Kitty's Calculations on a Tree

Kitty has a tree, T, consisting of n nodes where each node is uniquely labeled from 1 to n. Her friend Alex gave her q sets, where each set contains k distinct nodes. Kitty needs to calculate the following expression on each set:

$$\left(\sum_{\{u,v\}} u \cdot v \cdot dist(u,v)\right) \bmod (10^9 + 7)$$

where:

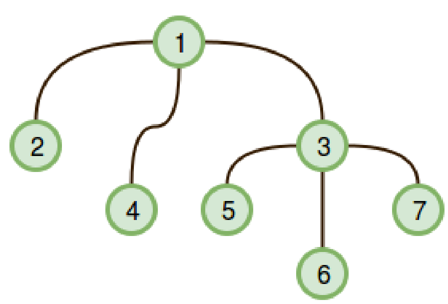
- $\{u, v\}$ denotes an unordered pair of nodes belonging to the set.
- $dist(u, v)$ denotes the number of edges on the unique (shortest) path between nodes u and v.

Given T and q sets of k distinct nodes, calculate the expression for each set. For each set of nodes, print the value of the expression modulo $10^9 + 7$ on a new line.

Example

$edges = [[1, 2], [1, 3], [1, 4], [3, 5], [3, 6], [3, 7]]$
$queries = [4, 5, 7]$

The graph looks like this:



There are three pairs that can be created from the query set: $[4, 5], [4, 7], [5, 7]$. The distance from 4 to 5 is 3, from 4 to 7 is 3, and from 5 to 7 is 2.

Now do the summation:

$$\begin{gathered}(4 \cdot 5 \cdot dist(4,5) + 4 \cdot 7 \cdot dist(4,7) + 5 \cdot 7 \cdot dist(5,7)) \bmod (10^9 + 7) \\ \Rightarrow (4 \cdot 5 \cdot 3 + 4 \cdot 7 \cdot 3 + 5 \cdot 7 \cdot 2) \bmod (10^9 + 7) \\ \Rightarrow 214\end{gathered}$$

Input Format

The first line contains two space-separated integers, the respective values of n (the number of nodes in tree T) and q (the number of nodes in the query set).
Each of the $n - 1$ subsequent lines contains two space-separated integers, a and b, that describe an

undirected edge between nodes a and b.
The $2 \cdot q$ subsequent lines define each set over two lines in the following format:

1. The first line contains an integer, k, the size of the set.
2. The second line contains k space-separated integers, the set's elements.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq a, b \leq n$
- $1 \leq q \leq 10^5$
- $1 \leq k_i \leq 10^5$
- The sum of k_i over all q does not exceed $2 \cdot 10^5$.
- All elements in each set are *distinct*.

Subtasks

- $1 \leq n \leq 2000$ for 24% of the maximum score.
- $1 \leq n \leq 5 \cdot 10^4$ for 45% of the maximum score.
- $1 \leq n \leq 2 \cdot 10^5$ for 100% of the maximum score.

Output Format

Print q lines of output where each line i contains the expression for the i^{th} query, modulo $10^9 + 7$.

Sample Input 0

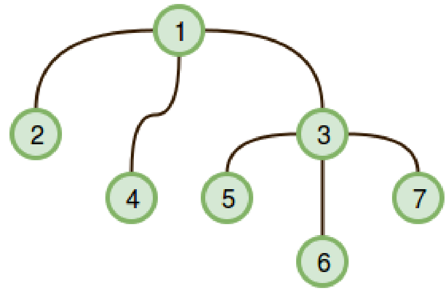
```
7 3
1 2
1 3
1 4
3 5
3 6
3 7
2
2 4
1
5
3
2 4 5
```

Sample Output 0

```
16
0
106
```

Explanation 0

Tree T looks like this:



We perform the following calculations for $q = 3$ sets:

- Set 0: Given set $\{2, 4\}$, the only pair we can form is $(u, v) = (2, 4)$, where $dist(2, 4) = 2$. We then calculate the following answer and print it on a new line:

$$(2 \cdot 4 \cdot dist(2, 4)) \bmod (10^9 + 7)$$
$$\Rightarrow (2 \cdot 4 \cdot 2) \bmod (10^9 + 7)$$
$$\Rightarrow 16$$

- Set 1: Given set $\{5\}$, we cannot form any pairs because we don't have at least two elements. Thus, we print 0 on a new line.

- Set 2: Given set $\{2, 4, 5\}$, we can form the pairs $(2, 4)$, $(2, 5)$, and $(4, 5)$. We then calculate the following answer and print it on a new line:

$$(2 \cdot 4 \cdot dist(2, 4) + 2 \cdot 5 \cdot dist(2, 5) + 4 \cdot 5 \cdot dist(4, 5)) \bmod (10^9 + 7)$$
$$\Rightarrow (2 \cdot 4 \cdot 2 + 2 \cdot 5 \cdot 3 + 4 \cdot 5 \cdot 3) \bmod (10^9 + 7)$$
$$\Rightarrow 106$$