6266. Smallest Value After Replacing With Sum of Prime Factors

My Submissions (/contest/weekly-contest-324/problems/smallest-value-after-replacing-with-sum-of-prime-factors/submissions/)

Back to Contest (/contest/weekly-contest-324/)

You are given a positive integer `n`.

Continuously replace `n` with the sum of its **prime factors**.

- Note that if a prime factor divides `n` multiple times, it should be included in the sum as many times as it divides `n`.

Return *the smallest value* `n` *will take on.*

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

Example 1:

```
Input: n = 15
Output: 5
Explanation: Initially, n = 15.
15 = 3 * 5, so replace n with 3 + 5 = 8.
8 = 2 * 2 * 2, so replace n with 2 + 2 + 2 = 6.
6 = 2 * 3, so replace n with 2 + 3 = 5.
5 is the smallest value n will take on.
```

Example 2:

```
Input: n = 3
Output: 3
Explanation: Initially, n = 3.
3 is the smallest value n will take on.
```

Constraints:

- $2 <= n <= 10^5$

JavaScript

```javascript
function smallestValue(n) {
    if (n == 2 || n == 4) return n;
    // Step 1: Find the prime factorization of n
    let factors = [];
    while (n % 2 === 0) {
        factors.push(2);
        n /= 2;
    }
    for (let i = 3; i <= Math.sqrt(n); i += 2) {
        while (n % i === 0) {
            factors.push(i);
            n /= i;
        }
    }
    if (n > 2) {
        factors.push(n);
    }

    // Step 2: Replace n with the sum of its prime factors
    n = factors.reduce((a, b) => a + b, 0);

    // Step 3: Repeat the process until n is a prime number
    while (true) {
        let isPrime = true;
        for (let i = 2; i <= Math.sqrt(n); i++) {
            if (n % i === 0) {
                isPrime = false;
                break;
            }
```

```
        }
        if (isPrime) {
            return n;
        } else {
            factors = [];
            while (n % 2 === 0) {
                factors.push(2);
                n /= 2;
            }
            for (let i = 3; i <= Math.sqrt(n); i += 2) {
                while (n % i === 0) {
                    factors.push(i);
                    n /= i;
                }
            }
            if (n > 2) {
                factors.push(n);
            }
            n = factors.reduce((a, b) => a + b, 0);
        }
    }
}

```

Custom Testcase | Use Example Testcases

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2