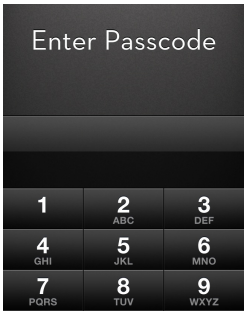
Problem D: Digital Root



After a particularly stressful night studying for a class reputed for its killer exams, you fall asleep in a computer lab. Eventually you wake up, only to find yourself locked in. Puzzled, you examine a newly installed digital display by the doorknob. It shows mysterious clues and requires a 10-digit passcode to unlock. An elaborate prank? Could this be your final exam?!

No time for questions, as a high window behind you cracks, letting through a massive wave! Huh, is the university campus submerged underwater? What could possibly have transpired overnight??? This is no accident... whatever mad game your professor is up to this time, it's likely your classmates are trapped inside similar rooms. At this rate, you figure you might drown in about 9 hours. Seek a way out!

Your main clue is the concept of a **digital root**, derived from a non-negative integer by repeatedly replacing the integer by the sum of its digits until the result has only a single digit. For example, the digital root of 1912 is 4 because

$$1912 \to 1 + 9 + 1 + 2 = 13 \to 1 + 3 = 4.$$

The display presents a string S of digits 0 to 9. Let $|S|$ denote its length. You must insert addition and multiplication signs and parentheses so that the resulting string is an expression E satisfying the recursive grammar (cases separated by '|')

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

Thus, you will insert $|S|-1$ pairs of parentheses and $|S|-1$ binary operators $+$ or $*$, resulting in a total of $|E| = 4|S| - 3$ characters. Two ways of doing this are considered to be different if, and only if, the resulting string E is different. Evaluating E as an arithmetical expression yields a well-defined integer result. For $i = 0, \ldots, 9$, let n_i count the number of ways to get a result whose digital root is i. The digital root of n_i is the $(i + 1)$'th digit of the passcode you need to escape.

Input Specification:

Each test case consists of a single line containing the numeric string S ($1 \leq |S| \leq 40$). The input contains no more than 1000 digits in total.

Output Specification:

For each test case, print the corresponding 10-digit passcode on a single line.

Sample Input:

```
504
20130928
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Sample Output:

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2020110002
2144894475
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Aram Ebtekar