

## E. Gold in the mine (round 2)

Input: standard input (from the keyboard)

Output: standard output (to the screen)

Time limit: 1 second

Memory limit: 256 Mb

### Problem

The Gold mine consists of rooms on different levels and transitions between them. The top-most room is the entrance to the mine. From each room, except the entrance, there is one transition to the room on a higher level. From each room there are no more than two transitions to lower-level rooms. And, only one western transition and only one eastern transition can lead to the lower level. Each room of the mine has unique number and there is some amount of gold in it. Two researchers had gone through the entire mine and left records of their trips. The first researcher coming in the room wrote down its number, then went to the eastern transition (if existed), returned to the room and went to the western transition (if existed). Second researcher first went to the eastern transition, then returned, wrote the number of the room and went to the western transition.

With records of both researchers and knowing how much gold is in each room, calculate the maximum amount of gold that can be collected moving from the entrance all the way down.

### Input

First line of the input contains one natural number  $N$  – number of rooms in the mine ( $1 \leq N \leq 100000$ ). Each of next  $N$  lines contains one natural number:  $g_i$  ( $0 \leq g_i \leq 10000$ ) – amount of gold in the room with number  $i$ .

In each of the following  $N$  lines there are two natural numbers written:  $a_i$  – the number of the  $i^{\text{th}}$  room, recorded by the first researcher,  $b_i$  – the number of the  $i^{\text{th}}$  room, recorded by the second researcher ( $1 \leq a_i, b_i \leq N$ ). All  $a_i$  are different and all  $b_i$  are different.

### Output

The output should contain only one number – the maximum amount of gold that can be collected moving from the entrance all the way down.

### Example

Input	Output
6 2 2 3 1 2 3 2 3 4 4 3 1 1 5 5 2 6 6	7

**Clarification:** researchers described the mine with the structure as on the scheme. The maximum amount of gold could be collected after passing rooms: 2, 4, 1, 5.

