Baltic OI '09 P5 - Triangulation

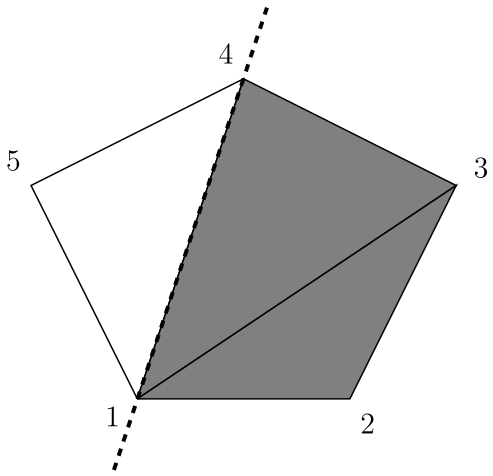
Time limit: 1.0s **Memory limit:** 512M

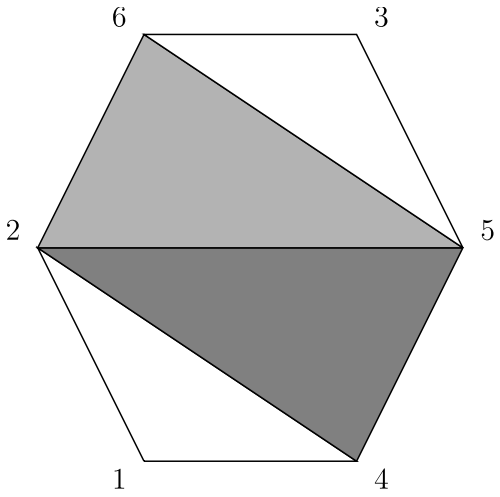
Baltic Olympiad in Informatics: 2009 Day 2, Problem 2

A *triangulation* of a polygon is a set of triangles with vertices at the vertices of a polygon. These triangles must not overlap and must cover the whole polygon.

We define a polygon *cut* as a straight line separating the polygon into two pieces.

Given a triangulated convex polygon, where each triangle has some color, find the maximal number of cuts one can do so that **no** two points of the same color end up in two different pieces.





Input Specification

The first line of input contains the number of vertices, n. Vertices are numbered with unique integers between 1 and n. Each of the next $n-2$ lines contains four integer numbers a, b, c and d, meaning that the triangle which has its vertices in a, b and c has the color d. a, b, and c are three different vertices. The input always contains data about a proper triangulation of a polygon and all triangles are colored.

Output Specification

Output one line containing one integer - the maximal number of cuts.

Sample Input 1

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

Sample Output 1

```
1
```

Sample Input 2

```
6
1 4 2 1
2 4 5 2
6 2 5 3
3 6 5 1
```

Sample Output 2

```
0
```

Constraints

$1 \leq n \leq 100\,000$

$1 \leq a, b, c, d \leq n$

Grading

For test cases worth 50% of the total score, $n \leq 5\,000$.