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:**

**Input:**

matrix = [

[1, 3, 5, 7],

[10, 11, 16, 20],

[23, 30, 34, 50]

]

target = 3

**Output:** true

**Example 2:**

**Input:**

matrix = [

[1, 3, 5, 7],

[10, 11, 16, 20],

[23, 30, 34, 50]

]

target = 13

**Output:** false