

Elytra

Dadas is exploring a vast *Minecraft* world using an elytra. The world contains N landmarks connected by $N - 1$ bidirectional flight routes, forming a tree. The landmarks are numbered from 1 to N . Route i connects landmarks u_i and v_i , and has length w_i . Some landmarks contain firework stations.

Before setting out, Dadas may choose any landmark S as his starting point. He must start at S , traverse every flight route at least once, and finally return to S .

At every moment, Dadas is in one of the following two modes:

- In normal mode, his speed is 1.
- In boost mode, his speed is 2.

Thus, traversing a route of length w takes w units of time in normal mode, and $w/2$ units of time in boost mode.

Initially, Dadas is in normal mode. However, if the starting landmark S contains a firework station, he uses a firework immediately before his first movement and enters boost mode. Whenever he reaches a landmark containing a firework station, he immediately uses a firework and enters boost mode.

Suppose that Dadas reaches a landmark through some route and immediately flies back along the same route. This is called a *U-turn*. Making a U-turn causes him to lose speed, so he enters normal mode before flying back. If the landmark contains a firework station, he immediately uses a firework after slowing down and therefore begins the return flight in boost mode. If he leaves the landmark through a different route, his current mode does not change.

Choose the starting landmark and the flight route so that the exploration is completed in minimum possible time. Output twice this minimum time.

Input

The first line contains an integer N , the number of landmarks.

The second line contains N integers $A[1], A[2], \dots, A[N]$. If $A[i] = 1$, landmark i contains a firework station; if $A[i] = 0$, it does not.

Each of the next $N - 1$ lines contains three integers u_i, v_i , and w_i , describing route i .

Output

Output one integer: twice the minimum possible time required to traverse every route at least once and return to the starting landmark.

Constraints

- All values in the input are integers.
- $1 \leq N \leq 2\,000$.
- $A[i] \in \{0, 1\}$ for every i such that $1 \leq i \leq N$.
- $1 \leq u_i, v_i \leq N$ for every i such that $1 \leq i \leq N - 1$.
- $u_i \neq v_i$ for every i such that $1 \leq i \leq N - 1$.
- $1 \leq w_i \leq 10^9$ for every i such that $1 \leq i \leq N - 1$.
- The flight routes form a tree.

Subtasks

Subtask	Score	Additional Constraints
1	7	$N \leq 10$
2	6	$N \leq 15$
3	21	$N \leq 50$
4	17	$N \leq 100$
5	21	$N \leq 400$
6	28	No additional constraints.

Example

Sample Input 1

```
4
0 1 0 0
1 2 4
2 3 3
2 4 2
```

Sample Output 1

27

Dadas may choose landmark 1 as the starting landmark and fly in the order 1, 2, 4, 2, 3, 2, 1. The corresponding travel times are 4, 1, 2, $3/2$, 3, 2, for a total of $27/2$. Therefore, twice the minimum possible time is 27.

Sample Input 2

```
5
0 0 1 0 0
1 2 5
2 3 4
2 4 3
4 5 2
```

Sample Output 2

47