

Comma-Predecessor Theorem  
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Here, we use the following characterization of comma successor  $k'$  of number  $k$  in base  $b$  from <https://oeis.org/A121805>:

Let  $x$  be the least significant digit of  $k$ ; then  $k' = k + x*b + y$  where  $y$  is the most significant digit of  $k'$  and is the smallest such  $y$ , if such a  $y$  exists. If no such  $y$  exists, [there is no successor]. (\*)

Note that  $k' - k \leq b^2 - 1$ .

Theorem. All terms of A367600 (numbers that are not the comma-successor of any number) greater than 98 are of the form

$$c*10^i \text{ for } i \geq 2 \text{ and } 2 \leq c \leq 9. (**)$$

Corollary. The theorem and proof are for  $b = 10$ , but replacing 10 with  $b$ , 9 with  $b-1$  and 8 with  $b-2$  gives the general case for base  $b > 2$ .

Proof. Let  $k'$  have  $i + 2$  digits, where  $i \geq 1$ . Then

$$k' = f' \text{ s w z } (\#)$$

where  $|f'| = |w| = |z| = 1$  and  $|s| \geq 0$ .

Since  $f'$  is the first digit of  $k'$ , we had to have

- (1) produced  $k'$  by  $y = f'$  in (\*)
- (2) no smaller  $y$  would have produced  $f'$  using (\*)

From (2), we have that  $k'$  cannot be equal to  $f' * 10^i$  for  $i \geq 2$ , and  $2 \leq f' \leq 9$ , else adding  $1 \leq f' - 1 \leq 8$  would have produced a first digit of  $f' - 1$ , satisfying (\*). Thus, terms of the form (\*\*) cannot have predecessors.

It remains to show that all other terms  $> 98$  have predecessors.

$$90 \rightarrow 90 + 10*0 + 9 = 99, \text{ so } 99 \text{ has a predecessor}$$

Also note that if  $k' = 10^i$  for  $i \geq 2$ , then  $(10^i - 1) - 9*10 = 10^i - 91$  is its predecessor.

All other terms  $> 100$  have predecessor

$k' = n - f' - 10*x > 0$ , where  $x = (n-f') \bmod 10$  and  $f'$  is the first digit of  $n$ . ###

Corollary. These terms are precisely the greater successors ( $> 99$ ) of terms in A367346.