USA Computing Olympiad

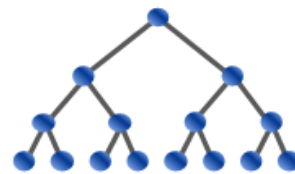OVERVIEW   TRAINING   CONTESTS   HISTORY   STAFF   RESOURCES

USACO 2022 DECEMBER CONTEST, SILVER
PROBLEM 1. BARN TREE

Return to Problem List

Time Remaining: **3 hrs, 59 min, 53 sec**

Not submitted yet

English (en) ∨

Note: the time limit for this problem is 4s, two times the default. The memory limit is also twice the default.

Farmer John's farm has N barns ($2 \leq N \leq 2 \cdot 10^5$) numbered $1 \ldots N$. There are $N - 1$ roads, where each road connects two barns and it is possible to get from any barn to any other barn via some sequence of roads. Currently, the jth barn has h_j hay bales ($1 \leq h_j \leq 10^9$).

To please his cows, Farmer John would like to move the hay such that each barn has an equal number of bales. He can select any pair of barns connected by a road and order his farmhands to move any positive integer number of bales less than or equal to the number of bales currently at the first barn from the first barn to the second.

Please determine a sequence of orders Farmer John can issue to complete the task in the minimum possible number of orders. It is guaranteed that a sequence of orders exists.

INPUT FORMAT (input arrives from the terminal / stdin):

The first line of input contains the value of N.

The second line of input contains the space-separated values of h_j for $j = 1 \ldots N$.

The final $N - 1$ lines of input each contain two space-separated barn numbers $u_i \; v_i$, indicating that there is a bidirectional road connecting u_i and v_i.

OUTPUT FORMAT (print output to the terminal / stdout):

Output the minimum possible number of orders, followed a sequence of orders of that length, one per line.

Each order should be formatted as three space-separated positive integers: the source barn, the destination barn, and the third describes the number of hay bales to move from the source to the destination.

If there are multiple solutions, output any.

SAMPLE INPUT:

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

SAMPLE OUTPUT:

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

In this example, there are a total of twelve hay bales and four barns, meaning each barn must have three hay bales at the end. The sequence of orders in the sample output can be verbally translated as below:

1. From barn 3 to barn 2, move 1 bale.
2. From barn 4 to barn 2, move 2 bales.
3. From barn 2 to barn 1, move 1 bale.

SCORING:

- Test cases 2-8 satisfy $N \leq 5000$
- Test cases 7-10 satisfy $v_i = u_i + 1$
- Test cases 11-16 satisfy no additional constraints

Problem credits: Aryansh Shrivastava

Language: [C ⌄]

Source File: [选择文件] 未选择任何文件

[Submit Solution]