C. An impassioned circulation of affection

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Nadeko's birthday is approaching! As she decorated the room for the party, a long garland of Dianthus-shaped paper pieces was placed on a prominent part of the wall. Brother Koyomi will like it!

Still unsatisfied with the garland, Nadeko decided to polish it again. The garland has n pieces numbered from 1 to n from left to right, and the i-th piece has a colour s_i, denoted by a lowercase English letter. Nadeko will repaint **at most** m of the pieces to give each of them an arbitrary new colour (still denoted by a lowercase English letter). After this work, she finds out all subsegments of the garland containing pieces of only colour c — Brother Koyomi's favourite one, and takes the length of the longest among them to be the Koyomity of the garland.

For instance, let's say the garland is represented by "kooomo", and Brother Koyomi's favourite colour is "o". Among all subsegments containing pieces of "o" only, "ooo" is the longest, with a length of 3. Thus the Koyomity of this garland equals 3.

But problem arises as Nadeko is unsure about Brother Koyomi's favourite colour, and has swaying ideas on the amount of work to do. She has q plans on this, each of which can be expressed as a pair of an integer m_i and a lowercase letter c_i, meanings of which are explained above. You are to find out the maximum Koyomity achievable after repainting the garland according to each plan.

Input

The first line of input contains a positive integer n ($1 \le n \le 1\,500$) — the length of the garland.

The second line contains n lowercase English letters $s_1 s_2 \ldots s_n$ as a string — the initial colours of paper pieces on the garland.

The third line contains a positive integer q ($1 \le q \le 200\,000$) — the number of plans Nadeko has.

The next q lines describe one plan each: the i-th among them contains an integer m_i ($1 \le m_i \le n$) — the maximum amount of pieces to repaint, followed by a space, then by a lowercase English letter c_i — Koyomi's possible favourite colour.

Output

Output q lines: for each work plan, output one line containing an integer — the largest Koyomity achievable after repainting the garland according to it.

Examples

input
6 koyomi 3 1 o 4 o 4 m
output
3 6 5

input

```
15
yamatonadeshiko
10
1 a
2 a
3 a
4 a
5 a
1 b
2 b
3 b
4 b
5 b
```

output

```
3
4
5
7
8
1
2
3
4
5
```

input

```
10
aaaaaaaaaa
2
10 b
10 z
```

output

```
10
10
```

Note

In the first sample, there are three plans:

- In the first plan, at most 1 piece can be repainted. Repainting the "`y`" piece to become "`o`" results in "`kooomi`", whose Koyomity of 3 is the best achievable;
- In the second plan, at most 4 pieces can be repainted, and "`oooooo`" results in a Koyomity of 6;
- In the third plan, at most 4 pieces can be repainted, and "`mmmmmi`" and "`kmmmmm`" both result in a Koyomity of 5.