TECHNISCHE UNIVERSITÄT
KAISERSLAUTERN

Department of Computer Science
AG Algorithms and Complexity

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10th Exercise sheet for
Advanced Algorithmics, SS 15

Hand In: *Until Wednesday, 01.07.2015, 12:00am, in lecture, exercise sessions, hand-in box in stairwell 48-6 or via email.*

Problem 27

Modify the algorithm CONTRACTION as follows. Instead of randomly choosing an edge and contracting, randomly choose two vertices x, y and identify them into one vertex.

Prove that for some (infinite class of) graphs, the probability that this modified algorithm finds a minimal cut is exponentially small in the number of vertices n.

Problem 28

   a) Assume you have access to an oracle that can determine in polynomial time and for arbitrary graphs which size a minimal VERTEX COVER has. How can you use it to construct a minimal VERTEX COVER in polynomial time?

   b) Does the approach from a) also work for factorising integers? Why (not)?

   c) Argue why problems for which the method from a) is effective are often amenable to branch-&-bound algorithms.

Problem 29

Give a (deterministic) 2-approximation for MAXIMUM SUBGRAPH (cf. Problem 19).