Problem 1643: Kth Smallest Instructions

Problem Information

Difficulty: Hard
Acceptance Rate: 44.33%
Paid Only: No
Tags: Array, Math, Dynamic Programming, Combinatorics

Problem Description

Bob is standing at cell `(0, 0)`, and he wants to reach `destination`: `(row, column)`. He can only travel **right** and **down**. You are going to help Bob by providing **instructions** for him to reach `destination`.

The **instructions** are represented as a string, where each character is either:

* `'H'`, meaning move horizontally (go **right**), or * `'V'`, meaning move vertically (go **down**).

Multiple **instructions** will lead Bob to `destination`. For example, if `destination` is `(2, 3)`, both `"HHHVV"` and `"HVHVH"` are valid **instructions**.

However, Bob is very picky. Bob has a lucky number `k`, and he wants the `kth` **lexicographically smallest instructions** that will lead him to `destination`. `k` is **1-indexed**.

Given an integer array `destination` and an integer `k`, return _the_`kth` _**lexicographically smallest instructions** that will take Bob to _`destination`.

Example 1:

Input: destination = [2,3], k = 1 **Output:** "HHHVV" **Explanation:** All the instructions that reach (2, 3) in lexicographic order are as follows: ["HHHVV", "HHVHV", "HHVVH", "HVHHV", "HVHVH", "HVVHH", "VHHHV", "VHHVH", "VHVHH", "VVHHH"].

Example 2:

Input: destination = [2,3], k = 2 **Output:** "HHVHV"

Example 3:

Input: destination = [2,3], k = 3 **Output:** "HHVVH"

Constraints:

* `destination.length == 2` * `1 <= row, column <= 15` * `1 <= k <= nCr(row + column, row)`, where `nCr(a, b)` denotes `a` choose `b`■■■■■.

Code Snippets

C++:

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

}
};
```

Java:

```
class Solution {
public String kthSmallestPath(int[] destination, int k) {

}
}
```

Python3:

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