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: $110100100010000\ldots$ 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

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

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

```
4
3
14
7
6
```

Sample Output 0

```
0 0 1 0
```