Query on a tree III

You are given a node-labeled rooted tree with n nodes.

Define the query (x, k): Find the node whose label is k-th largest in the subtree of the node x. Assume no two nodes have the same labels.

Input

The first line contains one integer n ($1 <= n <= 10^5$). The next line contains n integers l_i ($0 <= l_i <= 10^9$) which denotes the label of the i-th node.

Each line of the following n - 1 lines contains two integers u, v. They denote there is an edge between node u and node v. Node 1 is the root of the tree.

The next line contains one integer m ($1 <= m <= 10^4$) which denotes the number of the queries. Each line of the next m contains two integers x, k. (k <= the total node number in the subtree of x)

Output

For each query (x, k), output the index of the node whose label is the k-th largest in the subtree of the node x.

Example

Input:

```
5
1 3 5 2 7
1 2
2 3
1 4
3 5
4
2 3
4 1
3 2
3 2
```

Output:

```
5
4
5
5
```