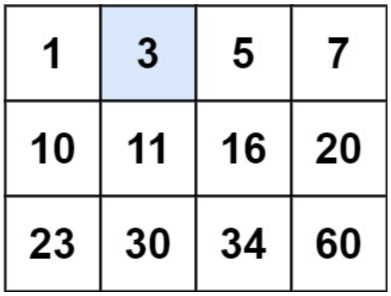
74. Search a 2D Matrix

Created	@July 9, 2021 12:03 AM
Difficulty	Medium
LC Url	https://leetcode.com/problems/search-a-2d-matrix/
Importance	
Tag	Binary search NEET
Video	

Write an efficient algorithm that searches for a value in an `m x n` matrix. This matrix has the following properties:

- Integers in each row are sorted from left to right.
- The first integer of each row is greater than the last integer of the previous row.

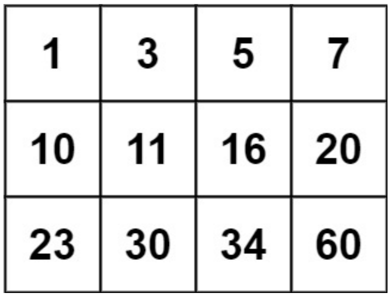
Example 1:



1	3	5	7
10	11	16	20
23	30	34	60

```
Input: matrix = [[1,3,5,7],[10,11,16,20],[23,30,34,60]], target = 3
Output: true
```

Example 2:



1	3	5	7
10	11	16	20
23	30	34	60

```
Input: matrix = [[1,3,5,7],[10,11,16,20],[23,30,34,60]], target = 13
Output: false
```

Constraints:

- `m == matrix.length`
- `n == matrix[i].length`
- `1 <= m, n <= 100`
- `10 4 <= matrix[i][j], target <= 10 4`

Solution

https://leetcode.cn/problems/search-a-2d-matrix-ii/solution/sou-suo-er-wei-ju-zhen-ii-by-leetcode-so-9hcx/

https://leetcode.cn/problems/search-a-2d-matrix-ii/solution/jian-dan-yi-dong-javac-pythonjsgo-sou-su-3mh6/

```
class Solution:
    def searchMatrix(self, matrix: List[List[int]], target: int) -> bool:
        if not matrix or target is None:
            return False

        rows, cols = len(matrix), len(matrix[0])
        low, high = 0, rows * cols - 1

        while low + 1 < high:
            mid = (low + high) // 2
            mid_num = matrix[mid // cols][mid % cols]

            if mid_num < target:
                low = mid
            elif mid_num > target:
                high = mid
            else:
                return True

        if matrix[low // cols][low % cols] == target:
            return True

        if matrix[high // cols][high % cols] == target:
            return True

        return False
```

```
class Solution:
    def searchMatrix(self, matrix: List[List[int]], target: int) -> bool:
        if not matrix or target is None:
            return False

        rows, cols = len(matrix), len(matrix[0])
        low, high = 0, rows * cols - 1

        while low <= high:
            mid = (low + high) // 2
            num = matrix[mid // cols][int(mid % cols)]

            if num == target:
                return True
            elif num < target:
                low = mid + 1
            else:
                high = mid - 1

        return False
```

A Python binary search solution - O(logn) - LeetCode Discuss

Level up your coding skills and quickly land a job. This is the best place to expand your knowledge and get prepared for your next interview.

https://leetcode.com/problems/search-a-2d-matrix/discuss/26201/A-Python-binary-search-solution-O(logn)