Problem L. Tokens on the Tree

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 mebibytes

Chiaki has a tree with n vertices, labeled by integers from 1 to n. For each vertex in the tree, there is a white token or a black token or no token at all. There are exactly w white tokens and exactly b black tokens. Also, for each pair of vertices with the same color of tokens, there exists a path between them such that every vertex on the path contains a token of the same color.

Chiaki would like to perform the following operations:

1. Choose a vertex u with a token.
2. Choose a path $p_1, p_2, \ldots, p_k$ such that $p_1 = u$, all vertices $p_1, p_2, \ldots, p_{k-1}$ contain a token of the same color, and there's no token in p_k.
3. Move the token in p_1 to p_k. Now there's no token in p_1 and p_k contains a token.

For two initial configurations of tokens S and T, if Chiaki could perform the above operations several (zero or more) times to make S become T, then S and T are considered equivalent.

Let $f(w, b)$ be the number of equivalence classes (that is, the maximum number of configurations that no two are equivalent). Chiaki would like to know the value of

$$\left(\sum_{w=1}^{n-1}\sum_{b=1}^{n-w} w \cdot b \cdot f(w,b)\right) \bmod (10^9+7).$$

Input

There are multiple test cases. The first line of input contains an integer T, indicating the number of test cases. For each test case:

The first line contains an integer n ($2 \le n \le 2 \cdot 10^5$): the number of vertices in the tree.

The second line contains $n-1$ integers $p_2, p_3, \ldots, p_n$ ($1 \le p_i < i$), where p_i means there is an edge between vertex i and vertex p_i.

It is guaranteed that the sum of n of all test cases will not exceed $2 \cdot 10^5$.

Output

For each test case, output an integer denoting the value of

$$\left(\sum_{w=1}^{n-1}\sum_{b=1}^{n-w} w \cdot b \cdot f(w,b)\right) \bmod (10^9+7).$$

Example

standard input	standard output
2 5 1 2 3 3 10 1 2 3 4 3 6 3 8 2	71 989

Note

For the first sample, the values of $f(w,b)$ for each w and b are:
$f(1,1)=1$, $f(1,2)=2$, $f(1,3)=3$, $f(1,4)=3$,
$f(2,1)=2$, $f(2,2)=2$, $f(2,3)=1$,
$f(3,1)=3$, $f(3,2)=1$,
$f(4,1)=3$.