Lehrstuhl für Informatik I
Effiziente Algorithmen und
wissensbasierte Systeme
Universität Würzburg

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Dr. Joachim Spoerhase
M.Eng. Dongliang Peng

Homework Assignment #3
Computational Geometry (Winter Term 2016/17)

Exercise 1

Let guardians be positioned such that they see the complete boundary of a polygon. Does that mean they can also see the complete interior of the polygon? **[5 points]**

Exercise 2

Let P be a simple polygon with n vertices, which has been partitioned by an arbitrary number of non-intersecting diagonals into a set of subpolygons. Prove that the sum of the vertices number of the subpolygons is $O(n)$. **[5 points]**

Exercise 3

Give an algorithm that computes a diagonal in $O(n \log n)$ time, so that the diagonal splits a simple polygon with n vertices into two simple polygons each with at most $\lfloor 2n/3 \rfloor + 2$ vertices.

Hint: You can use the fact that there is an algorithm (which will be presented in the next lecture) that computes a triangulation of a simple polygon in $O(n \log n)$ time. You may use the dual graph of a triangulation. (Every triangle in the triangulation is represented as a node in the dual graph. Two nodes are connected with an edge if the corresponding triangles share an edge.) **[10 points]**

This assignment is due at 10:15 on November 16. Solutions will be discussed in the tutorial on Friday, November 18, 14:15–15:45 in room SE I.