Problem G. Guardians of Galaxy

The planets under the obligation of the IPO (Interplanetary Peace Organization) make up an acyclic connected graph (connected through high-tech space bridges).

The IPO council aims to choose one planet to take care of the other planets and name it as the capital in a way that the sum of the planets' happiness becomes maximum.

The planet u will be sub-planet of v if and only if the path from u to capital includes v.

The happiness of each planet is calculated by the following formula: The sum of income of the planet and its sub-planets minus the sum of the rest of the planets' income. Help the IPO council choose the planet capital.

Input

The first line of the input file contains one integer n — the number of the planets.

$$1 \le n \le 400\,000$$

The second line contains a sequence of integers, the incomes of each planet c_1, c_2, $\ldots$, c_n ($0 \le c_i \le 10^7$).

The following $n - 1$ lines describe the connection bridges. Each line contains two integers a_i and b_i.

$$1 \le a_i,\ b_i \le n$$

Output

In a single line print two integers the maximum possible happiness and the index of the capital planet.

In the case of multiple answers chose the capital with the minimum index.

Examples

test	answer
5 1 1 1 1 1 1 2 2 3 2 4 5 1	3 5
4 1 1 1 1 1 2 2 3 2 4	2 1