

D. Roads not only in Berland

time limit per test: 2 seconds
memory limit per test: 256 megabytes

Berland Government decided to improve relations with neighboring countries. First of all, it was decided to build new roads so that from each city of Berland and neighboring countries it became possible to reach all the others. There are n cities in Berland and neighboring countries in total and exactly $n - 1$ two-way roads. Because of the recent financial crisis, the Berland Government is strongly pressed for money, so to build a new road it has to close some of the existing ones. Every day it is possible to close one existing road and immediately build a new one. Your task is to determine how many days would be needed to rebuild roads so that from each city it became possible to reach all the others, and to draw a plan of closure of old roads and building of new ones.

Input

The first line contains integer n ($2 \leq n \leq 1000$) — amount of cities in Berland and neighboring countries. Next $n - 1$ lines contain the description of roads. Each road is described by two space-separated integers a_i, b_i ($1 \leq a_i, b_i \leq n, a_i \neq b_i$) — pair of cities, which the road connects. It can't be more than one road between a pair of cities. No road connects the city with itself.

Output

Output the answer, number t — what is the least amount of days needed to rebuild roads so that from each city it became possible to reach all the others. Then output t lines — the plan of closure of old roads and building of new ones. Each line should describe one day in the format $i \ j \ u \ v$ — it means that road between cities i and j became closed and a new road between cities u and v is built. Cities are numbered from 1. If the answer is not unique, output any.

Examples

input	Copy
2 1 2	
output	Copy
0	

input	Copy
7 1 2 2 3 3 1 4 5 5 6 6 7	
output	Copy
1 3 1 3 7	

→ Attention

The package for this problem was not updated by the problem writer or Codeforces administration after we've upgraded the judging servers. To adjust the time limit constraint, a solution execution time will be multiplied by 2. For example, if your solution works for 400 ms on judging servers, then the value 800 ms will be displayed and used to determine the verdict.

Codeforces Beta Round 25 (Div. 2 Only)

Finished

Practice

★

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

Submission	Time	Verdict
263872530	Jun/03/2024 14:39	Accepted

→ Problem tags

dsu graphs trees *1900

No tag edit access

→ Contest materials

Announcement

Tutorial