Perfect primes (hard version) P43557_en

The statement of this exercise is identical to that of exercise **problem://problemsjutge.org:problems/p1/rour**
But here the solution required is more efficient in general.

Given a natural number n, let $s(n)$ be the sum of the digits of n. In this exercise, we say that
n is a perfect prime if the infinite sequence $n, s(n), s(s(n)), \ldots$ only contains prime numbers.
For instance, 977 is a perfect prime, because $977, 9 + 7 + 7 = 23, 2 + 3 = 5, 5, \ldots$, are all prime
numbers.

Write a recursive function that tells if a natural number @n@ is a perfect prime or not.

Interface

C++	**bool** *is_perfect_prime* (**int** n);
C	**int** *is_perfect_prime* (**int** n);
Java	**public static boolean** *isPerfectPrime* (**int** n);
Python	*is_perfect_prime* (n) # returns bool
	is_perfect_prime $(n:$ **int**$)$ $->$ **bool**

Precondition

We have @n@ ≥ 0.

Observation

You only need to submit the required procedure; your main program will be ignored.

Problem information

Author: Salvador Roura
Translator: Carlos Molina

Generation: 2026-01-25T11:12:15.984Z