

Problem 1738: Find Kth Largest XOR Coordinate Value

Problem Information

Difficulty: Medium

Acceptance Rate: 63.87%

Paid Only: No

Tags: Array, Divide and Conquer, Bit Manipulation, Sorting, Heap (Priority Queue), Matrix, Prefix Sum, Quickselect

Problem Description

You are given a 2D `matrix` of size `m x n`, consisting of non-negative integers. You are also given an integer `k`.

The **value** of coordinate `(a, b)` of the matrix is the XOR of all `matrix[i][j]` where `0 <= i <= a < m` and `0 <= j <= b < n` *(0-indexed)*.

Find the `kth` largest value **(1-indexed)** of all the coordinates of `matrix`.

Example 1:

Input: matrix = [[5,2],[1,6]], k = 1 **Output:** 7 **Explanation:** The value of coordinate (0,1) is 5 XOR 2 = 7, which is the largest value.

Example 2:

Input: matrix = [[5,2],[1,6]], k = 2 **Output:** 5 **Explanation:** The value of coordinate (0,0) is 5 = 5, which is the 2nd largest value.

Example 3:

Input: matrix = [[5,2],[1,6]], k = 3 **Output:** 4 **Explanation:** The value of coordinate (1,0) is 5 XOR 1 = 4, which is the 3rd largest value.

****Constraints:****

```
* `m == matrix.length` * `n == matrix[i].length` * `1 <= m, n <= 1000` * `0 <= matrix[i][j] <= 106`  
* `1 <= k <= m * n`
```

Code Snippets

C++:

```
class Solution {  
public:  
    int kthLargestValue(vector<vector<int>>& matrix, int k) {  
  
    }  
};
```

Java:

```
class Solution {  
public int kthLargestValue(int[][][] matrix, int k) {  
  
}  
}
```

Python3:

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