

## Problem F. Square Subsequences

Input file: *standard input*  
Output file: *standard output*  
Time limit: 2 seconds  
Memory limit: 256 mebibytes

Bob has a string  $s_1s_2\cdots s_n$ . He would like to find its longest subsequence that is a square. Could you please help him?

A subsequence of  $s_1s_2\cdots s_n$  can be represented as a string  $s_{p_1}s_{p_2}\cdots s_{p_m}$  meeting the condition that  $1 \leq p_1 < p_2 < \dots < p_m \leq n$ .

A string  $t_1t_2\cdots t_m$  is a square if and only if:

- $m$  is even;
- $t_i = t_{i+\frac{m}{2}}$  for  $i = 1, 2, \dots, \frac{m}{2}$ .

### Input

The input contains several test cases. The first line contains an integer  $T$  indicating the number of test cases. The following describes all test cases. For each test case:

The only line contains a string of  $n$  lowercase letters,  $s_1s_2\cdots s_n$ .

- $1 \leq T, n \leq 3000$
- The sum of  $n$  in all test cases does not exceed 3000.

### Output

For each test case, firstly output a line containing “Case #x: m” (without quotes), where  $x$  is the test case number starting from 1, and  $m$  is the length of the longest square subsequence.

If  $m$  is positive, then output a string in the next line, representing the longest square subsequence. If there are many optimal solutions, please output any of them.

### Example

standard input	standard output
5	Case #1: 2
abba	aa
abbab	Case #2: 4
abac	abab
abcd	Case #3: 2
bbabab	aa
	Case #4: 0
	Case #5: 4
	bbbb

### Note

For the last sample test case, the longest square subsequence can be baba as well.