Problem 3111: Minimum Rectangles to Cover Points

Problem Information

Difficulty: Medium
Acceptance Rate: 63.21%
Paid Only: No
Tags: Array, Greedy, Sorting

Problem Description

You are given a 2D integer array `points`, where `points[i] = [xi, yi]`. You are also given an integer `w`. Your task is to **cover** **all** the given points with rectangles.

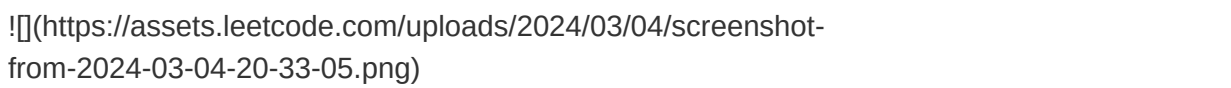
Each rectangle has its lower end at some point `(x1, 0)` and its upper end at some point `(x2, y2)`, where `x1 <= x2`, `y2 >= 0`, and the condition `x2 - x1 <= w` **must** be satisfied for each rectangle.

A point is considered covered by a rectangle if it lies within or on the boundary of the rectangle.

Return an integer denoting the **minimum** number of rectangles needed so that each point is covered by **at least one** rectangle _._

Note: A point may be covered by more than one rectangle.

Example 1:



Input: points = [[2,1],[1,0],[1,4],[1,8],[3,5],[4,6]], w = 1

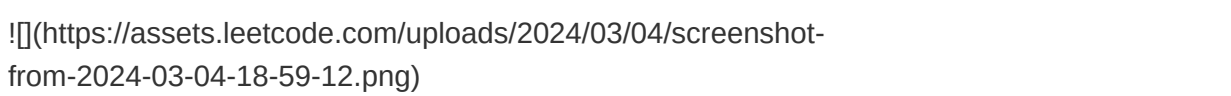
Output: 2

Explanation:

The image above shows one possible placement of rectangles to cover the points:

* A rectangle with a lower end at `(1, 0)` and its upper end at `(2, 8)` * A rectangle with a lower end at `(3, 0)` and its upper end at `(4, 8)`

Example 2:



Input: points = [[0,0],[1,1],[2,2],[3,3],[4,4],[5,5],[6,6]], w = 2

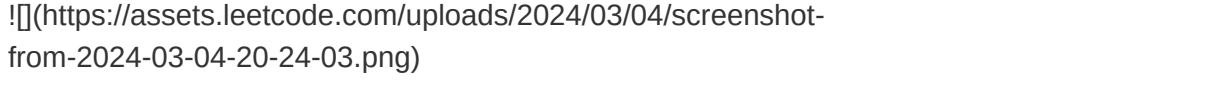
Output: 3

Explanation:

The image above shows one possible placement of rectangles to cover the points:

* A rectangle with a lower end at `(0, 0)` and its upper end at `(2, 2)` * A rectangle with a lower end at `(3, 0)` and its upper end at `(5, 5)` * A rectangle with a lower end at `(6, 0)` and its upper end at `(6, 6)`

Example 3:



Input: points = [[2,3],[1,2]], w = 0

Output: 2

Explanation:

The image above shows one possible placement of rectangles to cover the points:

* A rectangle with a lower end at `(1, 0)` and its upper end at `(1, 2)` * A rectangle with a lower end at `(2, 0)` and its upper end at `(2, 3)`

Constraints:

* `1 <= points.length <= 105` * `points[i].length == 2` * `0 <= xi == points[i][0] <= 109` * `0 <= yi == points[i][1] <= 109` * `0 <= w <= 109` * All pairs `(xi, yi)` are distinct.

Code Snippets

C++:

```
class Solution {
public:
int minRectanglesToCoverPoints(vector<vector<int>>& points, int w) {

}
};
```

Java:

```
class Solution {
public int minRectanglesToCoverPoints(int[][] points, int w) {

}
}
```

Python3:

```
class Solution:
def minRectanglesToCoverPoints(self, points: List[List[int]], w: int) -> int:
```