

Problem B. Borderless Words

Input file: borderless.in
Output file: borderless.out
Time limit: 4 seconds
Memory limit: 512 megabytes

A word w is called *bordered* if there exists a word u , other than w and empty word ε , such that u is both suffix and prefix of w . For example, a word «abbababb» is bordered because «abb» is both its prefix and its suffix. A word that is not bordered is called *borderless*. For example, a word «aabab» is borderless.

Consider all borderless words of length n composed of letters «a» and «b». Let us denote the number of such words as C_n . Order them lexicographically — by the first letter, then by the second one, etc, and number from 1 to C_n . Given k find the k -th word in this order.

Input

The input file contains multiple test cases.

Each test case contains two integers n and k on a line ($1 \leq n \leq 64$, $1 \leq k \leq C_n$).

Input is followed by a line with $n = k = 0$. There are at most 1000 test cases in one input file.

Output

For each test case output one line — the k -th lexicographically borderless word of length n .

Examples

borderless.in	borderless.out
5 1	aaaab
5 2	aaabb
5 3	aabab
5 4	aabbb
5 5	ababb
0 0	