13068 The Weakest Link

It is clearly a literal fact that a chain is only as strong as its weakest link. The conversion of that notion into a figurative phrase was established in the language in the 18th century. Thomas Reid's *Essays on the Intellectual Powers of Man* (1786), included this line:

> In every chain of reasoning, the evidence of the last conclusion can be no greater than that of the weakest link of the chain, whatever may be the strength of the rest.

In this problem a *chain of length n* is a string $C = c_1 c_2 \ldots c_n$ of n lowercase characters where c_n is considered to be followed by c_1 in a cyclical fashion. Character i is said to be *weaker* than character j in a chain C if the string $c_i c_{i+1} \ldots c_n c_1 \ldots c_{i-1}$ comes before the string $c_j c_{j+1} \ldots c_n c_1 \ldots c_{j-1}$ in lexicographical order.

Given a chain C, your task is to find the weakest character in C.

Input

The first line of the input contains a non-negative integer N indicating the number of test cases. Each test case comprises a single line with a nonempty string C of at most $60\,000$ lowercase characters of the English alphabet 'a'-'z'. You may assume that $a < b < \cdots < z$ as usual.

Output

For each test case, output a line containing an integer w such that c_w is the weakest character in the chain C. If there is more than one such value, then output the smallest one.

Sample Input

```
4
ccpl
abracadabra
hocuspocus
aa
```

Sample Output

```
1
11
8
1
```