Problem 1444: Number of Ways of Cutting a Pizza

Problem Information

Difficulty: Hard
Acceptance Rate: 61.55%
Paid Only: No
Tags: Array, Dynamic Programming, Memoization, Matrix, Prefix Sum

Problem Description

Given a rectangular pizza represented as a `rows x cols` matrix containing the following characters: `'A'` (an apple) and `'.'` (empty cell) and given the integer `k`. You have to cut the pizza into `k` pieces using `k-1` cuts.

For each cut you choose the direction: vertical or horizontal, then you choose a cut position at the cell boundary and cut the pizza into two pieces. If you cut the pizza vertically, give the left part of the pizza to a person. If you cut the pizza horizontally, give the upper part of the pizza to a person. Give the last piece of pizza to the last person.

_Return the number of ways of cutting the pizza such that each piece contains**at least** one apple. _Since the answer can be a huge number, return this modulo 10^9 + 7.

Example 1:

Input: pizza = ["A..","AAA","..."], k = 3 **Output:** 3 **Explanation:** The figure above shows the three ways to cut the pizza. Note that pieces must contain at least one apple.

Example 2:

Input: pizza = ["A..","AA.","..."], k = 3 **Output:** 1

Example 3:

Input: pizza = ["A..","A..","..."], k = 1 **Output:** 1

Constraints:

* `1 <= rows, cols <= 50` * `rows == pizza.length` * `cols == pizza[i].length` * `1 <= k <= 10` * `pizza` consists of characters `'A'` and `'.'` only.

Code Snippets

C++:

```
class Solution {
public:
int ways(vector<string>& pizza, int k) {

}
};
```

Java:

```
class Solution {
public int ways(String[] pizza, int k) {

}
}
```

Python3:

```
class Solution:
def ways(self, pizza: List[str], k: int) -> int:
```