MAI520 Beräkningsgeometri 2000/2001
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Exercises — 2

1. Construct an algorithm to find the convex hull of a monotone polygon in linear time.
2. (Gauss-Bonnet theorem) Compute the total sum of the face angles at all the vertices of a few polyhedra of genus 0, and formulate a conjecture. Prove it.
3. Given two points P, Q in the plane. We say that P dominates Q if the x– and y–coordinates of P are both greater than the x– and y–coordinates of Q. Given a set S of n points in the plane, describe an $O(n \log n)$ time algorithm for finding every point in S that is not dominated by any other point in S.
4. Prove that the number of edges in a Voronoi polygon, averaged over all Voronoi regions for any set of n points, does not exceed 6.
5. A triangulation of a set of points P is called a Pitteway triangulation if, for each triangles T with vertices a, b and c, every point in T has one of a, b or c as its nearest neighbor among the points in P.
   (a) Show by example that not every Delaunay triangulation is a Pitteway triangulation.
   (b) Characterize those Delaunay triangulations that are Pitteway triangulations.

Hand in your solutions at the latest on the **11/12**.