EXERCISES CSC2003 2024-01-22

Exercise I: Fibonacci Sequence

Fibonacci series is defined by:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, …

Represented by an array, it would be: a[0] = 1, a[1] = 1, a[2] = 2, …, a[n] = a[n-1] + a[n-2].

Write a Java program named "TestFibonacci.java" which reads two non-negative numbers from the console by using System.in. Denote the two numbers by n and d, and the program is expected to output d elements of the series from n-th element (i.e. a[n-1]) in the reverse order to the console by using System.out. An example is given below. (You can assume that the output numbers are no larger than 100000).

Note:

1. Each line of the input file consists of a positive integer, a comma, a space, and a non-negative number. The output is expected to be a series of numbers, separated by a comma and a space. If there is no number to output, the output is an empty line. We guarantee that the input is valid and d > 0.
2. The first line of each test case input will be an integer N (In the example above, N equals to 3). This integer N represents the number of lines of data to be input next.

Input:
```
2
5, 3
7, 7
```

Output:
```
5, 3, 2
13, 8, 5, 3, 2, 1, 1
```

OJ link: http://10.26.200.14/d/csc2003_2024_Spring/p/P10004

Exercise II: Divisor

Write a Java program to compute the greatest common divisor of two given positive integers A and B. You can assume the two positive integers are no larger than 1,000,000. For example, the highest common factor of 54 and 24 is 6.

Input 1:

```
54 24
```

Output 1:

```
6
```

Input 2:

```
70 27
```

Output 2:

```
1
```

OJ link: http://10.26.200.14/d/csc2003_2024_Spring/p/P10005

Exercise III: Narcissistic Numbers

A Narcissistic Number (or a self-love number) is a number that is the sum of its own digits each raised to the power of the number of digits. For example, a 3-digit Narcissistic Number satisfies the equation $abc = a^3 + b^3 + c^3$. Write a Java program to print all the 3-digit Narcissistic Numbers.

Exercise IV (Optional): Narcissistic Numbers

Given a number m ($100 < m < 10^7$), write a Java program to print all the Narcissistic Numbers that is less than m.