

Problem 1808: Maximize Number of Nice Divisors

Problem Information

Difficulty: **Hard**

Acceptance Rate: 34.87%

Paid Only: No

Tags: Math, Recursion, Number Theory

Problem Description

You are given a positive integer `primeFactors`. You are asked to construct a positive integer `n` that satisfies the following conditions:

* The number of prime factors of `n` (not necessarily distinct) is **at most** `primeFactors`. *
The number of nice divisors of `n` is maximized. Note that a divisor of `n` is **nice** if it is divisible by every prime factor of `n`. For example, if `n = 12`, then its prime factors are `[2,2,3]`, then `6` and `12` are nice divisors, while `3` and `4` are not.

Return **the number of nice divisors of** `n`. Since that number can be too large, return it **modulo** `109 + 7`.

Note that a prime number is a natural number greater than `1` that is not a product of two smaller natural numbers. The prime factors of a number `n` is a list of prime numbers such that their product equals `n`.

Example 1:

Input: `primeFactors = 5` **Output:** `6` **Explanation:** `200` is a valid value of `n`. It has 5 prime factors: `[2,2,2,5,5]`, and it has 6 nice divisors: `[1,2,4,5,10,20]`. There is not other value of `n` that has at most 5 prime factors and more nice divisors.

Example 2:

Input: `primeFactors = 8` **Output:** `18`

****Constraints:****

*`1 <= primeFactors <= 109`

Code Snippets

C++:

```
class Solution {  
public:  
    int maxNiceDivisors(int primeFactors) {  
  
    }  
};
```

Java:

```
class Solution {  
    public int maxNiceDivisors(int primeFactors) {  
  
    }  
}
```

Python3:

```
class Solution:  
    def maxNiceDivisors(self, primeFactors: int) -> int:
```