**Exercise T1** (Delone triangulations)  
(5 points)
Show that if every \((n + 2)\)-element subset of \(S \subset \mathbb{R}^n\) does not lie on a common \((n - 1)\)-sphere, then the lifted polyhedron \(P(S)\) is simple and therefore every Voronoi region is simple. Deduce that the Delone subdivision \(DS(S)\) of \(S\) is a triangulation.

**Exercise T2** (projective transformation to a polytope)  
(Bonus: 5 points)
Let \(S \subset \mathbb{R}^n\) be a finite point set, \(\pi\) be the projective transformation introduced in the lecture and \(P(S) \subset \mathbb{R}^{n+1}\) the polyhedron whose vertical projection is the Voronoi diagram \(VD(S)\). Show that the closure of the image \(PS = \pi(P(S))\) is a polytope, under the assumption that \(0 \in S\) and for all \(x \in VR_S(0)\) holds \(||x|| \leq 1\).

**Exercise T3** (Voronoi diagrams w.r.t the Chebyshev distance)  
(5 points)
Draw the Voronoi diagram of
\[
S = \left\{ \left( \begin{array}{c} 0 \\ 0 \end{array} \right), \left( \begin{array}{c} 2 \\ 1 \end{array} \right), \left( \begin{array}{c} -1 \\ 3 \end{array} \right), \left( \begin{array}{c} -3 \\ -3 \end{array} \right), \left( \begin{array}{c} 3 \\ -2 \end{array} \right), \left( \begin{array}{c} 0 \\ -4 \end{array} \right) \right\}.
\]

w.r.t the Chebyshev distance also known as maximum metric. Show that this Voronoi diagram is not the orthogonal projection of the boundary complex of a polytope.

**Exercise T4** (random points)  
(Bonus: 10 points)
Write a polymake/perl script (or a C++ client) that computes a Floating-point-approximation of the volume of a not-necessarily full-dimensional simplex. Extend your script/client such that it computes the volume of an arbitrary bounded polytope.  
*Please hand in your code via e-mail at schroeter@math.tu-berlin.de not later than June 15. A template will be available: at the homepage of the course.*