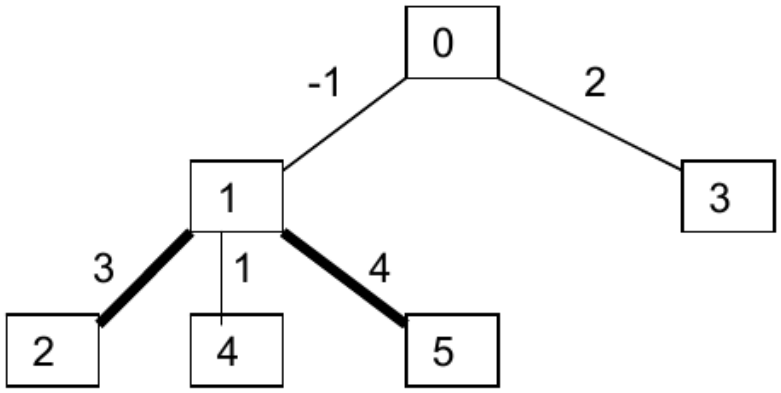
3283 Paths

A developer has designed a subdivision within a city such that all roads connect at intersections in a treelike design. This is to prevent all petrolhead hooligans from disturbing the residents by not having any road loops for races. Only the entering intersection is connected to the rest of the city. The developer is selling off land alongside roads between adjacent intersections. A real estate agent has produced a book indicating the expected dollar profit (positive, zero or negative) that can be obtained by purchasing the land alongside each road.

Potential buyers want to maximize their profit, but prefer to buy a contiguous stretch of land alongside a simple road chain that connects two intersections of the subdivision. Your task is to write a program to determine the maximum non negative profit that can be obtained this way, and return 0 if no such profit can be obtained.

As an example, consider the following representation of a subdivision, where road labels represent expected profits. In this scenario, the maximum non negative profit is 7, and can be obtained alongside the road chain between the intersections #2 and #5:



Input

Input for this problem consists of a sequence of one or more scenarios. Each scenario contains two or more lines.

- The first line contains an integer n, $1 \leq n \leq 500000$, indicating the number of intersections, including the entrance intersection, implicitly labelled 0.
- This is then followed by one or more lines, containing $n - 1$ pairs of integers. All integers are separated by single spaces or newlines. The y-th intersection is defined by the y-th pair of integers 'x p', where $1 \leq y < n$, $0 \leq x < y$, $-1000 \leq p \leq 1000$. This pair indicates a road segment between y and a previously defined intersection, x, with a profit value p.(Attention, for this program, input lines may contain up to 4096 characters each!)

The input will be terminated by a line consisting of one zero (`0`). This line should not be processed.

Output

Output will be a sequence of lines, one for each input scenario. Each line will contain an integer, indicating the maximum nonnegative profit, over all possible simple road chains connecting two intersections of the subdivision. Write zero (`0`) if no profit can be obtained.

Sample Input

```
6
0 -1 1 3 0 2 1 1 1 4
6
0 2 0 1 0 2 0 1 1 1
5
0 1 1 -3 0 -2 1 -2
5
0 -1 1 -3 0 -2 1 -2
10
0 -1 0 -1 0 0 1 3 1 4 2 4 2 2 3
3 3 3
0
```

Sample Output

```
7
5
1
0
7
```