Jutge.org

The Virtual Learning Environment for Computer Programming

Perfect numbers

A proper divisor of a number is a positive factor of that number other than the number itself. For example, the proper divisors of 6 are 1, 2, and 3. A perfect number is a positive integer that is equal to the sum of its proper positive divisors. For instance, 6 = 1 + 2 + 3 and 28 = 1 + 2 + 4 + 7 + 14 are perfect numbers. In contrast, 1, 2, 3 and 18 are not perfect. Write a function *show_perfect(f)* that given a list *f* of integers greater than zero computes the first perfect number that appears in *f*, if any. When *f* has no perfect numbers the function returns -1.

The following function *proper_divisors*(*n*) that computes the ordered list of proper divisors of a natural number *n* can be helpful.

```
def proper_divisors(n):
    , , ,
    n is an integer greater than zero
    returns the ordered list of proper divsisors of n
    >>> proper_divisors(6)
    [1, 2, 3]
    >>> proper_divisors(284)
    [1, 2, 4, 71, 142]
    >>> proper_divisors(1)
    []
    , , ,
    if n == 1:
       return []
    result = [1]
    d = 2
    while d*d <= n:
        if n%d == 0:
            result.append(d)
            if n//d != d:
                result.append(n//d)
        d += 1
    return sorted(result)
```

Sample session

```
>>> show_perfect([1, 3, 5, 28, 1, 18, 6])
28
>>> show_perfect([3, 5, 7, 9])
-1
>>> show_perfect([6])
6
>>> show_perfect([2, 10, 15, 1, 6, 5, 28])
6
```

Problem information

Author : ProAl

Generation : 2017-11-17 17:34:42

© Jutge.org, 2006–2017. http://jutge.org