

Data Structures Assignment-3

C) Aakash and Slow Texting

Aakash wants to send a message of N words to his girlfriend Ritika. But his typing speed is too slow and Ritika is waiting eagerly for his message. His phone has M words in its dictionary sorted by their usage in strictly decreasing order. His phone supports a special TAB feature, which allows you to type the word with the maximum usage beginning with the letters typed so far. It can't be used if nothing has been typed. Also it supports typing and deleting a letter from the text written till now.

Each operation (typing a single letter, deleting a single letter, using TAB key) takes 1 sec as he takes too much time to look for the key. He wants to send the message with N words as fast as possible using the given operations. For each word, he wants to know the minimum number of operations required to type that word.

Input

First line contains two integers M and N . Each of the next M lines contains the dictionary word in strictly decreasing order of usage. Each of the next N lines contain the words to be typed in the message.

Output

Output N lines, each line containing the minimum number of operations required to type that word.

Constraints

$1 \leq N \leq 200000$, number of words in the message
 $1 \leq M \leq 200000$, number of words in dictionary of phone
All the words have lowercase English letters
Sum of lengths of all words ≤ 4000000
No word is repeated in the dictionary.

Sample Input 1

```
4 4
i
make
spelling
errors
i
made
many
errors
```

Sample Output 1

```
1
4
4
2
```

Sample Explanation 1

For "i", Steps: 1) Type 'i'

For "made", Steps: 1) Type 'm', 2) Type 'a', 3) Type 'd', 4) Type 'e'

For "many", Steps: 1) Type 'm', 2) Type 'a', 3) Type 'n', 4) Type 'y'

For "errors", Steps: 1) Type 'e', 2) Press TAB. It takes you to 'errors' because there is only one word starting with 'e'.

Sample Input 2

```
3 3
i
luvz
your
i
luvd
you
```

Sample Output 2

```
1
4
3
```

Sample Explanation 2

For "i", Steps: 1) Type 'i'.

For "luvd", Steps: 1) Type 'l', 2) Press TAB, it takes you to 'luvz', 3) Delete 'z', 4) Type 'd'.

For "you", Steps: 1) Type 'y', 2) Press TAB, it takes you to 'your', 3) Delete 'r'.

Sample Input 3

```
2 1
abcd
adef
abcf
```

Sample Output 3

```
4
```

Sample Explanation 3

For "abcf", Steps: 1) Type 'a', 2) Press TAB, it takes you to 'abcd' (Note that it doesn't jump to 'adef' because it is used less than 'abcd'), 3) Delete 'd', 4) Type 'f'.

Limits

Time: 4 second

Memory: 256 MB