Problem 1359: Count All Valid Pickup and Delivery Options

Problem Information

Difficulty: Hard
Acceptance Rate: 64.88%
Paid Only: No
Tags: Math, Dynamic Programming, Combinatorics

Problem Description

Given `n` orders, each order consists of a pickup and a delivery service.

Count all valid pickup/delivery possible sequences such that delivery(i) is always after of pickup(i).

Since the answer may be too large, return it modulo 10^9 + 7.

Example 1:

Input: n = 1 **Output:** 1 **Explanation:** Unique order (P1, D1), Delivery 1 always is after of Pickup 1.

Example 2:

Input: n = 2 **Output:** 6 **Explanation:** All possible orders: (P1,P2,D1,D2), (P1,P2,D2,D1), (P1,D1,P2,D2), (P2,P1,D1,D2), (P2,P1,D2,D1) and (P2,D2,P1,D1). This is an invalid order (P1,D2,P2,D1) because Pickup 2 is after of Delivery 2.

Example 3:

Input: n = 3 **Output:** 90

Constraints:

* `1 <= n <= 500`

Code Snippets

C++:

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

}
};
```

Java:

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

}
}
```

Python3:

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