



Filibuster

The Red Elephant party and the Blue Donkey party are stuck in a political deadlock.

The senators from the Blue Donkey party wish to pass a new healthcare bill, but senators from the Red Elephant party hope to block the bill by holding a filibuster.

Each of the n senators of the Red Elephant party has prepared a speech. For simplicity, we can represent the i^{th} senator's speech s_i as a string of lowercase Latin alphabet characters.

Now, some senators discovered an ingenious way to prolong the filibuster. They will make their speeches longer by simply copying the speech of a senator coming before them, and just adding a few of their own words! This way, they can give a longer speech without having to put in any original thought.

To be more specific, the i^{th} senator's speech s_i satisfies

$$s_i = s_{x_i} + w_i$$

where x_i is the index of the senator they will copy the speech from and w_i is a non-empty string of lowercase Latin alphabet characters. Some senators consider themselves morally above plagiarizing speeches and will not copy another's speech ($x_i = 0$); we define s_0 to be the empty string for convenience.

A recent leak has revealed the speech t the most senior senator from the Blue Donkey party will give. This speech can also be represented as a string of lowercase Latin alphabet characters. However, it is rumored that not the whole speech will be given, but only a part of it.

It is not known which part of the speech will be given. There are q rumors; the i^{th} rumor posits that the speech given will be substring of t consisting of all the characters from the l_i^{th} one to the r_i^{th} one, inclusive.

The senators of the Red Elephant party are a quirky bunch and think that the best way to rebut a speech is to give the *lexicographically largest* speech that is not *lexicographically larger* than the given speech. For each rumor, they need to know which senator should give his speech such that the speech is best rebutted. Note that if there are multiple possible senators with the same best rebuttal, you should report the index of the smaller one. If no senator can give a rebuttal, you must also report this.

Unfortunately, the senators from the Red Elephant party are not the brightest bunch, so they need your help. Although you are secretly rooting for the Blue Donkey party, by helping them you figure they can get the filibuster over and done with as soon as possible.

For each rumor, determine which senator should give his speech.

Input format

The first line contains a string t , the leaked speech.

The second line contains a single integer n , the number of senators in the Red Elephant party.

n lines follow. The i^{th} of these lines contains an integer x_i and a string w_i , describing the i^{th} senator's speech s_i .

The next line contains a single integer q , the number of rumors.

q lines follow. The i^{th} of these lines contains two integers l_i and r_i , describing the i^{th} rumor.

Output format

For each rumor, output a single integer, the index of the senator that should give his speech.

If no senator can rebut, output instead -1 .

Subtasks

In all subtasks $0 \leq x_i < i$, $1 \leq l_i \leq r_i \leq |t|$ and $\sum_{i=1}^n |w_i| \leq 300\,000$.

Subtask	Points	$n, q, t $	Additional Constraints
1	9	$1 \leq n, q, t \leq 2\,000$	$ s_i \leq 2\,000$
2	26	$1 \leq n, q, t \leq 300\,000$	$\sum_{i=1}^q (r_i - l_i + 1) \leq 10^7$
3	28	$1 \leq n, q, t \leq 300\,000$	$x_i = 0$
4	37	$1 \leq n, q, t \leq 300\,000$	

Example

Consider the following input:

```
weneedtopassanewhealthcarebill
5
0 russian
0 as
2 set
0 blue
4 donkey
4
10 12
27 30
1 30
24 26
```

The correct output is:

```
2
3
1
-1
```

There are $n = 5$ senators, and their speeches are

1. russian
2. as
3. asset
4. blue
5. bluedonkey

The first rumor posits that the Blue Donkey senator's speech will consist of `ass`. The best rebuttal is to have the 2nd senator speak.

The second rumor posits that the Blue Donkey senator's speech will consist of `bill`. The best rebuttal is to have the 3rd senator speak.

The third rumor posits that the Blue Donkey senator's speech will consist of `weneedtopassanewhealthcarebill`. The best rebuttal is to have the 1st senator speak.

The fourth rumor posits that the Blue Donkey senator's speech will consist of `are`. No senator can rebut.