10	7 1 2 3 4 6 8 10 2 2 4 2 1 3

Problem E.

Given an array of positive integers, find the median and mode of the array. It is guaranteed that the array has an odd length. If two or more integers have the highest frequency, print the smaller one as the mode.

Input

Input will consist of 2 lines. The first line contains the size of the array and the second line contains the elements of the array.

Output

The output should consist of 2 integers separated by a space, the median, and the mode respectively.

Examples

test	answer
9 1 5 2 3 1 3 2 3 2	2 2

Explanation

The array after sorting is 1 1 2 2 2 3 3 3 5, 2 is the middle element and hence the median. 2 and 3 both have the highest frequency and since 2 is smaller, we print it as the mode.

Problem F.

You wish to conduct a club meeting in room F-106. You will be allowed to schedule such a meeting only if it doesn't clash with any other meeting that is already scheduled in F-106. Suppose there are n meetings already scheduled in F-106 and you are given the start and stop times of each of these meetings. It is **guaranteed** that $start[i] \geq stop[i-1]$ $\forall i$ from 1 to $n-1$ (0-based indexing). You wish to schedule a new meeting with starting time x and stopping time y. Write a program to check whether it is possible to schedule such a meeting.

Input

The input consists of $n+2$ lines. The first line contains the value for n, the number of scheduled meetings. Each of the next n lines contains 2 integers, the start and stop times for the scheduled meetings. The $n+2^{th}$ line contains 2 integers x and y, the starting and stopping times for the new meeting.

Output

The output should consist of just one line - print **YES** if the new meeting can be scheduled, and **NO** otherwise. (Print it in the exact same format, the output will be considered **case-sensitive**).

Examples

test	answer
5 1 3 4 8 9 10 11 13 17 19 14 17	YES
5 1 3 4 8 9 10 11 13 17 19 11 12	NO

Problem G.

You are given an array of integers and an integer k. Find a subsequence of the array such that the sum of its elements equals k. If there are multiple subsequences, print any one among them.

A subsequence is a sequence that can be derived from the given array by deleting zero or more elements without changing the order of the remaining elements. For example in the array [1, 3, 7, 4, 8, 5], [3,7,8,5] is a valid subsequence while [3, 7, 5, 4] is not as the order of elements is not maintained.

Input

Input will consist of 2 lines. The first line contains two integers - the size of the array and an integer k respectively.

The second line contains the elements of the array.

Output

The output should consist of two lines. The first line is the size of the subsequence.

The second line should be the elements of the subsequence separated by space.

Examples

test	answer
9 38 3 1 9 8 12 3 1 25 42	3 1 12 25

Problem H.

You have been assigned n tasks, and each task has an effort e_i associated with it. Every time you perform a task i, you lose e_i units of energy. You perform a task only if your current energy level is greater than or equal to the effort corresponding to the task. Initially, you have a total energy of x. Since you are lazy, you decided to complete only a **contiguous** set of tasks. Find the maximum number of tasks that you can complete.

Input

The input consists of 3 lines. The first line contains the value of n, the total number of tasks assigned to you. The second line contains n integers, the effort values corresponding to each of the n tasks. The third line contains the value of x, the total energy that you have initially.

Output

The output contains a single line. Print the maximum number of tasks that you can complete.

Example

test	answer
5 1 3 3 2 1 7	3

Explanation

The optimal set of tasks can correspond to tasks 1,2,3 - total effort of $1+3+3=7$, or tasks 3,4,5 - total effort of $3+2+1=6$.

Problem I.

You are given n points in a cartesian plane, find the number of rectangles with sides parallel to the axes that can be formed by joining 4 points. Each point is represented by its x and y coordinates.

Input

The first line of the input is a single integer n - the number of points in the cartesian plane. Then n lines follow, each line consists of two integers representing the x and y coordinates of a point respectively.

Output

The output contains a single integer - the number of rectangles with sides parallel to the axes.

Examples

test	answer
7 2 2 2 3 3 2 3 3 4 2 4 3 10 8	3

Note

The rectangles are

1. (2, 2), (2, 3), (3, 2), (3, 3)
2. (2, 2), (2, 3), (4, 2), (4, 3)
3. (3, 2), (3, 3), (4, 2), (4, 3)

Problem J.

There are n bells, the i^{th} of which rings at a frequency of t_i seconds ($t_i \geq 1$). If all the bells were turned on at time $t = 0$, find the minimum time (in seconds) at which all the bells ring at the same time.

Input

The input consists of 2 lines. The first line contains n, the number of bells. The second line contains n integers, the frequency of each of the n bells.

Output

The output should contain a single line. Print the minimum time (in seconds) at which all the bells ring at the same time.

Examples

test	answer
5 1 1 2 4 8	8
4 2 4 7 3	84

Explanation

In the first example, the first and second bells ring at time instance $t = 1, 2, 3, 4, 5, 6, 7, 8, ...$ sec. The third bell rings at $t = 2, 4, 6, 8, ...$ sec. The fourth bell rings at $t = 4, 8, ...$ sec and the fifth bell rings for the first time at $t = 8$ sec. Thus, we can see that the minimum time from the start where all the bells ring at the same time is $t = 8$ sec.