

Problem F. Four Russians on a Tree

Input file: `four.in`
 Output file: `four.out`
 Time limit: 2 seconds
 Memory limit: 512 mebibytes

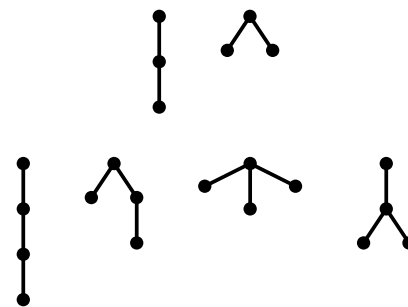
Four Russians method is a general approach to reducing complexity of various combinatorial problems which proceeds as follows: separate the problem instance to small blocks, precompute results for all possible small blocks, and then solve the original problem by processing each small block in one step. The Four Russians are actually the Russian scientists Arlazarov, Diniz, Kronrod and Faradjev.

Fred is solving some problem on the tree and he has decided to use Four Russians method. The Four Russians method on a tree involves splitting the tree to small trees of fixed size. This splitting is usually easy, but unfortunately Fred didn't completely understand the method, so his preparation step is now to difficult for him. He asks you to help.

Consider a rooted tree T with n vertices. All trees in this problem are unlabelled and have unordered children. Fred has chosen an integer k , and calls a rooted tree with exactly k vertices a *microtree*. He now wants split T to microtrees in the following way.

- Remove some leafs of T to get the tree T' .
- Remove some edges of T' to get microtrees T_1, T_2, \dots, T_v (each microtree T_i must have exactly k vertices).

He wants to choose such way to split T to microtrees that there is minimal number of *microtree types*. Two microtrees have the same type if they are isomorphic as rooted trees. For example, there are 2 types of microtrees with 3 vertices, and 4 types of microtrees with 4 vertices, they are shown at the picture on the right.



Help Fred. For the given tree T and integer k find the minimal number s such that T can be split in the way described above to microtrees of size k that belong to one of s types.

Input

The input file contains several test cases. The first line of each test case contains n and k ($2 \leq n \leq 100$, $2 \leq k \leq 5$). The second line contains $n - 1$ integers and describe the tree T . The root of T is vertex number 1. For each vertex i from 2 to n its parent p_i is specified, $p_i < i$.

The last test case is followed by a line that contains two zeroes, it must not be processed. The sum of n for all tests cases is one file doesn't exceed 300.

Output

For each test case output s — the minimal number such that T can be split to microtrees of s types. If it is impossible to split the tree in such way, output -1 .

Examples

<code>four.in</code>	<code>four.out</code>
7 3	1
1 1 2 2 4 4	2
8 3	-1
1 1 2 2 3 4 5	
11 3	
1 1 2 2 3 3 4 5 6 7	
0 0	