class Solution:

def searchMatrix(self, matrix: List[List[int]], target: int) -> bool:

row = len(matrix)

col = len(matrix[0])

l = (0,0)

r = (row-1, col-1)

while l[0] <= r[0] or (l[0] == r[0] and l[1] <= r[1]):

mid = ((l[0]+r[0])//2, (l[1]+r[1])//2)

if matrix[mid[0]][mid[1]] == target or matrix[l[0]][l[1]] == target or matrix[r[0]][r[1]] == target:

return True

if matrix[l[0]][l[1]] > target:

return False

if matrix[r[0]][r[1]] < target:

return False

if matrix[mid[0]][mid[1]] < target:

if matrix[mid[0]][col-1] < target:

if mid[0] + 1 <= row-1:

l = (mid[0]+1, 0)

else:

break

else:

if r[0] > mid[0]:

r = (mid[0], col-1)

if mid[1] + 1 <= col-1:

l = (mid[0], mid[1]+1)

else:

break

else:

if matrix[mid[0]][0] > target:

if mid[0]-1 >= 0:

r = (mid[0]-1, col-1)

else:

break

else:

if l[0] < mid[0]:

l = (mid[0], 0)

if mid[1]-1 >= 0:

r = (mid[0], mid[1]-1)

else:

break

return False