Round A 2022 - Kick Start 2022

Challenge Nine

PROBLEM ANALYSIS

Problem

Ada gives John a positive integer $\mathbf{N}$. She challenges him to construct a new number (without leading zeros), that is a multiple of 9, by inserting *exactly* one digit ($0 \ldots 9$) anywhere in the given number $\mathbf{N}$. It is guaranteed that $\mathbf{N}$ does not have any leading zeros.

As John prefers smaller numbers, he wants to construct the *smallest* such number possible. Can you help John?

Input

The first line of the input gives the number of test cases, $\mathbf{T}$. $\mathbf{T}$ test cases follow.

Each test case has a single line containing a positive integer $\mathbf{N}$: the number Ada gives John.

Output

For each test case, output one line containing `Case #`x`:` y, where x is the test case number (starting from 1) and y is the new number constructed by John. As mentioned earlier, y cannot have leading zeros.

Limits

Memory limit: 1 GB.
$1 \leq \mathbf{T} \leq 100$.

Test Set 1

Time limit: 20 seconds.
$1 \leq \mathbf{N} \leq 10^5$.

Test Set 2

Time limit: 40 seconds.
For at most 10 cases:
$1 \leq \mathbf{N} \leq 10^{123456}$.

For the remaining cases:
$1 \leq \mathbf{N} \leq 10^5$.

Sample

Sample Input

```
3
5
33
12121
```

Sample Output

```
Case #1: 45
Case #2: 333
Case #3: 121212
```

In Sample Case #1, there are only two numbers that can be constructed satisfying the divisibility constraint: 45 and 54. John chooses the smaller number.

In Sample Case #2, 333 is the only number possible.

In Sample Case #3, there are four possible options - 212121, 122121, 121221 and 121212 - out of which the smallest number is 121212.