Not a Work of Idol 2

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

Little Cyan Fish has a tree $G = (V, E)$ with n vertices. The vertices of the tree are numbered with positive integers from 1 to n. The i-th $(1 \leq i \leq n-1)$ edge connects vertex u_i and v_i.

Little Cyan Fish wants you to assign a positive integer p_i from 1 to n to each vertex i, satisfying the following requirements:

- For each $1 \leq i < j \leq n$, $p_i \neq p_j$. In other words, $p_{1\ldots n}$ forms a permutation of length n.
- For each edge $(u, v) \in E$ on the tree, we have $p_u + p_v \leq n + 1$.

Little Cyan Fish wants you to calculate how many permutations p satisfy this condition. As usual, since this problem is *Not a Work of Idol*, Little Cyan Fish does not want you to output the answer modulo a large prime. Therefore, please output the answer modulo **4**.

Input

There are multiple test cases. The first line of the input contains a single integer T $(1 \leq T)$, indicating the number of test cases.

For each test case, the first line of the input contains an integer n $(1 \leq n \leq 10^6)$, indicating the number of vertices in the tree.

The next $(n-1)$ lines each contain two integers u_i and v_i $(1 \leq u_i, v_i \leq n,\ u_i \neq v_i)$, indicating an edge connecting vertex u_i and v_i. It is guaranteed that these $(n-1)$ edges form a valid tree.

It is guaranteed that the sum of n over all test cases does not exceed 10^6.

Output

For each test case, output a single line containing one integer, indicating the answer modulo **4**.

Example

standard input	standard output
4 1 2 1 2 4 3 1 2 1 2 4 4 4 3 3 1 2 3	1 2 0 2