

Query Problem

McFn interested in string problem recently. He found a interesting function and he felt he could use this function to invent a new match algorithm.

For a string $S[1 \dots n]$ and $i \in [1, n]$, define $F(i)$ is the length of the longest common suffix of S and $S[1 \dots i]$.

For example, for the string $S[1 \dots 11] = \text{zaaxbaacbaa}$, then $F(1) = 0$, $F(2) = 1$, $F(3) = 2$ (note that $S[1 \dots 3] = \text{zaa}$), $F(4) = 0$, ... $F(10) = 1$, $F(11) = 11$;

For the string $S[1 \dots n]$, $i \in [1, n]$, $S[i \dots n]$ is its suffix;

Input

The first line is a integer T .the number of test cases
for each test case

The first line is a string S , composed of only lowercase letters, $\text{len}(s)$ is the length of s , $1 \leq \text{len}(s) \leq 1000000$;

Next line, a number N ($1 \leq N \leq 100000$), denote that the number of queries;

The next N lines, each line contains a number x ($1 \leq x \leq \text{len}(s)$).

Output

For each x the output $F(x)$;

Example

Input:

```
1
zaaxbaacbaa
11
1
2
3
4
5
6
7
8
9
10
11
```

Output:

```
0
1
2
0
0
1
3
0
0
1
```

