Problem 3567: Minimum Absolute Difference in Sliding Submatrix

Problem Information

Difficulty: Medium
Acceptance Rate: 68.88%
Paid Only: No
Tags: Array, Sorting, Matrix

Problem Description

You are given an `m x n` integer matrix `grid` and an integer `k`.

For every contiguous `k x k` **submatrix** of `grid`, compute the **minimum absolute** difference between any two **distinct** values within that **submatrix**.

Return a 2D array `ans` of size `(m - k + 1) x (n - k + 1)`, where `ans[i][j]` is the minimum absolute difference in the submatrix whose top-left corner is `(i, j)` in `grid`.

Note : If all elements in the submatrix have the same value, the answer will be 0.

A submatrix `(x1, y1, x2, y2)` is a matrix that is formed by choosing all cells `matrix[x][y]` where `x1 <= x <= x2` and `y1 <= y <= y2`.

Example 1:

Input: grid = [[1,8],[3,-2]], k = 2

Output: [[2]]

Explanation:

* There is only one possible `k x k` submatrix: `[[1, 8], [3, -2]]`. * Distinct values in the submatrix are `[1, 8, 3, -2]`. * The minimum absolute difference in the submatrix is `|1 - 3| = 2`. Thus, the answer is `[[2]]`.

Example 2:

Input: grid = [[3,-1]], k = 1

Output: [[0,0]]

Explanation:

* Both `k x k` submatrix has only one distinct element. * Thus, the answer is `[[0, 0]]`.

Example 3:

Input: grid = [[1,-2,3],[2,3,5]], k = 2

Output: [[1,2]]

Explanation:

* There are two possible `k × k` submatrix: * Starting at `(0, 0)`: `[[1, -2], [2, 3]]`. * Distinct values in the submatrix are `[1, -2, 2, 3]`. * The minimum absolute difference in the submatrix is `|1 - 2| = 1`. * Starting at `(0, 1)`: `[[-2, 3], [3, 5]]`. * Distinct values in the submatrix are `[-2, 3, 5]`. * The minimum absolute difference in the submatrix is `|3 - 5| = 2`. * Thus, the answer is `[[1, 2]]`.

Constraints:

* `1 <= m == grid.length <= 30` * `1 <= n == grid[i].length <= 30` * `-105 <= grid[i][j] <= 105` * `1 <= k <= min(m, n)`

Code Snippets

C++:

```
class Solution {
public:
vector<vector<int>> minAbsDiff(vector<vector<int>>& grid, int k) {

}
};
```

Java:

```
class Solution {
public int[][] minAbsDiff(int[][] grid, int k) {

}
}
```

Python3:

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