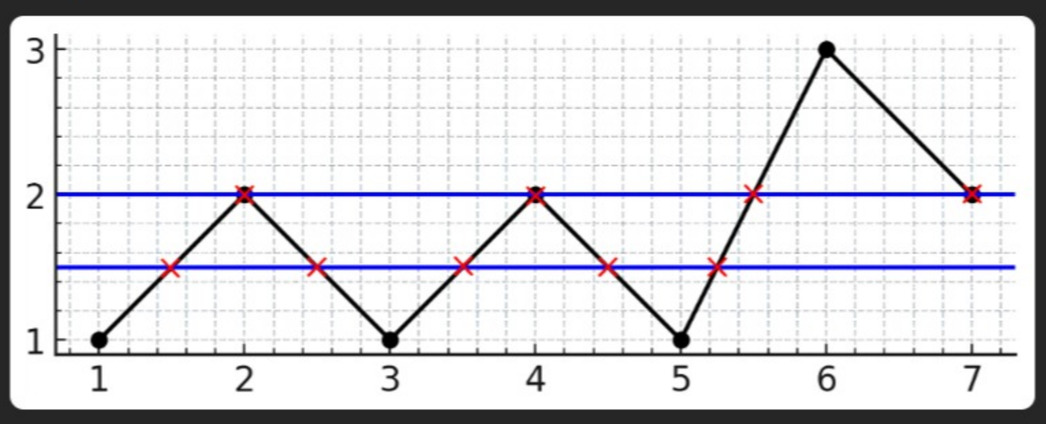
3009. Maximum Number of Intersections on the Chart Premium

Hard | Topics | Companies | Hint

There is a line chart consisting of `n` points connected by line segments. You are given a **1-indexed** integer array `y`. The `k^th` point has coordinates `(k, y[k])`. There are no horizontal lines; that is, no two consecutive points have the same y-coordinate.

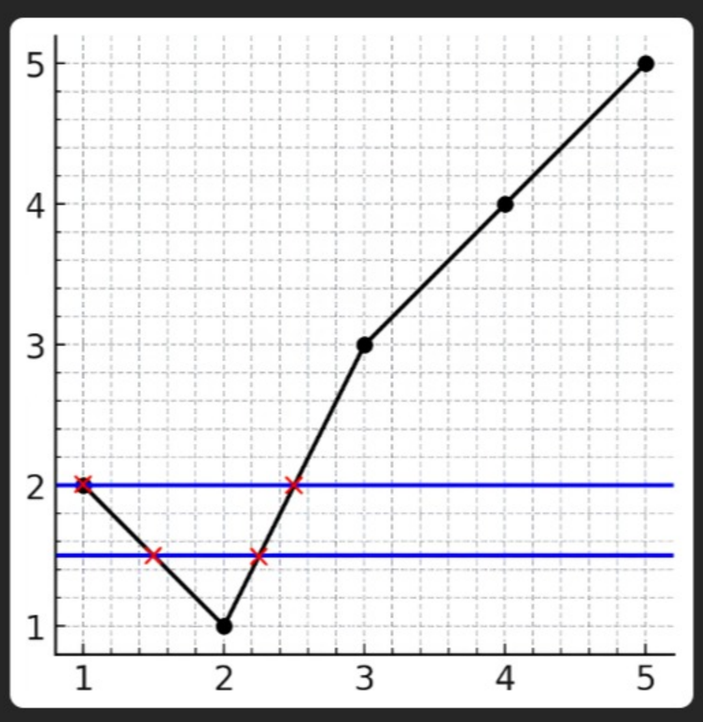
We can draw an infinitely long horizontal line. Return *the **maximum** number of points of intersection of the line with the chart.*

Example 1:




```
Input: y = [1,2,1,2,1,3,2]
Output: 5
Explanation: As you can see in the image above, the line y = 1.5 has 5 intersections with the chart (in red crosses). You can also see the line y = 2 which intersects the chart in 4 points (in red crosses). It can be shown that there is no horizontal line intersecting the chart at more than 5 points. So the answer would be 5.
```

Example 2:




```
Input: y = [2,1,3,4,5]
Output: 2
Explanation: As you can see in the image above, the line y = 1.5 has 2 intersections with the chart (in red crosses). You can also see the line y = 2 which intersects the chart in 2 points (in red crosses). It can be shown that there is no horizontal line intersecting the chart at more than 2 points. So the answer would be 2.
```

Constraints:

- `2 <= y.length <= 10^5`
- `1 <= y[i] <= 10^9`
- `y[i] != y[i + 1]` for `i` in range `[1, n - 1]`

Seen this question in a real interview before? 1/5

Yes | No

Accepted 3.8K | Submissions 8.4K | Acceptance Rate 45.6%

Topics

Array | Math | Binary Indexed Tree | Geometry

Companies

0 - 6 months

Microsoft 2

6 months ago

Meta 2

Hint 1

We move a horizontal line from the bottom of the chart to the top.

Hint 2

For each point we reach, the number of intersections might change, so we have to count it.

Hint 3

If a point we just reached is lower than its previous/next point, the number of intersections increases.

Hint 4

If a point we just reached is higher than its previous/next point, the number of intersections decreases.

Hint 5

There is also another solution using Fenwick Tree.

Discussion (5)