F. Tree nesting

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given two trees (connected undirected acyclic graphs) S and T.

Count the number of subtrees (connected subgraphs) of S that are isomorphic to tree T. Since this number can get quite large, output it modulo $10^9 + 7$.

Two subtrees of tree S are considered different, if there exists a vertex in S that belongs to exactly one of them.

Tree G is called isomorphic to tree H if there exists a bijection f from the set of vertices of G to the set of vertices of H that has the following property: if there is an edge between vertices A and B in tree G, then there must be an edge between vertices $f(A)$ and $f(B)$ in tree H. And vice versa — if there is an edge between vertices A and B in tree H, there must be an edge between $f^{-1}(A)$ and $f^{-1}(B)$ in tree G.

Input

The first line contains a single integer $|S|$ ($1 \le |S| \le 1000$) — the number of vertices of tree S.

Next $|S| - 1$ lines contain two integers u_i and v_i ($1 \le u_i, v_i \le |S|$) and describe edges of tree S.

The next line contains a single integer $|T|$ ($1 \le |T| \le 12$) — the number of vertices of tree T.

Next $|T| - 1$ lines contain two integers x_i and y_i ($1 \le x_i, y_i \le |T|$) and describe edges of tree T.

Output

On the first line output a single integer — the answer to the given task modulo $10^9 + 7$.

Examples

input

```
5
1 2
2 3
3 4
4 5
3
1 2
2 3
```

output

```
3
```

input

```
3
2 3
3 1
3
1 2
1 3
```

output

```
1
```

input

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

output

```
20
```

input

```
5
1 2
2 3
3 4
4 5
4
4 1
4 2
4 3
```

output

```
0
```