6.851: Advanced Data Structures, Fall 2017

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Problem Set 3

Due: Wednesday, September 27, 2017 at noon

Problem 3.1 [Right Isosceles Triangle Range Searching].

Describe and analyze a static data structure for storing a set of n 2D points subject to the following query operation:

> Given an axis-aligned right isosceles triangle (bounded by a horizontal, vertical, and diagonal line), report the k points in the triangle in $O(\log n + k)$ time.

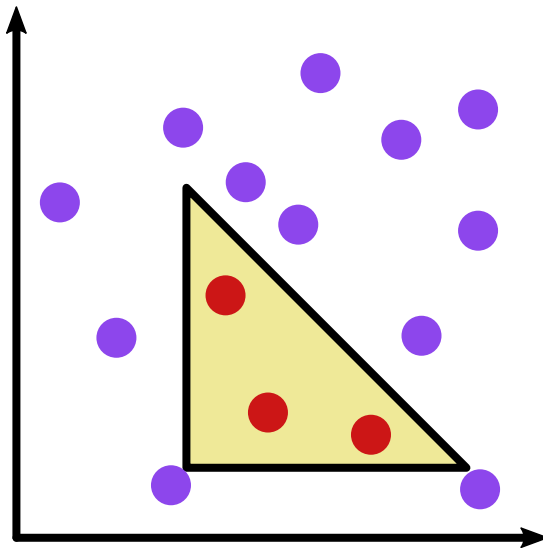Your data structure should occupy $O(n \operatorname{polylog} n)$ space.

Figure 1: An example range query by an axis-aligned right isosceles triangle.