

Program Name: `partners.cpp`Input File: `partners.dat`

In order to foster customer loyalty, airlines form alliances and partnerships. Among other benefits, these partnerships allow customers to coordinate collection of frequent flier miles in order to maximize rewards. Customers frequently choose flights on airlines that are partners with the airline that they are collecting miles with. For example, a customer who wanted to fly from Houston to Los Angeles and receive frequent flier miles with Continental Airlines could fly on America West Airlines and still collect miles with Continental.

For the purposes of this program (and to properly test your abilities to write recursive code), a customer will be allowed to also collect frequent flier miles by flying on an airline that is the partner of a partner, or the partner of a partner of a partner, etc. with no limit to the length of a partnership chain. For example, Delta Airlines is a partner of Swiss Air. If Swiss Air is then a partner of Air Egypt, the customer could collect Delta miles by flying on Air Egypt. Your program should consider this to be true even if Delta and Air Egypt do not have a direct partnership with one another. Further, if Air India has a partnership with Air Egypt, then the customer could earn Delta miles on Air India, even if Swiss Air and Delta are not partners of Air India.

### Input

Input to your program has three segments. First, your program is given a list of airlines. The first line of input contains a single integer ( $1 \leq A \leq 100$ ) indicating the number of airlines to be considered by your program. The next  $A$  lines each contain exactly one airline name starting in column 1. Airline names are subject to the following rules:

1. Airline names are between 1 and 20 characters in length.
2. A single underscore (“\_”) character will be used in place of airlines with spaces in their names.
3. Airline names contain only lower case characters and underscores. For example, Costa Mesa airlines would appear as “costa\_mesa”.
4. Airline names are listed only once in the first segment.

The second segment of input is a list of partnership agreements. The first line of this segment contains a single integer ( $1 \leq P \leq 100$ ) representing the number of partnership agreements. The next  $P$  lines each contain one partnership definition consisting of exactly two airline names from the list in the first segment. The first partner’s name will start in column 1 and will be followed by a single space followed by the second partner’s name. The order of the listing in the partnership agreement has no significance, i.e. the partnership is bi-directional. No single partnership agreement line will list the same airline name twice.

The third segment of the input file starts with a single integer ( $1 \leq Q \leq 100$ ) indicating the number of queries your program is to process. The next  $Q$  lines each contain 1 query on a line by itself. Each query consists of a pair of valid airline names with the first starting in column 1 and exactly 1 space separating the two names. No single query will list the same airline name twice.

### Output

For each partnership query, if there is a partnership or partnership chain for the two airlines, your program should print the message “PARTNERS” on a line by itself starting in column 1. Otherwise, your program should print the message “No miles for you” starting in column 1.

**Example: Input File**

```
14
continental
delta
austrian_airways
alaska
america_west
mesa
twa
virgin_atlantic
air_china
southwest
swiss_air
northwest
air_france
air_canada
13
continental america_west
continental air_china
america_west mesa
continental alaska
america_west alaska
continental air_france
america_west twa
continental virgin_atlantic
virgin_atlantic air_france
delta swiss_air
austrian_airways delta
delta austrian_airways
delta air_canada
4
delta america_west
continental mesa
southwest delta
twa air_france
```

**Output to screen**

```
No miles for you
PARTNERS
No miles for you
PARTNERS
```