VM7WC '15 #6 Gold - Agriphilosophical Data Slaves

Time limit: 1.0s **Memory limit:** 64M

In philosophy class, you are given a set of data slaves numbered from 1 to N $(1 \leq N \leq 400\,000)$ who each must manually type out test data for the 7 Week Challenge (yes, this is really how the test data is made). The i^{th} $(2 \leq i \leq N)$ data slave must type out c_i $(-1000 \leq c_i \leq 1000)$ characters before sending all his work to his superior data slave. The superior data slave will have a supervisor with a lower identifying number. The exception to this is the data slave numbered 1 (Leo Feng), who has no superior. Note that the data slaves are unintelligent and may sometimes delete characters accidentally, when $c_i < 0$. Define the *agriculturality* of a data slave to be the total number of characters that he types as well as those that are typed by those who work under him (accounting for those deleted as well). In other words, the *agriculturality* of a data slave is the sum of the work done in the subtree rooted at that slave. Considering all data slaves, find the maximum *agriculturality* of a single data slave. You plan to promote this slave, which you believe may be useful to solving the "What is the meaning of life" problem.

For inspiration, "The meaning of life is to find the meaning of life." ~ Philosopher Zihao Zhang 2014.

Input Specification

The first line will have the single integer N. Each of the following $N-1$ lines will contain two space separated integers, where the first number will correspond to the data slave who is the superior of the data slave with the second number. The next line will contain N space-separated integers, representing the number of characters each data slave types, in order.

Output Specification

Print the maximum *agriculturality* of a single slave.

Sample Input

```
5
1 2
1 3
2 4
2 5
4 -5 -3 10 6
```

Sample Output

```
12
```

Explanation

The *agriculturality* of each of the data slaves is as follows: 12, 11, -3, 10, 6. Therefore, the largest is 12.