Bhagat and String

Bhagat loves string very much. Bhagat is given a string **S** and an integer **N**. He hates a string **P** which is substring of **S** and occurs at least **N** times in **S**. Your task is to find maximum length of substring **P** of **S** which occurs at least **N** times.

If there are multiple solutions then substring with right most occurrence is preferred.

Input

First line will contain **T**, denoting number of test cases. Each test case consist of two lines. The first line contains the string **S** and the next line contains the integer **N**.

Output

If there is no solution, output **HATE**, otherwise, print two integers in a line, separated by a space. The first integer denotes the maximum length of a substring appearing at least **N** times; the second integer gives the rightmost possible starting position of such a substring.

Constraints

0 < **T** <= 10

1 <= |**S**| <= 50000

1 <= **N** <= |S|

S consists of only lowercase letters.

Sample

Input:
3
aaaaaaa
3
babab
2
abcde
3

Output:
5 3
3 3
HATE