

Task Tree 2

 1.0 sec.  256 MB

Alisa has once again thought of a tree with N vertices, and she will erase the labels of some of them. She will play with Bobi, who will try to reconstruct the original tree with its vertex labels using Alisa's new tree, having agreed in advance on the strategy they will use. Your goal is to implement a strategy for the two of them which erases a maximal number of vertex labels.

Implementation details

You have to implement the following functions, which will be called in **separate** processes:

```
std::vector<int> encode(int N, std::vector<std::pair<int, int>> v);
```

This function implements Alisa's strategy. It is called once by the jury and receives as parameters the number of vertices and the bidirectional edges (x, y) describing the tree. It must return the labels of the vertices that she will erase.

```
std::vector<std::pair<int, int>> decode(int N, std::vector<std::pair<int, int>> v);
```

This function implements Bobi's strategy. It is called once by the jury and receives as parameters the number of vertices and the bidirectional edges (x, y) in Alisa's new tree. The jury may have swapped the order of the vertices in some edges, **but not the order of the edges themselves**. The label of every vertex of the original tree that has been erased by Alisa is replaced by a new, negative number from $-N$ to -1 , such that the new labels of no two vertices coincide. The function must return the original tree, described by the original bidirectional edges and the original vertex labels. The order of the edges, as well as the order of the vertices within them, does not matter.

The new labels of all erased vertices are determined at random in a deterministic manner, with the exception of vertex 1. If it is erased, in the new tree it always has label -1!

Constraints

- $1 \leq N \leq 65536$

Scoring

Let S be the number of vertex labels erased by Alisa. Then $points = \min(\frac{S}{\lfloor \sqrt{N} \rfloor}, 1)$.

Subtasks

Subtask	Points	Additional constraints
0	0	The example.
1	50	$N = 256$
2	50	$N = 65536$

If all tests in a subtask are correct, the points are determined as the total correctness of the tests.

Example

Jury	Contestant
<code>encode(3, {{1, 2}, {2, 3}})</code>	<code>{2}</code>
<code>decode(3, {{1, -1}, {-1, 3}})</code>	<code>{{1, 2}, {2, 3}}</code>

Sample grader

The first line contains the number N . The next $N - 1$ lines contain the edges (x, y) .