E. On Changing Tree

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a rooted tree consisting of n vertices numbered from 1 to n. The root of the tree is a vertex number 1.

Initially all vertices contain number 0. Then come q queries, each query has one of the two types:

- The format of the query: $1\ v\ x\ k$. In response to the query, you need to add to the number at vertex v number x; to the numbers at the **descendants** of vertex v at distance 1, add x - k; and so on, to the numbers written in the descendants of vertex v at distance i, you need to add x - $(i \cdot k)$. The distance between two vertices is the number of edges in the shortest path between these vertices.
- The format of the query: $2\ v$. In reply to the query you should print the number written in vertex v modulo 1000000007 $(10^9 + 7)$.

Process the queries given in the input.

Input

The first line contains integer n $(1 \le n \le 3 \cdot 10^5)$ — 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 is the number of the vertex that is the parent of vertex i in the tree.

The third line contains integer q $(1 \le q \le 3 \cdot 10^5)$ — the number of queries. Next q lines contain the queries, one per line. The first number in the line is $type$. It represents the type of the query. If $type = 1$, then next follow space-separated integers v, x, k $(1 \le v \le n;\ 0 \le x < 10^9 + 7;\ 0 \le k < 10^9 + 7)$. If $type = 2$, then next follows integer v $(1 \le v \le n)$ — the vertex where you need to find the value of the number.

Output

For each query of the second type print on a single line the number written in the vertex from the query. Print the number modulo 1000000007 $(10^9 + 7)$.

Examples

input
3 1 1 3 1 1 2 1 2 1 2 2
output
2 1

Note

You can read about a rooted tree here: `http://en.wikipedia.org/wiki/Tree_(graph_theory)`.