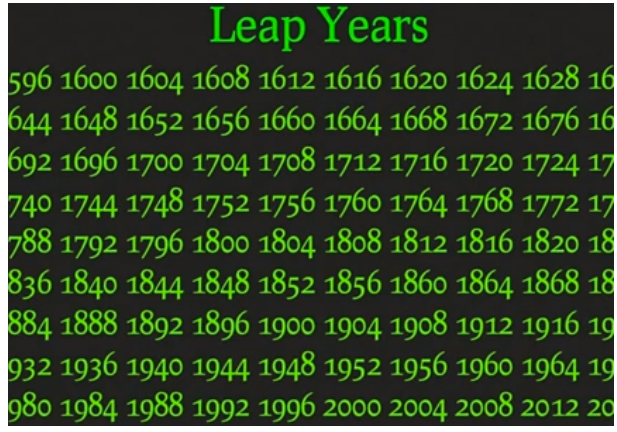
Given an infinite sequence A with $A[N]$ ($N \geq 1$) being the smallest multiple of 4 that begins with N, concatenate digits of $A[N]$ to create an infinite string S. Chuck Norris can do this for you in his spare time.

What is the K-th digit in S?

Specifically, sequence begins as 12, 20, 32, 4, 52, 60, ..., resulting in

$S =$ "12203245260...".



Input

Number of cases, each case contains positive integer K ($K \leq 10^{15}$). Last case is followed by the line containing a single zero.

Output

For each test case, print the K-th digit of S on separate line.

Sample Input

```
1
7
15
0
```

Sample Output

```
1
4
9
```