Problem 1594: Maximum Non Negative Product in a Matrix

Problem Information

Difficulty: Medium
Acceptance Rate: 35.40%
Paid Only: No
Tags: Array, Dynamic Programming, Matrix

Problem Description

You are given a `m x n` matrix `grid`. Initially, you are located at the top- left corner `(0, 0)`, and in each step, you can only **move right or down** in the matrix.

Among all possible paths starting from the top-left corner `(0, 0)` and ending in the bottom-right corner `(m - 1, n - 1)`, find the path with the **maximum non-negative product**. The product of a path is the product of all integers in the grid cells visited along the path.

Return the _maximum non-negative product**modulo** _`109 + 7`. _If the maximum product is**negative** , return _`-1`.

Notice that the modulo is performed after getting the maximum product.

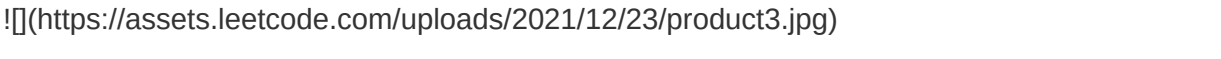
Example 1:

Input: grid = [[-1,-2,-3],[-2,-3,-3],[-3,-3,-2]] **Output:** -1 **Explanation:** It is not possible to get non-negative product in the path from (0, 0) to (2, 2), so return -1.

Example 2:

Input: grid = [[1,-2,1],[1,-2,1],[3,-4,1]] **Output:** 8 **Explanation:** Maximum non-negative product is shown (1 * 1 * -2 * -4 * 1 = 8).

Example 3:



Input: grid = [[1,3],[0,-4]] **Output:** 0 **Explanation:** Maximum non-negative product is shown (1 * 0 * -4 = 0).

Constraints:

* `m == grid.length` * `n == grid[i].length` * `1 <= m, n <= 15` * `-4 <= grid[i][j] <= 4`

Code Snippets

C++:

```
class Solution {
public:
int maxProductPath(vector<vector<int>>& grid) {

}
};
```

Java:

```
class Solution {
public int maxProductPath(int[][] grid) {

}
}
```

Python3:

```
class Solution:
def maxProductPath(self, grid: List[List[int]]) -> int:
```