



Factor Tree

Problem Code: **FCTRE**

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as well.

Chef lives in a country called ChefLand. The country can be represented as a tree of N cities (numbered 1 through N) connected by $N - 1$ roads. For each valid i , the cost of a house in city i is A_i .

You should answer Q queries. In each query, you are given cities u and v (possibly identical); Chef is planning to buy houses in these cities. Chef's *happiness quotient* is equal to the product of the costs of houses in all cities which lie on the simple path between u and v (both inclusive). Since Chef loves playing with factors, he is asking you to tell him the number of factors of his happiness quotient, modulo 1,000,000,007 ($10^9 + 7$).

Input

- The first line of the input contains a single integer T denoting the number of test cases. The description of T test cases follows.
- The first line of each test case contains a single integer N .
- Each of the next $N - 1$ lines contains two space-separated integers x and y denoting that cities x and y are connected by a road.
- The following line contains N space-separated integers A_1, A_2, \dots, A_N .
- The following line contains a single integer Q .
- Each of the next Q lines contains two space-separated integers u and v describing a query.

Output

For each query, print a single line containing one integer — the number of factors of the happiness quotient modulo 1,000,000,007 ($10^9 + 7$).

Constraints

- $1 \leq T \leq 3$
- $1 \leq N, Q \leq 10^5$
- $1 \leq A_i \leq 10^6$ for each valid i
- the sum of N over all test cases does not exceed 10^5

Subtasks

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Subtask #1 (10 points): $N, Q \leq 10^3$

Subtask #2 (30 points): $N \leq 10^3$

Subtask #3 (60 points): original constraints

Example Input

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

Example Output

```
9
4
```

All submissions for this problem are available.

Author: 5★ [dvyn01 \(/users/dvyn01/\)](/users/dvyn01/)

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Date Added: 19-01-2020

Time Limit: 7.5 secs

Source Limit: 50000 Bytes

Languages: C, CPP14, JAVA, PYTH, PYTH 3.6, PYPY, CS2, PAS fpc, PAS gpc, RUBY, PHP, GO, NODEJS, HASK, rust, SCALA, swift, D, PERL, FORT, WSPC, ADA, CAML, ICK, BF, ASM, CLPS, PRLG, ICON, SCM qobi, PIKE, ST, NICE, LUA, BASH, NEM, LISP sbcl, LISP clisp, SCM guile, JS, ERL, TCL, SQL, kotlin, PERL6, TEXT, CPP17, SCM chicken, PYP3, CLOJ, R, COB, FS

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competitions, CodeChef also has various algorithm tutorials and forum discussions to help those who are new to the world of **computer programming**.

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