

Problem H Query on the subtree

bobo has a tree, whose vertices are conveniently labeled by $1, 2, \dots, n$. At the very beginning, the i -th vertex is assigned with weight w_i .

There are q operations. Each operations are of the following 2 types:

- Change the weight of vertex v into x (denoted as “! v x ”),
- Ask the total weight of vertices whose distance are no more than d away from vertex v (denoted as “? v d ”).

Note that the distance between vertex u and v is the number of edges on the shortest path between them.

Input

The first line contains n, m ($1 \leq n, q \leq 10^5$). The second line contains n integers w_1, w_2, \dots, w_n ($0 \leq w_i \leq 10^4$). Each of the following $(n - 1)$ lines contain 2 integers a_i, b_i denoting an edge between vertices a_i and b_i ($1 \leq a_i, b_i \leq n$). Each of the following q lines contain the operations ($1 \leq v \leq n, 0 \leq x \leq 10^5, 0 \leq d \leq n$).

Output

For each queries, a single number denotes the total weight.

Sample input 1

```
4 3
1 1 1
1 2
2 3
3 4
? 2 1
! 1 0
? 2 1
```

Sample output 1

```
3
2
```

Sample input 2

```
3 3
1 2 3
1 2
1 3
? 1 0
? 1 1
? 1 2
```

Sample output 2

```
1
6
6
```