1, 10, 100, 1000... 1



Let's consider an infinite sequence of digits constructed of ascending powers of 10 written one after another. Here is the beginning of the sequence: 110100100010000... You are to find out what digit is located at the definite position of the sequence.

Input Format

There is the only integer N in the first line . The i-th of N left lines contains the integer K_i — the number of position in the sequence.

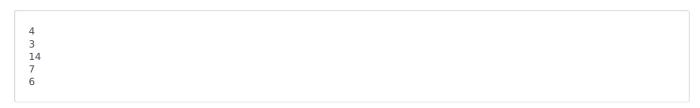
Constraints

$$1 \le N \le 65535 \\ 1 \le K_i \le 2^{31} - 1$$

Output Format

You are to output N digits 0 or 1 separated with a space. More precisely, the i-th digit of output is to be equal to the K_i -th digit of described above sequence.

Sample Input 0



Sample Output 0

0010