Technische Universität München
Fakultät für Informatik
Lehrstuhl für Effiziente Algorithmen
Prof. Dr. Harald Räcke
Chintan Shah

Summersemester 2014
Übungsblatt 11
June 30, 2015

Efficient Algorithms and Datastructures II

Aufgabe 1 (10 Punkte)

In the maximum k-cut problem, we are given an undirected graph $G = (V, E)$, and non-negative weights $w_{ij} \geq 0, \forall (i, j) \in E$. The goal is to partition the vertex set V into k parts $V_1, \ldots, V_k$ so as to maximize the weights of all edges whose endpoints are in different parts (i.e., $max_{(i,j)\in E: i\in V_a, j\in V_b, a\neq b} w_{ij}$). Give a randomized $\frac{k-1}{k}$ approximation algorithm for the maximum k-cut problem.

Aufgabe 2 (10 Punkte)

Derandomize the above algorithm.

Aufgabe 3 (10 Punkte)

Using randomized rounding and First Fit, give a randomized polynomial-time algorithm for the bin-packing problem that uses $\rho \cdot OPT + k$ bins for some $\rho < 2$ and some small constant k.