Good telephone number

It would be better if your phone number is easy to remember, even though people are just storing phone numbers in their mobile phone. Phone numbers which are easy to remember are limited in numbers, so we need to devise another way of creating phone numbers easy to remember.

It is well known that people may not remember the phone number itself: instead, they remember the movement of fingers on keyboards. The layout of numbers on a phone is as follows. We can safely forget about * and #.

1	2	3
4	5	6
7	8	9
*	0	#

It is evident that phone numbers which can be dialed by keeping a finger on the phone continuously or by moving the finger in the same direction are easy to remember. Assume that phone numbers are made up with more than two numbers. Now, we define the score which tells “how hard to memorize this phone number”. If a phone number has a high score, it is not easy to remember.

The score of each digit in a phone number is calculated as follows.

- The score of the first digit is always zero.
- The score of the second digit is defined as follows.
    a. If the first and the second digits are the same, it is zero.
    b. If the second digit is adjacent to the first one, it is one. For example, assume that the first digit is 5. Unless the second digit is 0, all the other numbers are adjacent to 5 and the score is one.
    c. Otherwise, it is two. .
- From the third digit, the score is defined as follows.
    a. If the current and the immediately previous digits are the same, it is zero.

b. If (i) the immediately previous digit is adjacent to its immediately previous one, (ii) the current digit is adjacent to the immediately previous one, and (iii) the moving directions in (i) and (ii) are the same, it is one.
c. If (i) neither (a) nor (b) is satisfied and (ii) the current digit is adjacent to the immediately previous one, it is two.
d. Otherwise, it is three.

The score of a phone number is the sum of the scores of its digits.Let's consider some examples.

- Assume that the phone number is 114. The score of the first digit 1 is 0. The score of the second digit 1 is 0 as it is the same with the first one. The score of the third digit 4 is 2 as 4 is adjacent to 1. The total score is 0 + 0 + 2 = 2.
- Assume that the phone number is 119. We already know the scores of the first and the second digits: they are zero. Finally, the score of the third digit 9 is 3 as 9 is not adjacent to 1. The total score is 0 + 0 + 3 = 3.
- Assume that the phone number is 159. The score of the first digit 1 is 0. The score of the second digit 5 is 1 as it is diagonally adjacent to the first one. The score of the third digit 9 is 1 as the moving directions 1->5 and 5->9 are the same. The total score is 0 + 1 + 1 = 2.
- Assume that the phone number is 158. We already know the scores of the first and the second digits: 0 and 1. Finally, the score of the third digit 8 is 2 as the moving directions 1->5 and 5->9 are not the same but 8 is adjacent to 5. The total score is 0 + 1 + 2 = 3.

We have N candidates for our phone number. Write a program to find the phone number which is the most easy to remember.

[Input]

The first line of the input file contains the number T of test cases in the file. In each test case, the first line contains an integer N (the number of candidates) ($1 \leq N \leq 10,000$) The next N lines each contain a candidate of our phone number. The length of a phone number is between 3 and 256. There is no duplication in candidates.

There are two kinds of inputs listed as follows.

- Small Set: $2 \leq N \leq 20$ and the maximum length of a phone number is 10.
- Large Set: $2 \leq N \leq 10,000$ and the maximum length of a phone number is 256.

[Output]

For each test case given, print one line with one phone number, which has the smallest score. If there are two or more phone numbers with the smallest score, pick the one which apprears the first among them in the input.

[I/O Example]

Input

```
2
4
114
119
159
158
4
1397
1793
2846
1596
```

Output

```
114
1596
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