Problem 3317: Find the Number of Possible Ways for an Event

Problem Information

Difficulty: Hard
Acceptance Rate: 34.19%
Paid Only: No
Tags: Math, Dynamic Programming, Combinatorics

Problem Description

You are given three integers `n`, `x`, and `y`.

An event is being held for `n` performers. When a performer arrives, they are **assigned** to one of the `x` stages. All performers assigned to the **same** stage will perform together as a band, though some stages _might_ remain **empty**.

After all performances are completed, the jury will **award** each band a score in the range `[1, y]`.

Return the **total** number of possible ways the event can take place.

Since the answer may be very large, return it **modulo** `109 + 7`.

Note that two events are considered to have been held **differently** if **either** of the following conditions is satisfied:

* **Any** performer is _assigned_ a different stage. * **Any** band is _awarded_ a different score.

Example 1:

Input: n = 1, x = 2, y = 3

Output: 6

Explanation:

* There are 2 ways to assign a stage to the performer. * The jury can award a score of either 1, 2, or 3 to the only band.

Example 2:

Input: n = 5, x = 2, y = 1

Output: 32

Explanation:

* Each performer will be assigned either stage 1 or stage 2. * All bands will be awarded a score of 1.

Example 3:

Input: n = 3, x = 3, y = 4

Output: 684

Constraints:

* `1 <= n, x, y <= 1000`

Code Snippets

C++:

```
class Solution {
public:
int numberOfWays(int n, int x, int y) {

}
};
```

Java:

```
class Solution {
public int numberOfWays(int n, int x, int y) {

}
}
```

Python3:

```
class Solution:
def numberOfWays(self, n: int, x: int, y: int) -> int:
```