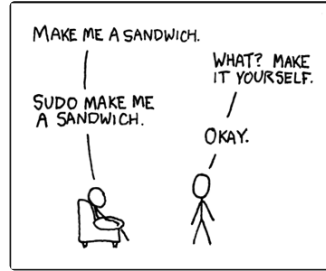


# Build Dependencies

**Problem ID:** builddeps  
**CPU Time limit:** 4 seconds  
**Memory limit:** 1024 MB  
**Difficulty:** 4.8

A Makefile is a file that specifies dependencies between different source code files. When one source code file changes, this file needs to be recompiled, and when one or more dependencies of another file are recompiled, that file needs to be recompiled as well. Given the Makefile and a changed file, output the set of files that need to be recompiled, in an order that satisfies the dependencies (i.e., when a file  $X$  and its dependency  $Y$  both need to be recompiled,  $Y$  should come before  $X$  in the list).



xkcd comic by Randall Munroe

**Author:** Jeroen Bransen  
**Source:** Northwestern European Regional Contest (NWERC) 20 Practice  
**License:**

## Input

The input consists of:

- one line with one integer  $n$  ( $1 \leq n \leq 100\,000$ ), the number of Makefile rules;
- $n$  lines, each with a Makefile rule. Such a rule starts with “ $f$ :” where  $f$  is a filename, and is then followed by a list of the filenames of the dependencies of  $f$ . Each file has at most 5 dependencies.
- one line with one string  $c$ , the filename of the changed file.

Filenames are strings consisting of between 1 and 10 lowercase letters. Exactly  $n$  different filenames appear in the input file, each appearing exactly once as  $f$  in a Makefile rule. The rules are such that no two files depend (directly or indirectly) on each other.

## Output

Output the set of files that need to be recompiled, in an order such that all dependencies are satisfied. If there are multiple valid answers you may output any of them.

### Sample Input 1

```
6
gmp:
solution: set map queue
base:
set: base gmp
map: base gmp
queue: base
gmp
```

### Sample Output 1

```
gmp
map
set
solution
```