Votka and String

Votka loves string very much. Recently he learned prefixes and suffixes. A prefix of a string S is any leading contagious part of S and a suffix of string S is any trailing contagious part of S, e.g., the prefixes of string “abc” are { “a”, “ab”, “abc” } and the suffixes are { “abc”, “bc”, “c” } . Votka considers a suffix S_i of string S beautiful, if S_i has at least b prefixes which are also prefixes of S. Formally,
let, P = the set of prefixes of the string S
P_i = the set of prefixes of the suffix S_i
Then, S_i is a beautiful suffix if $|P \cap P_i| \geq b$.
For example, consider S = “abcabcd” and b = 3, then suffix S_3 i.e. “abcd” is a beautiful suffix because it has 3 (≥ b) prefixes { “a”, “ab”, “abc” } which are also prefixes of S. Note that, S itself is a beautiful suffix for all $b \leq |S|$.
Now Votka thinks about a problem. The problem is, you are given a string S and m numbers {K_1, K_2, … , K_m }. For each number K_i, you have to find the number of beautiful suffixes of S considering $b = K_i$.
Votka announces that he will give a treat to the first solver of this problem. Luffy, a close friend of Votka, wants to have that treat. As Luffy is very dumb, he asks for your help. Can you help him? :)

Input

Input starts with an integer **T (≤ 10)**, denoting the number of test cases. The first line of each case contains a string **S (1 ≤ |S| ≤ 100000)**. S contains only lowercase English letters. The next line contains an integer **m (1 ≤ m ≤ 100000)**. The following line contains m space separated integers K_1, K_2, … , K_m **($0 \leq K_i \leq 100000$)**.

Output

For each test case, print m space separated integers (number of beautiful suffixes of S considering $b = K_i$) in a single line. (Caution: Dataset is large. Use faster I/O.)

Sample

Input:
2
abcabcd
3
3 7 8
aaaaa
5
1 2 3 4 5

Output:
2 1 0
5 4 3 2 1