Amicable numbers

Problem 21 (http://projecteuler.net/problem=21)

Let d(n) be defined as the sum of proper divisors of n (numbers less than n which divide evenly into n). If d(a) = b and d(b) = a, where a ≠ b, then a and b are an amicable pair and each of a and b are called amicable numbers.

For example, the proper divisors of 220 are 1, 2, 4, 5, 10, 11, 20, 22, 44, 55 and 110; therefore d(220) = 284. The proper divisors of 284 are 1, 2, 4, 71 and 142; so d(284) = 220.

Evaluate the sum of all the amicable numbers under 10000.

Solution

In [1]:

```
def dn(n):
    x, h, s = 1, n//2, 0
    while x<=h:
        if n % x == 0:
            s += x
        x += 1
    return s

print(sum(x for x in range(10000) if x == dn(dn(x)) and x
```

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31626
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Comment

d(6) = 6, d(28) = 28, but neither 6 nor 28 included. Why?