

Sashka clandestinely opened Alex's computer. She wanted to google some gossips about The Bachelor, but surprisingly, with the corner of her eye, she saw an open incognito tab. As curious as always, she proceeded to open the tab, but weirdly enough, the tab was locked with a password. The password can be represented as a string $p_1, p_2, \dots, p_N$ of N characters. Sashka, the best programmer to ever exist, knew how to approach the situation – she types M words, said by Alex, which she considers to be possible passwords. She types down the i -th word in the string $s_{i,1}, s_{i,2}, \dots$, where the different words can have different lengths. Sashka can use her skills to force the computer to delete $0, 1, 2, 3, \dots, N - 1$ symbols from the password, then she'll try to guess it. She will try every word s_i , typing it symbol by symbol. If the password matches the typed symbols by Sashka at any time, the password would be guessed. More precisely, if the password is a prefix of the i -th word, after the deletion of symbols, then when Sashka types s_i , she will guess the password.

While being in the other room, Alex notices what's happening. He is proud of his google search in the incognito tab, so he wants Sashka to crack the password as soon as possible. For this purpose, Alex wants to know for every $0 \leq K \leq N - 1$, if he manipulates the deletion of K symbols from his password, what is the biggest possible number of words, which when typed by Sashka will guess the password. Because of this, Alex opens his phone to write a program `hacking.cpp`, finding the maximum number of words for which the password will be a prefix of them if deleted 0 to $N - 1$ characters from it.

Input

On the first line of `hacking.in` is given the number N . On the second line of the file are given N symbols, $p_1, p_2, p_3, \dots, p_N$ respectively. On the third line of the file is given the number M . On the last M lines from the file are given the M words, which Sashka considers as possible passwords, where the i -th of them is s_i .

Output

On one line in `hacking.out` print N numbers, respectively the maximal number of words when 0 symbols deleted, the maximal number of words when 1 symbol deleted, ..., the maximal number of words when $N - 1$ symbols deleted.

Constraints

$$1 \leq N, M \leq 2 \times 10^5$$

$$1 \leq \sum |s_i| \leq 2 \times 10^5$$

Time Limit: 0.3 sec.

Memory Limit: 256 MB.

Hacking



SEASON 2021/2022 – SIXTH ROUND

Sample testcases

Input (hacking.in)	Output (hacking.out)
2 ab 5 a b ab ba bb	1 3
8 abcbbabb 14 abbabc abbabb abbabd abbabe abc aaaa aac acb acab abbb abbcd abcbbabb abcbbaba abcbbaca	1 2 3 4 4 6 10 14