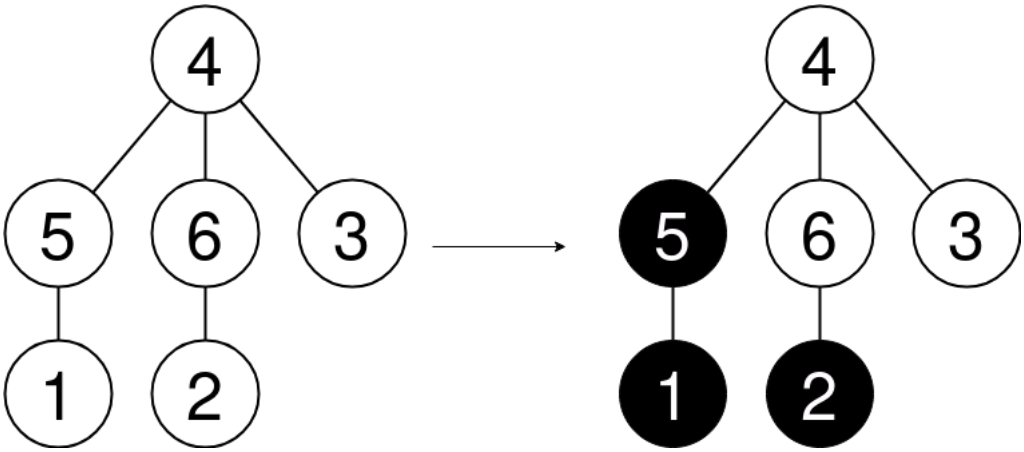
H Food Serving Machine

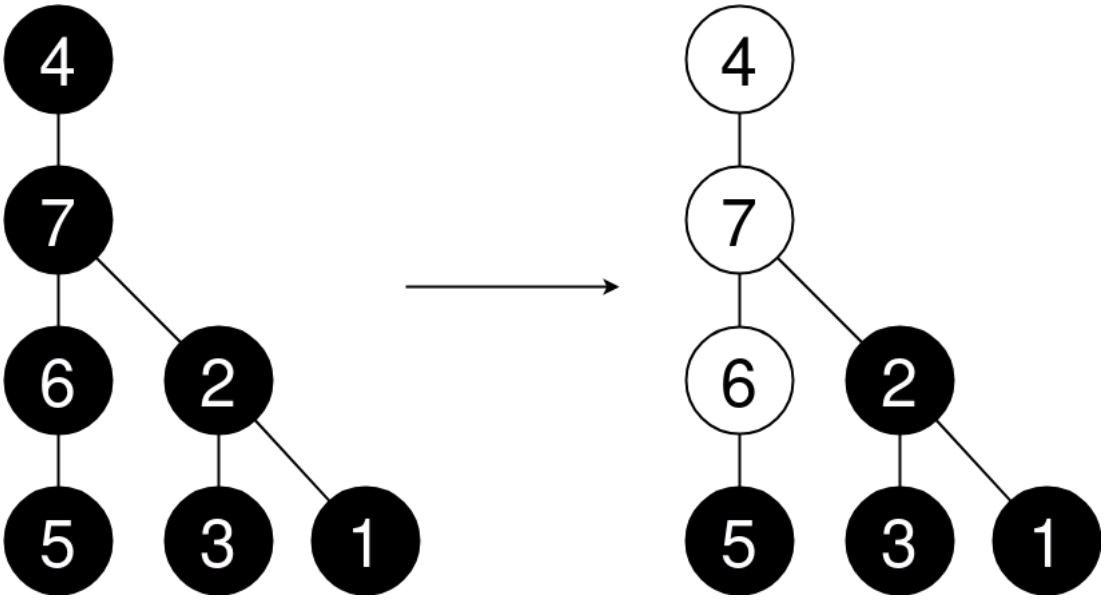
Time limit: 1.0s
Memory limit: 256MB

We have a machine in Chehel Sotoon Palace for serving food that can be visualized as a rooted tree. The nodes of the tree are numbered from 1 to n. Each node is either empty or contains a plate full of food. Initially, all nodes are empty. While running, the machine can perform operations of two different types:

- Add k food to the machine: Foods are put one by one into the root node. As long as a food has an empty node directly beneath it, it will move down. If there are multiple empty child nodes, the food will choose the one that has the node with the smallest number in its subtree. So if the food moves down multiple levels, it makes a choice at each level. For example: If we add three Foods to the machine in the picture below, they will go to nodes 1, 5, and 2: The first food moves from node 4 to node 5 and then node 1 because node 5 is empty and it contains node 1 in its subtree. The second food moves from node 4 to node 5 as well and stops there. The third food moves from node 4 to node 6 and then node 2.



- Pick a food from a specified node: This node becomes empty and Foods from above (if there are any) move down. Whenever a parent of an empty node contains food, this food will roll down. If we remove foods from nodes 3, 1, and 5 (in this order) from the machine in the picture below, nodes 4, 7, and 6 will become empty.



Input

The first line contains two integers n and q ($1 \leq n, q \leq 10^5$) — the number of tree nodes and the number of operations.

The next n lines describe the ball machine. Each of these lines contains one integer, the number of a node: the i-th of these lines contains the number of node i's parent node, or 0 if node i is the tree root.

Each of the next q lines contains two integers and describes an operation to be performed. An operation of type 1 is denoted by 1 k where k is the number of foods to be added to the machine. An operation of type 2 is denoted by 2 x where x is the number of the node from which a food is to be picked.

It is guaranteed that all performed operations are correct: Operations will not require adding more foods than empty nodes in the machine or picking a food from an empty node.

Output

For each operation of type 1, output the number of the node where the last inserted food ended up. For each operation of type 2, output the number of food that rolled down after picking the food from the specified node.

Samples

Sample input 1	Sample output 1
15 10 5 9 11 3 10 3 13 13 11 12 12 0 10 5 9 1 8 2 13 2 7 2 7 2 8 2 2 2 1 1 4 2 8 2 7	2 1 1 0 0 0 1 13 1 0