

B — Beginner's Zelda

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Solution

We can prove by induction that on any tree with K leaves, the answer is $\lfloor \frac{K+1}{2} \rfloor$, where with $\lfloor x \rfloor$ we denote the greatest integer smaller than x . This can be proven by induction, we will give an overview of what a proof would look like:

- For two leaves, the answer is clearly 1.
- For three leaves, the answer is clearly 2.
- For more than four leaves, it is always the case that we can find two leaves for which the node that will be created as a result of applying an operation on these two will have degree greater than 1 (i.e. it will not be a leaf)

The third argument holds because in a tree with four leaves, we have either at least two nodes with degree at least 3 (and as such we can choose two leaves which contain these two nodes on their chain), or a node with degree at least 4. Furthermore, it reduces the number of leaves in the tree by 2.

Code (valeriu)

```
#include <cmath>
#include <functional>
#include <fstream>
#include <iostream>
#include <vector>
#include <algorithm>
#include <string>
#include <set>
#include <map>
#include <list>
#include <time.h>
#include <math.h>
#include <random>
#include <deque>
#include <queue>
#include <unordered_map>
#include <unordered_set>
#include <iomanip>
#include <cassert>
#include <bitset>
#include <sstream>
#include <cstring>
#include <numeric>
#define all(x) (x).begin(),(x).end()
using namespace std;

using ll = long long;
using ld = long double;
```

```

// #define int ll
#define sz(x) ((int)(x).size())

using pii = pair<int,int>;
using tii = tuple<int,int,int>;

const int nmax = 1e6 + 5;
const int inf = 1e9 + 5;
int n, k, m, q;
int freq[nmax];

static void testcase() {
    cin >> n;
    for (int i = 1, a, b; i < n; i++) {
        cin >> a >> b;
        freq[a]++;
        freq[b]++;
    }
    int cnt = 0;
    for(int i = 1; i <= n; i++)
        cnt += (freq[i] == 1),
        freq[i] = 0;
    cout << (cnt + 1) / 2 << '\n';
    return;
}

signed main() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    int t;
    cin >> t;
    for (int i = 0; i < t; i++)
        testcase();
}

/**
    Anul asta se da centroid.
-- Surse oficiale
*/

```

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