

Substitution cipher

You are given a sequence of n characters $S = s_1, s_2, \dots, s_n$ in such a way that for $i \neq j$ we have also $s_i \neq s_j$. Your task is to substitute every s_i with s_{i+1} for i in $\{1, 2, \dots, n-1\}$ and s_n with s_1 in the given plain text.

Input

In the first line you are given one integer $2 \leq n \leq 26$, and in the following line n characters.

In the third line you are given one integer $2 \leq m \leq 100$, and in the following m lines you are given a plaintext to be encoded. Plaintext contains only white spaces and small letters from the Latin alphabet. The whole plain text is at most 1000 characters long.

Output

Encoded text, as specified above.

Example 1

Input:

```
6
spojit
3
after this training
we will solve even
difficult and tricky problems easily
```

Output:

```
afser shtp sratntng
we wtlj pjlv eevn
dtfftculs and srcky orjblemp eaptly
```

Example 2

Input:

```
10
dontgiveup
3
after this training
we will solve even
difficult and tricky problems easily
```

Output:

```
afgur ghvs gravtvti
wu wvll snleu ueut
ovffvcplg ato grvcky drnblums uasvly
```