Tree Colouring

Submit solution

My submissions
All submissions
Best submissions

Points: 100 (partial)
Time limit: 1.0s
Memory limit: 256M

Allowed languages
C, C++

You are given a tree consisting of n vertices (a connected acyclic undirected graph). Each vertex must be painted in one of three colors. For every vertex, you are provided with the cost of painting it in each color.

A painting is called **good** if for every triple of distinct vertices (x, y, z) where:

- x is connected by an edge with y,
- y is connected by an edge with z,
- and x, y, z are all distinct,

the colors assigned to x, y and z are all pairwise different.

Your task is to compute the minimum cost of a good painting and output one such painting. **If there are multiple good paintings with the minimum cost, output the lexicographically smallest painting array.** (An array a is lexicographically smaller than an array b if at the first position where they differ, $a_i < b_i$.

If no good painting exists, output -1.

Input Format

- The first line contains one integer n ($3 < n < 100,000$)~ — the number of vertices.
- The next three lines each contain n space-separated integers:
  - The second line contains $c_{1,1}, c_{1,2}, \ldots, c_{1,n} (1 \leq c_{1,i} \leq 10^9)$, where $c_{1,i}$ is the cost of painting vertex i with color 1.
  - The third line contains $c_{2,1}, c_{2,2}, \ldots, c_{2,n} (1 \leq c_{2,i} \leq 10^9)$, where $c_{2,i}$ is the cost of painting vertex i with color 2.
  - The fourth line contains $c_{3,1}, c_{3,2}, \ldots, c_{3,n} (1 \leq c_{3,i} \leq 10^9)$, where $c_{3,i}$ is the cost of painting vertex i with color 3.
- Then, $n-1$ lines follow. Each of these lines contains two integers u_i and v_i $(1 \leq u_i, v_i \leq n,\ u_i \leq v_i)$

Output Format

- If no good painting exists, output a single line with `-1`.
- Otherwise, output the minimum total cost of a good painting on the first line.
- On the second line, output n integers $b_1, b_2, \ldots, b_n (1 \leq b_i \leq 3)$, where b_i is the color assigned to vertex i.
- If there are multiple good paintings with the minimum cost, output the lexicographically smallest painting array.

Sample Input

Copy

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

Sample Output

Copy

```
6
1 3 2
```

Sample Input

Copy

```
3
1 1 1
1 1 1
1 1 1
1 2
2 3
```

Sample Output

Copy

```
3
1 2 3
```

In the sample test 1, the only path with three vertices is $(1–2–3)$. For the painting $([1, 3, 2])$, the colors on this path are all distinct and the total cost is $(3 + 1 + 2 = 6)$. No other painting can achieve a lower cost while satisfying the conditions, and $([1, 3, 2])$ is the lexicographically smallest among all optimal paintings.

In the second case we have to print the lexicographically smallest sequence.

Clarifications

Request clarification

No clarifications have been made at this time.