

F: Flight Collision

Problem Author: Jorke de Vlas

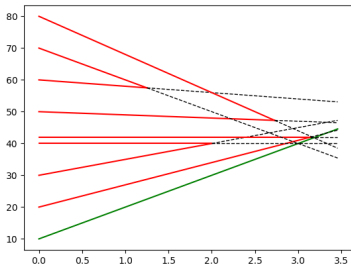


Problem

Some drones are flying along a straight line at constant speed. Simulate the crashes and report the survivors.

Insight

At any moment, the next crash is going to be between two adjacent drones.



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Solution

- Maintain a set of potential crash events, sorted by time.
- The crash times can be found by solving linear equations.
- When processing a crash, add a new event for the two drones that become adjacent.
- Time complexity: $\mathcal{O}(n \log n)$.

Gotchas

- Use fractions or long double to avoid precision errors.
- Only consider crashes at times $t > 0$.

Statistics: 421 submissions, 46 + ? accepted