Problem 1916: Count Ways to Build Rooms in an Ant Colony

Problem Information

Difficulty: Hard
Acceptance Rate: 49.63%
Paid Only: No
Tags: Math, Dynamic Programming, Tree, Graph, Topological Sort, Combinatorics

Problem Description

You are an ant tasked with adding `n` new rooms numbered `0` to `n-1` to your colony. You are given the expansion plan as a **0-indexed** integer array of length `n`, `prevRoom`, where `prevRoom[i]` indicates that you must build room `prevRoom[i]` before building room `i`, and these two rooms must be connected **directly**. Room `0` is already built, so `prevRoom[0] = -1`. The expansion plan is given such that once all the rooms are built, every room will be reachable from room `0`.

You can only build **one room** at a time, and you can travel freely between rooms you have **already built** only if they are **connected**. You can choose to build **any room** as long as its **previous room** is already built.

Return _the**number of different orders** you can build all the rooms in_. Since the answer may be large, return it **modulo** `109 + 7`.

Example 1:

Input: prevRoom = [-1,0,1] **Output:** 1 **Explanation:** There is only one way to build the additional rooms: 0 -> 1 -> 2

Example 2:

Input: prevRoom = [-1,0,0,1,2] **Output:** 6 **Explanation:** The 6 ways are: 0 -> 1 -> 3 -> 2 -> 4 0 -> 2 -> 4 -> 1 -> 3 0 -> 1 -> 2 -> 3 -> 4 0 -> 1 -> 2 -> 4 -> 3 0 -> 2 -> 1 -> 3 -> 4 0 -> 2 -> 1 -> 4 -> 3

Constraints:

* `n == prevRoom.length` * `2 <= n <= 105` * `prevRoom[0] == -1` * `0 <= prevRoom[i] < n` for all `1 <= i < n` * Every room is reachable from room `0` once all the rooms are built.

Code Snippets

C++:

```
class Solution {
public:
int waysToBuildRooms(vector<int>& prevRoom) {

}
};
```

Java:

```
class Solution {
public int waysToBuildRooms(int[] prevRoom) {

}
}
```

Python3:

```
class Solution:
def waysToBuildRooms(self, prevRoom: List[int]) -> int:
```