GSS7 - Can you answer these queries VII

Given a tree with N (N <= 100000) nodes. Each node has a interger value x_i ($|x_i|$ <= 10000).

You have to apply Q (Q <= 100000) operations:

1. *1 a b* : answer the maximum contiguous sum (maybe empty,will always larger than or equal to 0) from the path *a->b* (inclusive).

2. *2 a b c* : change all value in the path *a->b* (inclusive) to *c*. ($|c|$ <= 10000)

Input

first line consists one interger N.

next line consists N interger x_i.

next N-1 line , each consists two interger u,v , means that node u and node v are connected

next line consists 1 interger Q.

next Q line : *1 a b* or *2 a b c* .

Output

For each query, output one line the maximum contiguous sum.

Example

```
Input:
5
-3 -2 1 2 3
1 2
2 3
1 4
4 5
3
1 2 5
2 3 4 2
1 2 5

Output:
5
9
```