Problem L
Constant strings

Time Limit: 2 seconds
Memory Limit: 512 Megabytes

Problem description

A string is considered constant if all characters of the string is the same. For example, “a”, “bb” and “ccc” are constant strings, while “abc” is not.

A substring of a string is obtained by removing a (possibly empty) prefix and a (possibly empty) suffix. Hence, the string “abbab” has 6 constant substrings: “a” appears twice, “b” appears three times and “bb” appears once.

Given two integers n and k, find the k-th string with exactly n constant substrings, when all strings are sorted in lexicographic order.

As a remind, string s = s1s2...sm is considered lexicographically smaller than string t = t1t2...tn if and only if either of the following conditions is satisfied:

- m < n and si = ti for every 1 <= i <= m
- there exists an index i such that 1 <= i <= m, si < ti and sj = tj for every 1 <= j < i

Input

The input contains several (at most 10) test cases. Each test case is presented in one separate line with two integers n and k (1 <= n <= 1e7, 1 <= k <= 3e18).

The input is terminated by a line containing two zeros, which is not a test case.

Output

For each test case, print the sought string in a single line. It is guaranteed that such string exists.

Example:

Input	Output
3 1 3 2 3 3 3 4 3 5 0 0	aa aba abc abd abe

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