Problem F
Sequence of Numbers
Max no. of test cases: 25
Time limit: 1 second

A **look-and-say sequence** is shown as follows:

$1, 11, 21, 1211, 111221, 312211, 13112221, 1113213211, 31131211131221, \ldots$

To generate a member of the sequence from the previous member, one would repeat the following process until end of that number: count and say the number of consecutive same digit followed by saying that digit. For example:

- 1 is read off as "one 1", represented by 11.
- 11 is read off as "two 1s" represented by 21.
- 21 is read off as "one 2, one 1" represented by 1211.
- 1211 is read off as "one 1, one 2, two 1s" represented by 111221.
- 111221 is read off as "three 1s, two 2s, one 1" represented by 312211.
- . . .

Now, we consider a variation of the look-and-say sequence as follows:

Given an arbitrary integer x, a number in the sequence is generated from the previous number by *counting the number of occurrences of digits* 0-9 *in order* and reading it off. A digit with zero occurrence should not be read off.

For example, given the integer 1, the generated sequence is as follows: "1, 11, 21, 1112, 3112, 211213, 312213, 212223, 114213, 31121314, 41122314, 31221324, 21322314, 21322314, 21322314, . . . ".

- 1 is read off as "one 1", represented by 11.
- 11 is read off as "two 1s" represented by 21.
- 21 is read off as "one 1, one 2" represented by 1112.
- 1112 is read off as "three 1s, one 2" represented by 3112.
- 3112 is read off as "two 1s, one 2, one 3" represented by 211213.
- . . .
- 31221324 is read off as "two 1s, three 2s, two 3s, one 4" represented by 21322314.
- 21322314 is read off as "two 1s, three 2s, two 3s, one 4" represented by 21322314.

- 21322314 is read off as "two 1s, three 2s, two 3s, one 4" represented by 21322314.
- . . .

This sequence number begins to repeat starting at the 13th number.

As another example, given integer 11111111111, the sequence is "11111111111, 111, 31, 1113, 3113, 2123, 112213, 312213, 212223, 114213, 31121314, 41122314, 31221324, 21322314, 21322314, 21322314, . . . ".

- 11111111111 is read off as "eleven 1s", represented by 111.
- 111 is read off as "three 1s" represented by 31.
- 31 is read off as "one 1, one 3" represented by 1113.
- 1113 is read off as "three 1s, one 3" represented by 3113.
- 3113 is read off as "two 1s, two 3s" represented by 2123.
- . . .
- 31221324 is read off as "two 1s, three 2s, two 3s, one 4" represented by 21322314.
- 21322314 is read off as "two 1s, three 2s, two 3s, one 4" represented by 21322314.
- 21322314 is read off as "two 1s, three 2s, two 3s, one 4" represented by 21322314.
- . . .

And the sequence number begins to repeat starting at the 14th number.

Please write a program to take a starting number x and determine where in the sequence does the number starts to repeat.

Input File Format

First line of the input contains one integer indicating the number of test cases. For each test case, there is one positive integer x, $1 \leq x \leq 10^{20}$, on a single line.

Output Format

For each test case, output an integer on a single line, indicating where in the generated sequence does the number starting to repeat.

Sample Input

```
4
1
22
126
11111111111
```

Output for the Sample Input

```
13
1
10
14
```