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Exercise for the lecture
Algorithms for Radio Networks
Winter 2011/12
Sheet 2

EXERCISE 2:
Voronoi Diagram
Consider following coordinates given in a spherical coordinate system.

$M_1 : 47.993713, 7.848775$
$M_2 : 47.997159, 7.842300$
$M_3 : 47.984902, 7.820204$
$M_4 : 48.029772, 7.843194$
$M_5 : 48.031149, 7.862259$
$S_1 : 47.998178, 7.842883$
$S_2 : 47.996786, 7.852042$
$S_3 : 47.993350, 7.848588$
$B_1 : 47.994122, 7.848528$
$B_2 : 48.030109, 7.843840$

For simplification you should assume all coordinates are on an even plane and use them as if they were Cartesian coordinates.

1. What is the convex hull of this pointset?

2. Which of these points has the largest bounded Voronoi region?

Weighted Voronoi Diagram
In a weighted Voronoi-diagram all points p have a weight $w(p) > 0$
A point is in the Voronoi-region of p if:
$\forall q \in V \setminus \{p\} : |x, p|w(p) < |x, q|w(q)$
Consider the region bounded by this polygon:

P1 48.000059, 7.843029
P2 47.996628, 7.839965
P3 47.990927, 7.853504
P4 47.997561, 7.856036

1. For $w(M_i) = 3, w(B_i) = 4, w(S_i) = 1$ Give the proportional area inside the polygon, that the voronoy regions of the M,B and S points occupy. Consider only M,B,S-points that are inside the region!

2. Is a weighted Voronoi diagram always convex?