Problem B
Subtree Removal Game
Time limit: 2 seconds

You are given a *rooted tree* with n nodes, numbered from 1 to n, rooted at node 1. For each node i ($2 \leq i \leq n$), its parent is node p_i. For each node i, if it is a *leaf* (a node having no children), the integer i is written on it. Otherwise, nothing is written.

Node u is a *descendant* of node v if $u = v$, or u is not the root and the parent of u is a descendant of v.

Now, you and your friend play a game on this tree, taking turns alternately: You move first, then your friend, and so on. On each turn, the current player must choose a node v and then remove the entire subtree of v (i.e., all descendants of v, including v itself). The move is allowed only if, *after* the removal, at least one node with an integer written on it remains in the tree.

The game ends when no further moves are possible. At that point, exactly one node with an integer written on it remains; the *score* of the game is the integer on that node.

You aim to minimize the score, while your friend aims to maximize it. Assuming you and your friend play optimally, determine the score of the game.

Input

The first line of input contains an integer n ($2 \leq n \leq 500\,000$).

The second line contains $n - 1$ integers $p_2, p_3, \ldots, p_n$ ($1 \leq p_i < i$ for all $2 \leq i \leq n$).

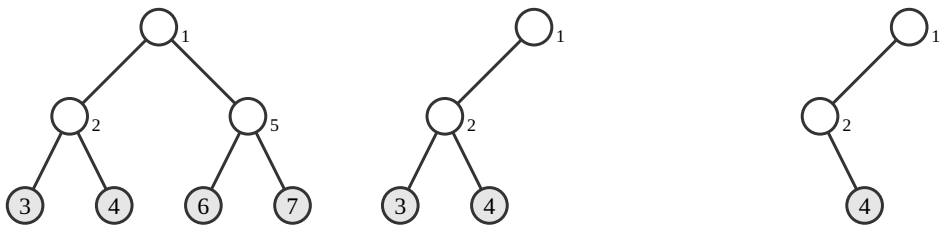
Output

Output the score of the game assuming you and your friend play optimally.

Sample Input #1	Sample Output #1
7 1 2 2 1 5 5	4

Explanation for the sample input/output #1

The given tree is illustrated in Figure B.1 (a).



(a) (b) (c)

Figure B.1: Illustration of Sample Input #1.

The only optimal moves for both players are as follows:

- You choose node 5. Then nodes 5, 6, and 7 are removed (Figure B.1 (b)).
- Your friend chooses node 3. Then only node 3 is removed (Figure B.1 (c)).
- You cannot make any moves, and the game ends.

After these moves, only one node with an integer written on it, node 4, remains. The score of this game is 4.

Sample Input #2	Sample Output #2
9 1 1 3 2 5 4 5 5	7

Explanation for the sample input/output #2

The given tree is illustrated in Figure B.2. One of the optimal moves for you is to choose node 2. The game ends after that, and the score is 7.

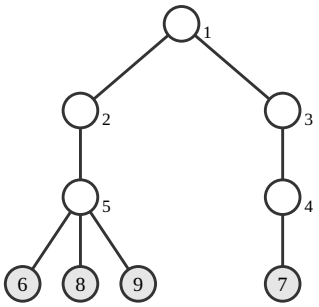


Figure B.2: Illustration of Sample Input #2.