JETBRAINS icpc global sponsor programming tools
HUAWEI icpc diamond multi-regional sponsor

Problem I – Inversion Insight

Author: Rafael Grandsire, Brasil

In MathemIsland, the wildlife is very diverse. There are roots, trees, leaves, pigeons – everything you'd find in a math book. And everywhere you look, there is a permutation.

ICPC University has devised a systematic way to catalog these permutations. Specifically, because inversions are of utmost importance in studying wildlife genetics, ICPC University has decided to sort all $N!$ permutations of the integers from 1 to N: first by the number of inversions and, in the case of a tie, by lexicographic order. This approach uniquely identifies each permutation by an integer from 1 to $N!$, indicating its position in the sorted list of all $N!$ permutations.

Thus, the identity permutation $(1, 2, \ldots, N)$, which is the only permutation with zero inversions, is assigned the identifier 1, while the reverse identity permutation $(N, N-1, \ldots, 1)$, which is the only one with the maximum number of inversions, is assigned the identifier $N!$.

As part of the team implementing the ICPC University database, your task is to retrieve a specific permutation based on its identifier. Write a program that, given two integers N and K, outputs the permutation of the integers from 1 to N corresponding to identifier K.

Remember that the number of inversions in a permutation is the number of pairs of elements that are out of their natural order. That is, for a permutation π with N elements, its number of inversions $\text{inv}(\pi)$ is defined as

$$\text{inv}(\pi) = |\{(i, j) : 1 \leq i < j \leq N \wedge \pi(i) > \pi(j)\}|$$

Input

The input consists of a single line that contains two integers N ($1 \leq N \leq 2 \cdot 10^5$) and K ($1 \leq K \leq \min(N!, 4 \cdot 10^{18})$).

Output

Output a single line with N integers, describing the K-th permutation of the integers from 1 to N, considering permutations sorted according to the university's criteria.

Sample input 1	**Sample output 1**
4 10	1 4 3 2

Sample input 2	**Sample output 2**
5 120	5 4 3 2 1

Sample input 3	**Sample output 3**
16 12345678901234	2 13 8 10 3 15 16 5 11 12 1 9 7 6 14 4