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March 8, 2019

Advanced Data Structures

1 Multidimensional Data Structures

1.1 Queries

- Exact search: $q = (s, s, ..., s)$.
- Partial match: $q = (s, s, *, *, s, *, s)$.
- Orthogonal queries.
- Range queries: $q = ([], [], ..., [])$
- Region queries.
- Nearest-Neighbor queries: q, *similarity function*.

2 Geometric Data Structures

2.1 Vertical Line Stabbing

Input: Collection of n intervals.

$$\mathrm{I} = \{[a_1, b_1], [a_2, b_2], \ldots, [a_n, b_n]\} \mathrm{b}$$
$a_i, b_i \in \mathbb{R}$
$q \in \mathbb{R}$

Output: List if intervals in I that contain q.

Solution: Interval Trees