

Problem K. Stringology

Input file: *standard input*
 Output file: *standard output*
 Time limit: 1 second
 Memory limit: 512 mebibytes

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

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

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

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

Input

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

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

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

- $1 \leq n, m \leq 10^6$
- $s_i \in \{a, \dots, z\}$ for each $1 \leq i \leq n$
- $t_i \in \{a, \dots, z\}$ 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 $f(0), \dots, f(n-1)$.

Examples

standard input	standard output
aaa	1 2 2
a	1 1 3 1 3
ababa	0 0
a	
ab	
cd	

Note

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

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

Therefore, $f(4) = 3$.