

Homework assignment no. 4

1. Let R be a set of n points in the plane, and let B be a set of n blue points in the plane. A line l is a *separator* for R and B if all points of R lie on one side of l and all points of B lie on the other side of l . Describe an algorithm for deciding in expected $O(n)$ time whether there exists a separator for R and B .
2. The *Gabriel* graph of a set \mathcal{P} of n points in the plane consists of all edges pq , $p, q \in \mathcal{P}$, such that the circle of diameter pq does not contain any point of \mathcal{P} in its interior.
 - (a) Observe that the Delaunay triangulation of \mathcal{P} contains the Gabriel graph of \mathcal{P} .
 - (b) Prove that pq is an edge of the Gabriel graph if and only if pq intersects the Voronoi edge between $\text{Vor}(p)$ and $\text{Vor}(q)$.
 - (c) Show that the Gabriel graph can be computed in $O(n \log n)$ time.

Submission: January 10, 2019.