Coloring

Description

Tom intends to color all the nodes of a tree with a pen. Suppose coloring a node cost 1 unit of time, and he can only color 1 node in 1 unit of time. Additionally, he is allowed to color a node when its father node has been colored.

For each node, it has a coloring cost factor C_i. At the beginning, the time is set to 0. If the finishing time of coloring node i is F_i , then the coloring cost of node i is C_i * F_i.

Please help Tom find out the minimum coloring cost for coloring all nodes.

Input Format

The first line contains two integers N, R, where N is the number of nodes in the tree and R is the node number of the root node.

The second line contains N integers, the i-th of which is C_i (1 ≤ C_i≤ 500), the coloring cost factor of node i.

Then the next $N-1$ lines, each line contains two integers x, y, denoting that x is the father node of y.

Output Format

One integer, the minimum total coloring cost.

Sample

Sample Input

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

Sample Output

```
33
```

Hint

For 70% data, $n \leq 10^3$.

For 100% data, $n \leq 10^5$, $0 < C_i \leq 1000$.