

Avalanche

Problem ID: laviner

After Joshua saw through Alexander's attempts to fake pictures of snowflakes¹, Alexander has become vengeful and obsessed with snow. He has come up with an evil master plan which could be the end of Joshua, where the first step is to invite him on a skiing trip.

Together, they are now in a large skiing system with N ski villages numbered from 1 to N . The villages are connected by $N - 1$ one-way ski slopes. At the top of the ski system is village 1, and from there it is possible to reach every other village by going down one or more skiing slopes. The rest of the villages each have exactly one slope leading into them.

The second step of Alexander's evil master plan is to start an avalanche in the skiing system. He plans to do this by making loud noises in one of the villages. The snow in this village will then tumble down along all slopes originating from the village. The snow will keep tumbling downward in all directions as far as possible. The *damage* of the avalanche is the number of villages affected.

Joshua, noticing that Alexander does not seem to be in his right mind, has seen through Alexander's evil master plan. Joshua is, as known by all, handy, and can choose some villages to build walls in. A wall in a village prevents the avalanche from reaching it. Alexander cannot start the avalanche from a walled ski village.

But time is running out, and after warning other skiers about what is about to happen, Joshua only has time to build walls in K different villages. Joshua does not know in which village Alexander will make loud noises, but he wants to minimize the number of villages affected.

First, Joshua will build the K walls so that the maximum damage Alexander can cause is minimized. Then Alexander will make loud noises in the village that causes the maximum possible damage. Your task is to calculate the damage, i.e., the number of villages affected by the avalanche.

Input

The first line of input has the two numbers N and K ($1 \leq K < N \leq 10^5$), the number of villages in the skiing system, and the number of walls Joshua can build.

Then there is a row containing the $N - 1$ numbers a_1, a_2, \dots, a_{N-1} , where $1 \leq a_i \leq i$. For each $i = 1, 2, \dots, N - 1$, there is a ski slope from the village with number a_i to the village with number $i + 1$.

Output

Output a single number: The maximum damage Alexander can cause, given that Joshua builds the walls optimally.

Points

Your solution will be tested on several test case groups. To get the points for a group, it must pass all the test cases in the group.

Group	Point value	Constraints
1	10	$a_i = i$ for all ($1 \leq i \leq N - 1$).
2	10	$K = 1, N \leq 1000$
3	10	$N \leq 20$
4	15	$K = 1$
5	25	$N \leq 1000$
6	30	No additional constraints.

Sample Input 1

5 2 1 2 1 1	Sample Output 1 1
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¹See <https://open.kattis.com/problems/falskflinga>

Sample Input 2

7 1
1 1 2 2 3 3

Sample Output 2

3

Sample Input 3

7 2
1 2 2 4 1 6

Sample Output 3

2
