D. Acyclic Organic Compounds

time limit per test: 3 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

You are given a tree T with n vertices (numbered 1 through n) and a letter in each vertex. The tree is rooted at vertex 1.

Let's look at the subtree T_v of some vertex v. It is possible to read a string along each simple path starting at v and ending at some vertex in T_v (possibly v itself). Let's denote the number of **distinct** strings which can be read this way as .

Also, there's a number c_v assigned to each vertex v. We are interested in vertices with the maximum value of .

You should compute two statistics: the maximum value of and the number of vertices v with the maximum .

Input

The first line of the input contains one integer n ($1 \le n \le 300\,000$) — the number of vertices of the tree.

The second line contains n space-separated integers c_i ($0 \le c_i \le 10^9$).

The third line contains a string s consisting of n lowercase English letters — the i-th character of this string is the letter in vertex i.

The following n - 1 lines describe the tree T. Each of them contains two space-separated integers u and v ($1 \le u, v \le n$) indicating an edge between vertices u and v.

It's guaranteed that the input will describe a tree.

Output

Print two lines.

On the first line, print over all $1 \le i \le n$.

On the second line, print the number of vertices v for which .

Examples

input
10 1 2 7 20 20 30 40 50 50 50 cacabbcddd 1 2 6 8 7 2 6 2 5 4 5 9 3 10 2 5 2 3

output
51 3

input

```
6
0 2 4 1 1 1
raaaba
1 2
2 3
2 4
2 5
3 6
```

output

```
6
2
```

Note

In the first sample, the tree looks like this:

The sets of strings that can be read from individual vertices are:

Finally, the values of are:

In the second sample, the values of are $(5, 4, 2, 1, 1, 1)$. The distinct strings read in T_2 are ; note that can be read down to vertices 3 or 4.