Problem 1175: Prime Arrangements

Problem Information

Difficulty: Easy
Acceptance Rate: 0.00%
Paid Only: No

Problem Description

Return the number of permutations of 1 to

n

so that prime numbers are at prime indices (1-indexed.)

(Recall that an integer is prime if and only if it is greater than 1, and cannot be written as a product of two positive integers both smaller than it.)

Since the answer may be large, return the answer

modulo

10^9 + 7

.

Example 1:

Input:

n = 5

Output:

12

Explanation:

For example [1,2,5,4,3] is a valid permutation, but [5,2,3,4,1] is not because the prime number 5 is at index 1.

Example 2:

Input:

n = 100

Output:

682289015

Constraints:

1 <= n <= 100

Code Snippets

C++:

```
class Solution {
public:
int numPrimeArrangements(int n) {

}
};
```

Java:

```
class Solution {
public int numPrimeArrangements(int n) {

}
}
```

Python3:

```
class Solution:
def numPrimeArrangements(self, n: int) -> int:
```

Python:

```
class Solution(object):
def numPrimeArrangements(self, n):
"""
:type n: int
:rtype: int
"""
```

JavaScript:

```
/**
* @param {number} n
* @return {number}
*/
var numPrimeArrangements = function(n) {

};
```

TypeScript:

```
function numPrimeArrangements(n: number): number {

};
```

C#:

```
public class Solution {
public int NumPrimeArrangements(int n) {

}
}
```

C:

```
int numPrimeArrangements(int n) {

}
```

Go:

```
func numPrimeArrangements(n int) int {

}
```

Kotlin:

```
class Solution {
fun numPrimeArrangements(n: Int): Int {

}
}
```

Swift:

```
class Solution {
func numPrimeArrangements(_ n: Int) -> Int {

}
}
```

Rust:

```
impl Solution {
pub fn num_prime_arrangements(n: i32) -> i32 {

}
}
```

Ruby:

```
# @param {Integer} n
# @return {Integer}
def num_prime_arrangements(n)

end
```

PHP:

```
class Solution {

/**
* @param Integer $n
* @return Integer
```

```
*/
function numPrimeArrangements($n) {

}
}
```

Dart:

```
class Solution {
int numPrimeArrangements(int n) {

}
}
```

Scala:

```
object Solution {
def numPrimeArrangements(n: Int): Int = {

}
}
```

Elixir:

```
defmodule Solution do
@spec num_prime_arrangements(n :: integer) :: integer
def num_prime_arrangements(n) do

end
end
```

Erlang:

```
-spec num_prime_arrangements(N :: integer()) -> integer().
num_prime_arrangements(N) ->
.
```

Racket:

```
(define/contract (num-prime-arrangements n)
(-> exact-integer? exact-integer?)
)
```

Solutions

C++ Solution:

```
/*
* Problem: Prime Arrangements
* Difficulty: Easy
* Tags: math
*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
* Space Complexity: O(1) to O(n) depending on approach
*/

class Solution {
public:
int numPrimeArrangements(int n) {

}
};
```

Java Solution:

```
/**
* Problem: Prime Arrangements
* Difficulty: Easy
* Tags: math
*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
* Space Complexity: O(1) to O(n) depending on approach
*/

class Solution {
public int numPrimeArrangements(int n) {

}
}
```

Python3 Solution:

```
"""
Problem: Prime Arrangements
Difficulty: Easy
Tags: math

Approach: Optimized algorithm based on problem constraints
Time Complexity: O(n) to O(n^2) depending on approach
Space Complexity: O(1) to O(n) depending on approach
"""

class Solution:
def numPrimeArrangements(self, n: int) -> int:
# TODO: Implement optimized solution
pass
```

Python Solution:

```
class Solution(object):
def numPrimeArrangements(self, n):
"""
:type n: int
:rtype: int
"""
```

JavaScript Solution:

```
/**
* Problem: Prime Arrangements
* Difficulty: Easy
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*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
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*/

/**
* @param {number} n
* @return {number}
*/
var numPrimeArrangements = function(n) {
```

```
};
```

TypeScript Solution:

```
/**
* Problem: Prime Arrangements
* Difficulty: Easy
* Tags: math
*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
* Space Complexity: O(1) to O(n) depending on approach
*/

function numPrimeArrangements(n: number): number {

};
```

C# Solution:

```
/*
* Problem: Prime Arrangements
* Difficulty: Easy
* Tags: math
*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
* Space Complexity: O(1) to O(n) depending on approach
*/

public class Solution {
public int NumPrimeArrangements(int n) {

}
}
```

C Solution:

```
/*
* Problem: Prime Arrangements
* Difficulty: Easy
```

```
* Tags: math
*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
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*/

int numPrimeArrangements(int n) {

}
```

Go Solution:

```
// Problem: Prime Arrangements
// Difficulty: Easy
// Tags: math
//
// Approach: Optimized algorithm based on problem constraints
// Time Complexity: O(n) to O(n^2) depending on approach
// Space Complexity: O(1) to O(n) depending on approach

func numPrimeArrangements(n int) int {

}
```

Kotlin Solution:

```
class Solution {
fun numPrimeArrangements(n: Int): Int {

}
}
```

Swift Solution:

```
class Solution {
func numPrimeArrangements(_ n: Int) -> Int {

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Rust Solution:

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// Problem: Prime Arrangements
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impl Solution {
pub fn num_prime_arrangements(n: i32) -> i32 {

}
}
```

Ruby Solution:

```
# @param {Integer} n
# @return {Integer}
def num_prime_arrangements(n)

end
```

PHP Solution:

```
class Solution {

/**
* @param Integer $n
* @return Integer
*/
function numPrimeArrangements($n) {

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```

Dart Solution:

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class Solution {
int numPrimeArrangements(int n) {
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}
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object Solution {
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defmodule Solution do
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