Problem J. You Are Given a Tree

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	512 megabytes

Vlad doesn't like to read. Grisha likes formal statements. Vlad came up with the task. Grisha wrote a statement. As there was no way you can find a story here, they would like you to recall that a tree of size n is a connected undirected graph with n vertices and $n-1$ edges. You are given a tree of size n. We denote as V ($|V| = n$) the set of its vertices. Vertices are numbered with consecutive integers from 1 to n.

For any $S \subset V$, we define its *beauty* as a size of the smallest set of vertices T ($T \subset V$) such that for any two vertices $u, v \in S$ all vertices on the unique simple path between u and v belong to T.

For any l and r ($1 \le l \le r \le n$) we define $S(l, r)$ as a set of vertices $\{l, l+1, l+2, ...r-1, r\}$.

Find the sum of the beauties of $S(l, r)$ for all $1 \le l \le r \le n$.

Input

The first line of the input contains a single integer n ($2 \le n \le 300\,000$), the number of vertices in the tree.

Next $n-1$ lines contain the description of the tree. The i-th of these lines (lines are numbered from 1) contains a single integer p_i ($1 \le p_i \le i$) describing an edge between vertices p_i and $i+1$.

Output

Output a single integer — the sum of the beauties of all $S(l, r)$.

Examples

standard input	standard output
2 1	4
3 1 1	11

Note

In the second sample, there are six sets.

1. $S = \{1\}, T = \{1\}$;
2. $S = \{2\}, T = \{2\}$;
3. $S = \{3\}, T = \{3\}$;
4. $S = \{1, 2\}, T = \{1, 2\}$;
5. $S = \{2, 3\}, T = \{1, 2, 3\}$;
6. $S = \{1, 2, 3\}, T = \{1, 2, 3\}$.