Small Steps

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

For a tree t with n vertices numbered from 1 to n, let $f(t)$ be the number of permutations $p = (p_1, \ldots, p_n)$ such that the following condition is satisfied:

- For each $i = 1, \ldots, n$, there are at most 2 edges on a simple path connecting vertices p_i and p_{i+1}, where $p_{n+1} = p_1$.

You are given positive integers N, K, and a tree T_0 with N vertices numbered from 1 to N. The i-th edge of T_0 connects vertices A_i and B_i.

A tree obtained by joining K disjoint copies of T_0 is called a **good tree**. More formally, we call a tree with NK vertices numbered from 1 to NK a **good tree** if and only if the following condition is satisfied:

- For all integers $1 \leq i \leq N-1$ and $0 \leq k \leq K-1$, there is an edge between vertices $(A_i + N \times k)$ and $(B_i + N \times k)$.

Find the sum of $f(T)$ over all good trees T, and output this value modulo 998244353.

You have Q test cases; solve each of them.

Input

The input is given from Standard Input in the following format:

Q
case_1
$\vdots$
case_Q

Each test case is given in the following format:

N K
A_1 B_1
$\vdots$
A_{N-1} B_{N-1}

- $1 \leq Q \leq 2 \times 10^5$
- $1 \leq N \leq 2 \times 10^5$
- $1 \leq K \leq 2 \times 10^5$
- $1 \leq A_i < B_i \leq N$
- The sum of N over all test cases does not exceed 2×10^5.
- T_0 is a tree.
- All input values are integers.

Output

Print Q lines. On the i-th line, output the answer to the i-th test case.

Example

standard input	standard output
5 4 1 1 2 1 3 1 4 4 1 1 2 2 3 3 4 1 4 4 2 1 2 1 3 1 4 6 200000 1 3 2 3 3 4 4 5 4 6	24 8 192 2304 210217795

Note

In the first test case, all possible permutations are counted since every simple path has at most 2 edges.

In the second test case, you need to count 8 permutations: $(1, 2, 4, 3)$, $(1, 3, 4, 2)$, $(2, 1, 3, 4)$, $(2, 4, 3, 1)$, $(3, 1, 2, 4)$, $(3, 4, 2, 1)$, $(4, 2, 1, 3)$ and $(4, 3, 1, 2)$.

In the third test case, you need to calculate the sum of $f(T)$ over all trees T with 4 vertices. Note that T_0 may have no edges.

In the fourth test case, the following trees are examples of good trees: