Problem E
Exact Permutation Mapping

Time Limit: 1.5 seconds
Memory Limit: 512 megabytes

In a universe linked by cosmic tunnels, *Futuristic Interstellar Tubes (FIT)* beckon explorers for traveling between planets. To embark, travelers need to solve challenges related to permutations of positive integers.

Consider the set of permutations of $2n$ positive integers $1, 2, \ldots, 2n$:

$$a_1, a_2, I, a_n, a_{n+1}, I, a_{2n}$$

with the following properties:

- The sequence a_1, a_2, I, a_n is in increasing order.
- The sequence a_{n+1}, I, a_{2n} is in increasing order.
- For all i $(1 \le i \le n)$, $a_i < a_{n+i}$.

All these permutations are sorted in lexicographic order and consecutively numbered starting from 1. Thus, each permutation has a serial number, and we call it the permutation index.

For example, with $n = 3$, we have all 5 permutations, after sorting the dictionary is numbered as illustrated in the table on the right.

Index	Permutation
1	1 2 3 4 5 6
2	1 2 4 3 5 6
3	1 2 5 3 4 6
4	1 3 4 2 5 6
5	1 3 5 2 4 6

Given the number n, your task is to solve the following two problems from the guardians of the Universal Passage:

1. Given an index k, find the permutation with index k.
2. Given a permutation $a_1, a_2, \ldots, a_{2n}$, find the index of this permutation.

Input

The input contains at most 2000 test cases. Each test case is in one line, with a number 1 or 2 at the beginning of the line indicating the problem you need to solve.

- If the first number is 1, it is followed by two integers n and k.
- If the first number is 2, it is followed by an integer n and $2n$ integers $a_1, a_2, \ldots, a_{2n}$.

Note that the input is guaranteed correct and the solution always exists.

Output

You need to output the results of each test case in the order they appear in the input.

Sample Input	Sample Output
1 3 4 2 3 1 3 5 2 4 6 1 4 2 2 4 1 2 3 6 4 5 7 8	1 3 4 2 5 6 5 1 2 3 5 4 6 7 8 3