Problem A. 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 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.
It is guaranteed that there are enough free seats for all visitors.

Output

Print the answer.

Examples

standard input	standard output
3 10 6 8 9	67
1 2 5	9

Note

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

Problem B. Age supremacy

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

In an unnamed state, the ruler is chosen by the right of age. The most adult person in the country will sit on the throne. You are given the dates of birth of people, output the order of their government.

Input

The first line includes a single number n ($1 \leq n \leq 10^5$). The next n lines contain dates of birth of people in the country.

Output

Print the answer.

Examples

standard input	standard output
3 08 02 1914 10 06 1992 02 23 1981	8 2 1914 2 23 1981 10 6 1992
4 12 09 1909 08 29 1908 08 11 1949 04 26 1911	8 29 1908 12 9 1909 4 26 1911 8 11 1949

Problem C. Vowels and consonants

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

Albert does not agree with the basic English alphabet. He thinks, that in the alphabet, first, we need to print vowel letters first and then consonants, and both vowels and consonants are ordered alphabetically. So he asks us to sort string according to his own alphabet.

Input

The first line contains the number n ($1 \leq n \leq 10^5$), denoting the length of string. The second line contains the string s.

Output

Print the answer.

Examples

standard input	standard output
5 abcde	aebcd
5 wlree	eelrw

Note

Vowel letters are a, e, i, o and u.

Problem D. 01 and Multiplication

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

01 loves to play with the array. He wants to find the largest product of 3 elements in the interval [1, i]. Help him with this problem.

Input

The first line contains an integer N ($1 \leq N \leq 10^5$), denoting the number of elements in the array A. The next line contains N space-separated integers, each denoting the ith integer of the array A ($1 \leq A_i \leq 10^6$).

Output

Print the answer for each index in each line. If there is no second largest or third-largest number in the array A up to that index, then print **-1**, without the quotes.

Examples

standard input	standard output
5 13 5 19 1 10	-1 -1 1235 1235 2470
4 2 4 5 3	-1 -1 40 60

Problem E. Triangle Binary Search Tree

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

You are given N integers in order of their insertion to Binary Search Tree. You draw a set of horizontal lines that goes through nodes with the same height. After that you can see triangles with nodes instead vertices and edges instead sides. Your task is to calculate the number of the smallest triangles.

Input

The first line consists of an integer N - number of nodes in Binary Search Tree ($1 \leqslant N \leqslant 10000$).

The second line contains N integers a_i - value of each node in Binary Search Tree in order of their insertion ($1 \leqslant a_i \leqslant N$).

It is guaranteed that there are no duplicates.

Output

Print the number of mini-triangles in resulting Binary Search Tree.

Examples

standard input	standard output
3 3 5 1	1
3 1 3 5	0
16 13 9 3 7 6 16 1 11 12 10 4 2 14 5 8 15	5

Problem F. Balanced Binary Search Tree

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

You have an array with 2^N - 1 elements in it. You want to build the Binary Search Tree on this array, adding elements in order of their appearance in array (from left to right). But there is a probability of imbalance of such tree. That's why you decided to shuffle your array to obtain perfectly balanced Binary Search Tree after adding elements (from left to right, again). Your task is to print your array after appropriate shuffle. If there are several possible shuffles, print the array after applying any of them.

Note, that you are not asked for building Binary Search Tree, but only for shuffling array.

Input

The first line of input consists of single integer N that describes the length of the array ($1 \leqslant N \leqslant 15$).

The next line contains 2^N - 1 integers a_i - elements of the array ($0 \leqslant a_i \leqslant 2 \cdot 10^9$).

It is guaranteed that there is no duplicates in the array.

Output

Print 2^N - 1 integers - elements in your array after applying required shuffle.

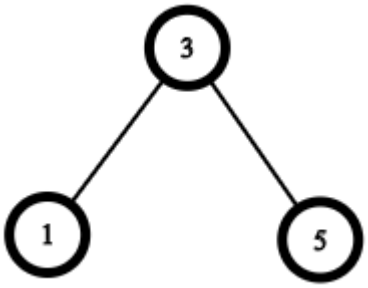
Examples

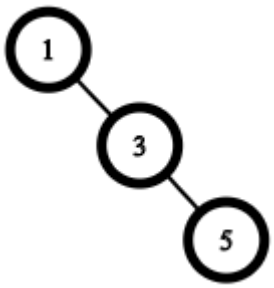
standard input	standard output
2 3 5 1	3 5 1
2 1 3 5	3 1 5

Note

In the first sample given array can be used for building balanced BST (left picture).

In the second sample given array gives such chain tree (right picture), so it must be shuffled.





Note, that for both samples [3, 5, 1] and [3, 1, 5] are correct answers.

Hint: Use divide and conquer method (recall advanced sorting algorithms) and implement recursive function to solve this problem