

Boxes on tree

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 64 megabytes

Bobo had a tree T of n vertices conveniently labeled by $1, 2, \dots, n$. There was a box in each vertex. Bobo would like to move the box in vertex i to vertex p_i using a robot.

The robot was initially in vertex 1. In a time unit, it could move to an adjacent vertex along the edge, carrying at most one of boxes in current vertex. It should return back to vertex 1 at last.

Find out the minimum time to finish the task.

Input

The first line contains 1 integer n ($1 \leq n \leq 500$).

The second line contains n integers $p_1, p_2, \dots, p_n$ ($1 \leq p_1, p_2, \dots, p_n \leq n, p_i \neq p_j$).

The i -th of the following $(n - 1)$ lines contains 2 integers a_i, b_i which denotes an edge between vertices a_i and b_i .

Output

An integer denotes the minimum time.

Examples

standard input	standard output
3 1 3 2 1 2 2 3	4
4 2 1 4 3 1 3 3 2 3 4	6