Pesky Prereqs

Finny Shquickly is a student majoring in Computer Science, who would like to complete his degree in as short a time as possible. He has received permission from his institution's administration to take as many courses each semester as long as he does not violate any prerequisite constraints. Fortunately for him, every course is offered in both Fall and Spring semesters, and there are never any scheduling conflicts between courses that he can take. Your task is to determine if it is possible for him to complete the degree requirement given these constraints, and if so, how quickly he can do so.

Input Format

The input consists of an initial line with an integer *c*, 0 < *c* < 60 on a line by itself, representing the number of courses that Finny must complete in order to earn his degree.

This line is followed by *c* lines each containing one unique course id, made up of numbers and lower-case letters (no whitespace). These c course ids correspond to all of the courses that Finny must complete.

Following these *c* lines, and on a line by itself, is a number 0 <= *p* <= 3481 that represents the number of prerequisite relationships.

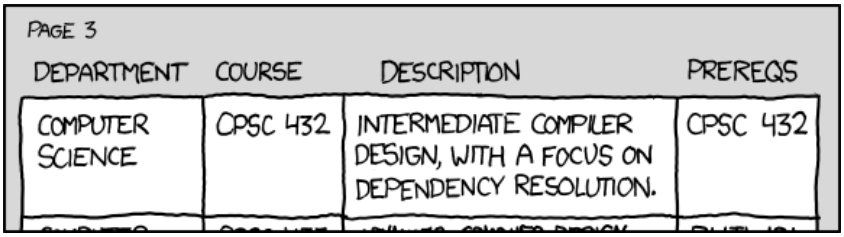
On the final *p* lines of the input are the prerequisite relationship in the format:

```
CourseID1 CourseID2
```

`CourseID1` and `CourseID2` are chosen from one of the *c* course ids, and this line indicates that `CourseID1` is a prerequisite for `CourseID2`, i.e. `CourseID1` must be completed in a semester prior to `CourseID2`.

Output Format

The output of the program either a single integer representing the fewest number of semesters in which Finny can complete the program or the string "never" if he cannot complete the program due to a problem with the way the prerequisite constraints are defined, e.g. in the picture below from XKCD:



http://xkcd.com/754/

Sample Input

```
1
CPSC432
1
CPSC432 CPSC432
```

Sample Output

```
never
```

Explanation

Since CMPSC432 is a prerequisite for itself, poor Finny can never graduate.