Multiply Strings / Easiest JAVA Solution with Graph Explanation

Easiest JAVA Solution with Graph Explanation

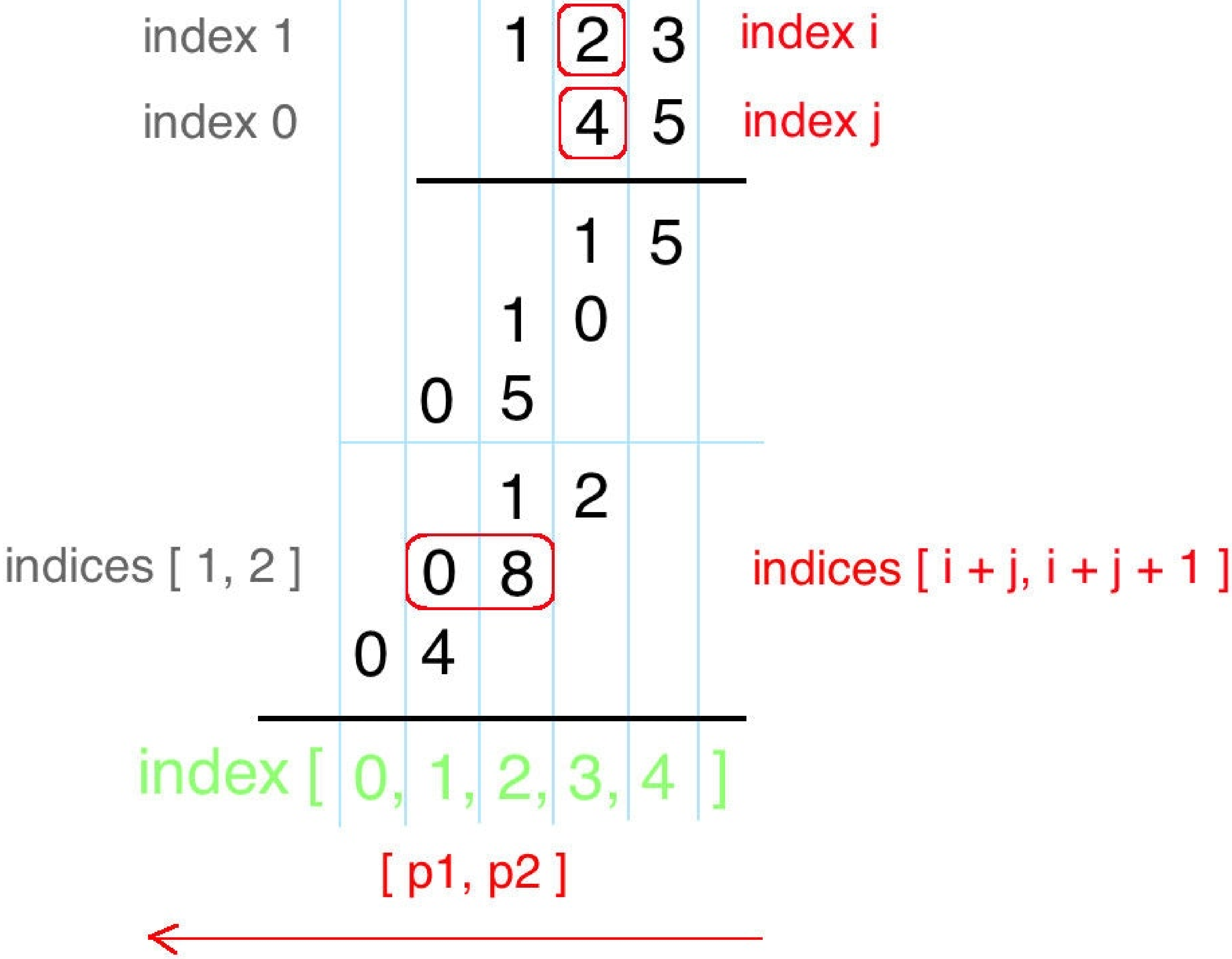
487

yavinci
Reputation: ★ 3139

Remember how we do multiplication?

Start from right to left, perform multiplication on every pair of digits, and add them together. Let's draw the process! From the following draft, we can immediately conclude:

```
`num1[i] * num2[j]` will be placed at indices `[i + j`, `i + j + 1]`
```


index 1
index 0
1 2 3
4 5
index i
index j
1 5
1 0
0 5
1 2
indices [1, 2]
0 8
indices [i + j, i + j + 1]
0 4
index [0, 1, 2, 3, 4]
[p1, p2]

Here is my solution. Hope it helps!

```
public String multiply(String num1, String num2) {
    int m = num1.length(), n = num2.length();
    int[] pos = new int[m + n];

    for(int i = m - 1; i >= 0; i--) {
        for(int j = n - 1; j >= 0; j--) {
            int mul = (num1.charAt(i) - '0') * (num2.charAt(j) - '0');
            int p1 = i + j, p2 = i + j + 1;
            int sum = mul + pos[p2];

            pos[p1] += sum / 10;
            pos[p2] = (sum) % 10;
        }
    }

    StringBuilder sb = new StringBuilder();
    for(int p : pos) if(!(sb.length() == 0 && p == 0)) sb.append(p);
    return sb.length() == 0 ? "0" : sb.toString();
}
```

85

Y

yzhai1986gmail.com

Reputation: ★ 85

big god. please accept my knees

▲
4
▼

S **satheeshravir**
Reputation: ★ 4

Neat and thoughtful answer. Voted

▲
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M **mach7**
Reputation: ★ 343

xue xi le, thank you. and i think `num1[i] * num2[j]` will be placed at indices `[i + j`, `i + j + 1]` if and only if we set length of the result string as num1.length() + num2.length()...

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R **ray14**
Reputation: ★ 0

Nice drawing :) very intuitive

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M **mustangigem**
Reputation: ★ 11

beautiful solution ! pretty 666

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Z **ZhuEason**
Reputation: ★ 84

love you, kiss me

0

Yuan__Yuan
Reputation: ★ 7

Great solution!

6

kowdk
Reputation: ★ 7

niubility！jiji fly towards the sky

3

marcusgao
Reputation: ★ 51

I think it might be a problem in

```
pos[p1] += sum / 10;
pos[p2] = (sum) % 10;
```

what if pos[p1] == 9 and sum > 10 ?

0

jerryxuzheng
Reputation: ★ 0

Each pos can store a number larger than 10. It will be below 10 in next loop.

0

F **Frog_pig**
Reputation: ★ -9

Such a genius@!

0

P **peckerisme** ↩ @satheeshravir
Reputation: ★ 0

perfect solution!

1

A **Adeath**
Reputation: ★ 142

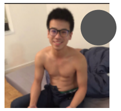
The idea to store a number that is >10 in a spot is really brilliant. I was only thinking 0-9.

0

R **ruo**
Reputation: ★ 0

very clear! good algorithm! thanks for sharing

1



wjixiaopeng
Reputation: ★ 24

niubility!!!!!!!!!!!!!!!!

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aaronyoung0626
Reputation: ★ 0

Exactly brilliant idea!

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Derek_Han
Reputation: ★ 4

Nice solution! So brilliant to use [i+j,i+j+1] to store num1[i]*num[j]. Thanks for sharing.

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icezhou0784
Reputation: ★ 5

I am still confused. So how can it prevent the front zero if it has?

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hzhu007 ↰ @icezhou0784
Reputation: ★ 4

@icezhou0784 It won't matter. Note this line `for(int p : pos) if(!(sb.length() == 0 && p == 0)) sb.append(p);`. You can try simulating the appending process when pos starts with 0.

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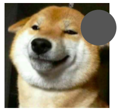

cdai

Reputation: ★ 128

Very intuitive and neat! Really love this kinda short code to complex problem. Thanks for your sharing!

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