





# 5949. Abbreviating the Product of a Range

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You are given two positive integers left and right with left <= right. Calculate the product of all integers in the inclusive range [left, right].

Since the product may be very large, you will abbreviate it following these steps:

- 1. Count all **trailing** zeros in the product and **remove** them. Let us denote this count as C. For example, there are  $\,3\,$  trailing zeros in  $\,1000\,$ , and there are  $\,0\,$  trailing zeros in  $\,546\,$ .
- 2. Denote the remaining number of digits in the product as  $d \cdot lf d > 10$ , then express the product as <...<suf> where denotes the first 5 digits of the product, and <suf> denotes the last 5 digits of the product after removing all trailing zeros. If d <= 10, we keep it unchanged. For example, we express 1234567654321 as 12345...54321, but 1234567 is represented as 1234567.
- 3. Finally, represent the product as a string "...<suf>eC". For example, 12345678987600000 will be represented as "12345...89876e5".

Return a string denoting the abbreviated product of all integers in the inclusive range [left, right].

User Accepted:	0
User Tried:	0
Total Accepted:	0
Total Submissions:	0
Difficulty:	Hard

### Example 1:

Input: left = 1, right = 4

Output: "24e0" **Explanation:** 

The product is  $1 \times 2 \times 3 \times 4 = 24$ .

There are no trailing zeros, so 24 remains the same. The abbreviation will end with "e0".

Since the number of digits is 2, which is less than 10, we do not have to abbreviate it further.

Thus, the final representation is "24e0".

### Example 2:

Input: left = 2, right = 11

Output: "399168e2"

**Explanation:** 

The product is 39916800.

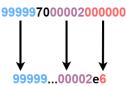
There are 2 trailing zeros, which we remove to get 399168. The abbreviation will end with "e2".

The number of digits after removing the trailing zeros is 6, so we do not abbreviate it further.

Hence, the abbreviated product is "399168e2".

#### Example 3:

#### 999998 x 999999 x 1000000 =



Input: left = 999998, right = 1000000

Output: "99999...00002e6"

**Explanation:** 

The above diagram shows how we abbreviate the product to "99999...00002e6".

- It has 6 trailing zeros. The abbreviation will end with "e6".
- The first 5 digits are 99999.
- The last 5 digits after removing trailing zeros is 00002.

## **Constraints:**

• 1 <= left <= right <= 10<sup>6</sup>

```
JavaScript
                                                                                                                      δ
  1
     const ll = BigInt;
  2
  3 ▼
     const abbreviateProduct = (l, r) \Rightarrow {
  4
          let p = 1n, e = 0, over 10 = false, prePow = 1;
  5 🔻
          for (let x = 1; x <= r; x++) {
  6
               p *= ll(x);
               while (p % 10n == 0) \{
  7 ▼
  8
                   p /= 10n;
                   e++;
 10
 11
               prePow += Math.log10(x);
 12
               while (prePow > 100) prePow--;
 13 ▼
               if (p > 1e11) {
 14
                   over10 = true;
 15
                   p %= ll(1e11);
 16
               }
 17
          if (p > 1e10) {
 18 ▼
               over10 = true;
 19
 20
               p %= ll(1e10);
 21
          }
          p = Number(p);
 22
 23
          if (!over10) return p + 'e' + e;
          let pre = (10 ** prePow) + '', suf = '0000000' + p;
 24
          pre.indexOf('e') == -1 ? pre = pre.slice(0, 5) : pre = pre[0] + pre.slice(2, 6);
 25
 26
          suf = '...' + suf.slice(-5) + 'e' + e;
 27
          return pre + suf;
 28
     };
☐ Custom Testcase
                      Use Example Testcases
                                                                                                                 Run
                                                                                                                            ♠ Submit
Submission Result: Accepted (/submissions/detail/607085296/) ?
                                                                             More Details > (/submissions/detail/607085296/)
Share your acceptance!
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```