Problem E - Escape

The meeting was a trap! You have now been kidnapped and locked into a windowless room. Your only way out is entering the right password to the lock on the door. You notice there is strings of digits, S, displayed on the lock...

A flash of memory! You remembered that you are very good friends with the designer of these locks, who also happened to be an ACM staff, and that he told you all the secrets about the lock.

First, you recalled that the essence of this lock is something called a **Digital Root**. For any non-negative integer, we can obtain its Digital Root by repeatedly replacing it with the sum of its digits, until we end up with a single digit. For example, the Digital Root of 1234 is 1 because $1234 \to 1+2+3+4 = 10 \to 1+0 = 1$.

Second, you recalled that the password is related to **Arithmetic Transformations** of the given string of digits. An Arithmetic Transformation is formed by taking the string of digits (say of length $|S|$), inserting $|S| - 1$ pairs of parenthess and $|S| - 1$ binary operators + or *, so that the resulting string satisfies the following grammar.

$$E := (E * E) \mid (E + E) \mid 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$$

For example, a valid Arithmetic Transformation of "1234" is "((1+2)*(3+4))". All Arithmetic Transformations are, of course, valid arithmetic expressions involving single digits. Two Arihmetic Transformations are distinct if they are distinct strings.

Ah you got it! The password you need has 10 digits! For $i = 0, \ldots, 9$, the i-th digit of the password is the Digital Root of the number of Arithmetic Transformations of the string whose result (when evaluated as an arithmetic expression) has digital root i.

Input

The first line contains a single integer, T, denoting the number of test cases.

Each test case consists of a single line containing the numeric string S ($1 \le |S| \le 40$).

The input contains no more than 1000 digits in total.

Output

For each test case, output the corresponding 10-digit password on a single line.

Sample Input

```
5
123
3842
10983
133246
20170116
```

Sample Output

```
0000024101
0523213375
5552405306
0879316743
2479177749
```

Sample Input Explanation

In the first test case, the possible Arithmetic Transformations are $((1+2)+3) = 6$, $((1+2)*3) = 9$, $((1*2)+3) = 5$, $((1*2)*3) = 6$, $(1+(2+3)) = 6$, $(1+(2*3)) = 7$, $(1*(2+3)) = 5$, $(1*(2*3)) = 6$.

There are 2 Arithmetic Transformations with 5 as the Digital Root, 4 Arithmetic Transformations with 6 as Digital Root, and 1 Arithmetic Transformation each with 7 and 9 as Digital Root.

Thus, the 5th, 6th, 7th, and 9th digits are 2, 4, 1, 1, and all other digits are zero.