Problem Valentine's Day

Input stdin
Output stdout

"Happy Valentine's Day to all programming lovers!"

Little Square has received a gift for Valentine's Day from his girlfriend, Princess Square. The gift consists of an array $a_1, \ldots, a_n$ of integers between 1 and n. She also told Little Square that a permutation $p_1, \ldots, p_n$ is *perfect* if $p_i \geq a_i$ for all $1 \leq i \leq n$. He knows that Princess Square loves the number k, so in order to impress her, he will do the following.

1. Write all perfect permutations of length n on a paper.
2. Sort them in increasing *lexicographic order*. (We say that a permutation $p_1, \ldots, p_n$ is less than a permutation $q_1, \ldots, q_n$ in lexicographic order if and only if $p_1 = q_1, \ldots, p_{i-1} = q_{i-1}$ and $p_i < q_i$ for some $1 \leq i \leq n$.)
3. Select the k-th permutation on the list and send it back to Princess Square as a gift.

But since it is already 8 PM and Valentine's Day ends in 4 hours, he needs to do this very fast, so he asks for your help. Write a program which, given n, k and the array $a_1, \ldots, a_n$, finds the k-th perfect permutation of length n in lexicographic order, and save Valentine's Day!

Input data

The first line of input contains the integers n and k. The second line of input contains the integers $a_1, \ldots, a_n$, separated by white space.

Output data

The output must contain a single line, which contains the desired permutation $p_1, \ldots, p_n$, separated by white space. It is guaranteed that such a permutation exists for every test case.

Restrictions

- $1 \leq n \leq 300\,000$
- $1 \leq k \leq 2 \times 10^9$

#	Points	Restrictions
1	9	$k = 1$
2	7	$n \leq 9$
3	15	$n \times k \leq 300\,000$
4	19	$n \leq 1\,000$
5	14	$a_1 \geq a_2 \geq \ldots \geq a_n$
6	20	$n \leq 100\,000$
7	16	No further restrictions

Examples

Input	Output
5 3 1 3 1 2 4	1 3 4 2 5
9 1 4 2 2 5 1 7 9 6 1	4 2 3 5 1 7 9 6 8
10 42 5 1 3 2 5 4 9 9 6 2	5 1 3 7 6 4 10 9 8 2
20 819011990 6 12 1 2 13 3 13 9 18 4 6 11 7 1 5 7 6 6 1 1	6 12 1 2 13 4 20 10 18 5 14 11 15 3 16 19 9 7 17 8

Explanations

First example Little Square's list is the following.

1. $\langle 1,3,2,4,5\rangle$
2. $\langle 1,3,2,5,4\rangle$
3. $\langle 1,3,4,2,5\rangle$
4. $\langle 1,3,5,2,4\rangle$
5. $\langle 1,4,2,3,5\rangle$
6. $\langle 1,4,3,2,5\rangle$
7. $\langle 1,5,2,3,4\rangle$
8. $\langle 1,5,3,2,4\rangle$
9. $\langle 2,3,1,4,5\rangle$
10. $\langle 2,3,1,5,4\rangle$
11. $\langle 2,4,1,3,5\rangle$
12. $\langle 2,5,1,3,4\rangle$
13. $\langle 3,4,1,2,5\rangle$
14. $\langle 3,5,1,2,4\rangle$
15. $\langle 4,3,1,2,5\rangle$
16. $\langle 5,3,1,2,4\rangle$

Thus we select the 3rd one i.e. $\langle 1,3,4,2,5\rangle$.

Second example The first few permutations in Little Square's list are the following.

1. $\langle 4,2,3,5,1,7,9,6,8\rangle$
2. $\langle 4,2,3,5,1,7,9,8,6\rangle$
3. $\langle 4,2,3,5,1,8,9,6,7\rangle$
4. $\langle 4,2,3,5,1,8,9,7,6\rangle$
5. $\langle 4,2,3,5,6,7,9,8,1\rangle$
6. $\langle 4,2,3,5,6,8,9,7,1\rangle$
7. $\langle 4,2,3,5,7,8,9,6,1\rangle$
8. $\langle 4,2,3,5,8,7,9,6,1\rangle$
9. $\langle 4,2,3,6,1,7,9,8,5\rangle$
10. $\langle 4,2,3,6,1,8,9,7,5\rangle$

Thus we select the first one i.e. $\langle 4,2,3,5,1,7,9,6,8\rangle$.