

Minimum Vertical Shots 1 - Solution Outline

Key Ideas

A single shot can hit all intervals that overlap a chosen coordinate. Sorting by right endpoint and shooting at the earliest possible endpoint is greedy-optimal.

Algorithm

1. Sort all intervals by increasing right endpoint.
2. Initialize `shots = 0` and `lastShot = -infinity`.
3. For each interval (l, r) in order:
 - If $l > \text{lastShot}$, fire a new shot at r , increment `shots`, and set `lastShot = r`.
4. Output `shots`.

Correctness Sketch

Choosing the earliest finishing interval and shooting at its right endpoint covers that interval and maximizes the chance to also cover subsequent intervals. Any optimal solution can be transformed to include this shot without increasing the number of shots, so the greedy strategy is optimal.

Complexity

- Time: $O(n \log n)$
- Space: $O(1)$ extra space if sorting in place