306. Additive Number

Medium 174 256 Favorite Share

Additive number is a string whose digits can form additive sequence.

A valid additive sequence should contain **at least** three numbers. Except for the first two numbers, each subsequent number in the sequence must be the sum of the preceding two.

Given a string containing only digits `'0'-'9'`, write a function to determine if it's an additive number.

Note: Numbers in the additive sequence **cannot** have leading zeros, so sequence `1, 2, 03` or `1, 02, 3` is invalid.

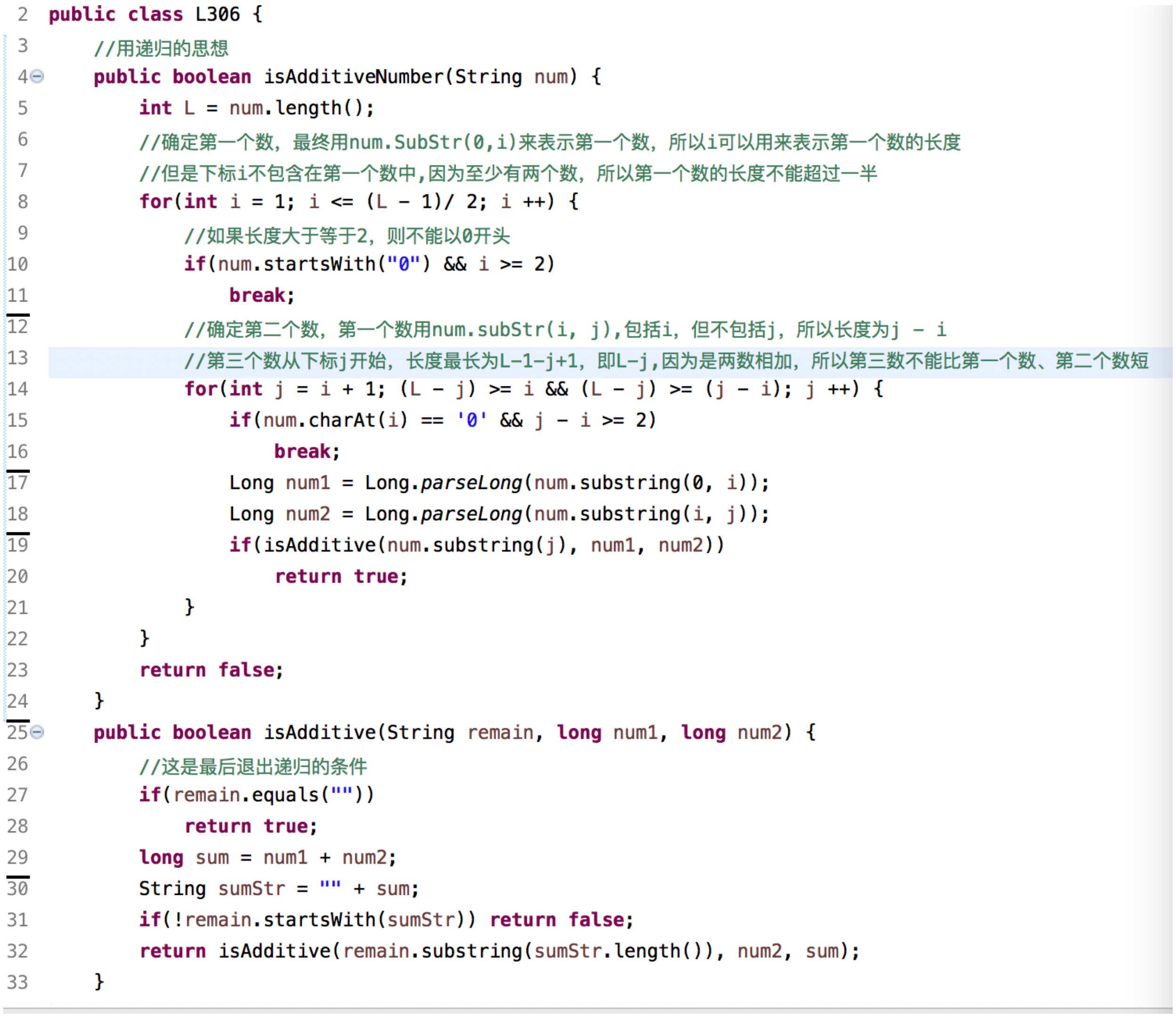
Example 1:

```
Input: "112358"
Output: true
Explanation: The digits can form an additive sequence: 1, 1, 2, 3, 5, 8.
             1 + 1 = 2, 1 + 2 = 3, 2 + 3 = 5, 3 + 5 = 8
```

Example 2:

```
Input: "199100199"
Output: true
Explanation: The additive sequence is: 1, 99, 100, 199.
             1 + 99 = 100, 99 + 100 = 199
```

Follow up:
How would you handle overflow for very large input integers?



```java
public class L306 {
    //用递归的思想
    public boolean isAdditiveNumber(String num) {
        int L = num.length();
        //确定第一个数，最终用num.SubStr(0,i)来表示第一个数，所以i可以用来表示第一个数的长度
        //但是下标i不包含在第一个数中,因为至少有两个数，所以第一个数的长度不能超过一半
        for(int i = 1; i <= (L - 1)/ 2; i ++) {
            //如果长度大于等于2，则不能以0开头
            if(num.startsWith("0") && i >= 2)
                break;
            //确定第二个数，第一个数用num.subStr(i, j),包括i，但不包括j，所以长度为j - i
            //第三个数从下标j开始，长度最长为L-1-j+1，即L-j,因为是两数相加，所以第三数不能比第一个数、第二个数短
            for(int j = i + 1; (L - j) >= i && (L - j) >= (j - i); j ++) {
                if(num.charAt(i) == '0' && j - i >= 2)
                    break;
                Long num1 = Long.parseLong(num.substring(0, i));
                Long num2 = Long.parseLong(num.substring(i, j));
                if(isAdditive(num.substring(j), num1, num2))
                    return true;
            }
        }
        return false;
    }
    public boolean isAdditive(String remain, long num1, long num2) {
        //这是最后退出递归的条件
        if(remain.equals(""))
            return true;
        long sum = num1 + num2;
        String sumStr = "" + sum;
        if(!remain.startsWith(sumStr)) return false;
        return isAdditive(remain.substring(sumStr.length()), num2, sum);
    }
```