43 Multiply Strings (link)

Description

Given two non-negative integers `num1` and `num2` represented as strings, return the product of `num1` and `num2`, also represented as a string.

Note: You must not use any built-in BigInteger library or convert the inputs to integer directly.

Example 1:

```
Input: num1 = "2", num2 = "3"
Output: "6"
```

Example 2:

```
Input: num1 = "123", num2 = "456"
Output: "56088"
```

Constraints:

- `1 <= num1.length, num2.length <= 200`
- `num1` and `num2` consist of digits only.
- Both `num1` and `num2` do not contain any leading zero, except the number `0` itself.

(scroll down for solution)

Solution

Language: cpp

Status: Accepted

```cpp
#include <string>
#include <vector>

class Solution {
public:
    std::string multiply(std::string num1, std::string num2) {
        int m = num1.size();
        int n = num2.size();

        std::vector<int> result(m + n, 0);

        // Умножение в столбик
        for (int i = m - 1; i >= 0; --i) {
            for (int j = n - 1; j >= 0; --j) {
                int mul = (num1[i] - '0') * (num2[j] - '0');
                int sum = mul + result[i + j + 1]; // Учитываем старый разряд
                result[i + j + 1] = sum % 10; // Текущая цифра
                result[i + j] += sum / 10; // Перенос
            }
        }

        // Преобразование массива в строку
        std::string res;
        for (int digit : result) {
            if (!(res.empty() && digit == 0)) { // Пропускаем ведущие нули, кроме слу
                res.push_back(digit + '0');
            }
        }

        return res.empty() ? "0" : res; // В случае "0" возвращаем "0"
    }
};
```