K. Stringology

For a string $u = u_1 \ldots u_n$, Bobo denotes the prefix $u_1 \ldots u_i$ by $\mathrm{pre}(u, i)$. Similarly, he denotes the suffix $u_{n-i+1} \ldots u_n$ by $\mathrm{suf}(u, i)$. In particular, $\mathrm{pre}(u, 0)$ and $\mathrm{suf}(u, 0)$ are empty strings.

For two strings $u = u_1 \ldots u_n$ and $v = v_1 \ldots v_m$, Bobo denotes the concatenation $u_1 \ldots u_n v_1 \ldots v_m$ by $u + v$. Also,

$$\mathrm{presuf}(u, v) = \max\{i \mid i < n \text{ and } i \leq m \text{ and } \mathrm{pre}(u, i) = \mathrm{suf}(v, i)\}.$$

Given two strings $s = s_1 \ldots s_n$ and $t = t_1 \ldots t_m$, let $f(i) = \mathrm{presuf}(s, \mathrm{pre}(s, i) + t)$. Find the value of $f(0), \ldots, f(n-1)$.

Input

The input consists of several test cases terminated by end-of-file. For each test case,

The first line contains a string $s_1 \ldots s_n$.

The second line contains a string $t_1 \ldots t_m$.

- $1 \leq n, m \leq 10^6$
- $s_i \in \{a, \ldots, z\}$ for each $1 \leq i \leq n$
- $t_i \in \{a, \ldots, z\}$ for each $1 \leq i \leq m$
- In each input, the sum of $\max(n, m) \leq 10^6$.

Output

For each test case, output n integers which denote $f(0), \ldots, f(n-1)$.

Sample Input

```
aaa
a
ababa
a
ab
cd
```

Sample Output

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

Note

For the second case, $f(4) = \mathrm{presuf}(s, \mathrm{pre}(s, 4) + t) = \mathrm{presuf}(\mathtt{ababa}, \mathtt{abab} + \mathtt{a}) = \mathrm{presuf}(\mathtt{ababa}, \mathtt{ababa})$.

i	$\mathrm{pre}(\mathtt{ababa}, i)$	$\mathrm{suf}(\mathtt{ababa}, i)$
0	(an empty string)	(an empty string)
1	a	a
2	ab	ba
3	aba	aba
4	abab	baba

Therefore, $f(4) = 3$.