
Task ordering

P16249_en

Novè Concurs de Programació de la UPC - Semifinal (2011-06-29)

There are n tasks to be done, but some tasks must be done before others. Given the names of the tasks and the direct dependencies among them, print the lexicographically smallest ordering of the tasks.

Input

Input consists of several cases. Each case begins with n , followed by n names of tasks. Follow the number of direct dependencies m , followed by m pairs of names $x y$, to indicate that x must be done before y . Assume $1 \leq n \leq 10^4$, $0 \leq m \leq 10n$, that the names are made up of between one and six lowercase letters, that no name is a prefix of another name (in particular, this excludes equal names), that there are no repeated dependencies, and that there are no dependencies of the kind $x x$.

Output

For every case, print the alphabetically smaller string that can be produced by concatenating a valid ordering of the tasks. If there is no valid ordering, tell so.

Sample input

```
4 a sample this is
3
this is
is sample
is a

3 and this too
0

2 a b
2
a b
b a
```

Sample output

```
thisisasample
andthistoo
NO VALID ORDERING
```

Problem information

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Generation : 2024-04-30 15:57:01

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