# 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 nonnegative weights $w_{i j} \geq 0, \forall(i, j) \in E$. 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., $\max _{(i, j) \in E: i \in V_{a}, j \in V_{b}, a \neq b} w_{i j}$ ). 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 $\rho \cdot O P T+k$ bins for some $\rho<2$ and some small constant $k$.

