

Minimum Number of Arrows to Burst Balloons

For this problem we must implement a classic interval scheduling/greedy problem.

[Key Insight:]

- Each balloon is an interval $[x_{start}, x_{end}]$.
- We want the minimum number of arrows to intersect all intervals.
- Strategy: Greedy by end coordinate
 - Sort balloons by their x_{end} (right boundary).
 - Shoot an arrow at the x_{end} of the first balloon.
 - For each subsequent balloon:
 - If its x_{start} is after the last arrow position, shoot a new arrow at its x_{end} .
 - Otherwise, it's already covered by the previous arrow.

[Algorithm:]

- Sort points by x_{end} .
- Initialize $arrows = 1$ and $arrowPos = \text{first interval's end}$.
- Iterate through intervals:
 - If $x_{start} > arrowPos$, increment $arrows$ and update $arrowPos = x_{end}$.

[Complexity:]

- Time: $O(n \log n)$ (sorting dominates)
- Space: $O(1)$ (in-place sorting)