Problem N.6

Amicable Numbers

Due Date: 3/29/2019
Folder: `NumberTheory`
File Name: `N6_Amicable_Name.py`
Points: 2 points

Learning Objectives

- Use previously defined function
- Use temporary variable

Problem Background

Let $d(n)$ be the sum of all proper divisors of n. Recall that the proper divisors of n are all natural numbers strictly less than n that divide n. For instance, if $n = 220$, then the proper divisors of 220 are 1, 2, 4, 5, 10, 11, 20,22,44,55, and 110. Then

$$d(220) = 1 + 2 + 4 + 5 + 10 + 11 + 20 + 22 + 44 + 55 + 110 = 284.$$

An **amicable pair** is a pair of natural numbers a, b, such that $d(a) = b$ and $d(b) = a$. Each of a and b are called amicable numbers. To continue with our example, we examine $d(284)$. The proper divisors of 284 are 1,2,4,71,and 142. Then

$$d(284) = 1 + 2 + 4 + 71 + 142 = 220.$$

Since $d(220) = 284$ and $d(284) = 220$ then 220 and 284 are an amicable pair, and each is an amicable number.

Program Criteria

Write a program that does the following:

- Find all amicable numbers up to some upper bound `N`.
- Print out all amicable numbers found in your program.

Deliverables

Place the following in a folder named `NumberTheory` in your repository:

- A Python file `N6_Amicable_Name.py` that satisfies the program criteria.