

# Tokens on the Tree

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            1 second  
Memory limit:         256 megabytes

Chiaki has a tree with  $n$  vertices. There might be a token colored white or black on each vertex of the tree, and there are exactly  $w$  white tokens and exactly  $b$  black tokens. Also, for each pair of vertices with the same color of tokens, there must have been 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  $p_1, p_2, \dots, p_k$  such that  $p_1 = u$ , all vertices  $p_1, p_2, \dots, p_{k-1}$  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 times to make  $S$  become  $T$ ,  $S$  and  $T$  are considered equivalent.

Let  $f(w, b)$  be the number of equivalence classes (an equivalence class is a maximal set of configurations where each two of them are equivalent; all equivalence classes partition the set of all configurations), 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  $n$  ( $2 \leq n \leq 2 \times 10^5$ ) – the number of vertices in the tree. The second line contains  $n - 1$  integers  $p_2, p_3, \dots, p_n$  ( $1 \leq p_i < i$ ), where  $p_i$  means there is an edge between vertex  $i$  and vertex  $p_i$ .

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

## 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	71
5	989
1 2 3 3	
10	
1 2 3 4 3 6 3 8 2	

## Note

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