

## Problem C: Give Me an E

Everyone knows that the letter “E” is the most frequent letter in the English language. In fact, there are one hundred sixteen E’s on this very page ... no, make that one hundred twenty one. Indeed, when spelling out integers it is interesting to see which ones do NOT use the letter “E”. For example 6030 (six thousand thirty) doesn’t. Nor does 4002064 (four million two thousand sixty four).

It turns out that 6030 is the 64th positive integer that does not use an “E” when spelled out and 4002064 is the 838th such number. Your job is to find the  $n$ -th such number.

Note: 1,001,001,001,001,001,001,001,000 is “one octillion, one septillion, one sextillion, one quintillion, one quadrillion, one trillion, one billion, one million, one thousand”. (Whew!)

### Input

The input file will consist of multiple test cases. Each input case will consist of one positive integer  $n$  (less than  $2^{31}$ ) on a line. A 0 indicates end-of-input. (There will be no commas in the input.)

### Output

For each input  $n$  you will print, with appropriate commas, the  $n$ -th positive integer whose spelling does not use an “E”. You may assume that all answers are less than  $10^{28}$ .

### Sample Input

```
1
10
838
0
```

### Sample Output

```
2
44
4,002,064
```