

Homework Exercises for Lecture 2

2-1 Given n points on a plane. Find a CF-coloring of points with respect to the following ranges(or regions):

(i) Cones with angle $\pi/2$ whose sides are axis-aligned (or two-sided rectangles) using $O(\log n)$ colors.

(ii) Three-sided axis-aligned rectangles using $O(\log^2 n)$ colors.

Hint: Reduce the problem to online CF-coloring of points on a line with respect to intervals.

(iii) axis-aligned rectangles using $O(\sqrt{n} \log n)$.

Hint: Use Erdos-Szekeres Theorem: For any n points on a plane there is a subset of size $\Omega(\sqrt{n})$ such that they are monotone based on both x and y coordinates.

2-2 Find a CF-coloring of n unit intervals on a line with respect to points using $O(\log n)$ colors.

Hint: Reduce the problem to the CF-coloring of points with respect to intervals.