Institut for Matematik og Datalogi
Syddansk Universitet

November 25, 2005
JFB

DM19 – Algorithms and Complexity
E05 – Lecture 12

Announcement 1

Instruktorater
Hjælp dine medstuderende, dygtiggør dig selv og få penge for det. Søg i dag! Der er normalt relativt få ansøgere, så det er ofte muligt at få et instruktorat, selv om man ikke er langt i studiet. Hvis du har spørgsmål, så henvend dig gerne på IMADA. Ansøgningsproceduren er beskrevet på www.jobs.sdu.dk. Hvis du allerede er ansat som instruktor i foråret 2005, leverer du ansøgning om tildeling af timer ind på IMADA's sekretariat (se opslag). Ansøgningsfrist: 6. december 2004 kl. 12:00.

Announcement 2

Der holdes pizzamøde for alle studerende tirsdag d. 29/11 kl. 16.00 - 18.00 i U20 og U24. Følgende punkter vil blive taget op: Generel information om speciale-/bachelorstudiet, Orientering om planlagte valgfri kurser i matematik og datalogi samt om mulige speciale- og bachelorprojekter. Endvidere eventuelle "ønsker" fra de studerende. Til slut vil der være gratis pizza, øl og sodavand til de fremmødte.

Lecture, November 23

We continued with approximation algorithms from chapter 35 in the textbook, finishing through section 35.3 and also covering section 35.5.

Lecture, November 30

We will finish with approximation algorithms from chapter 35 in the textbook (section 35.4, especially Theorem 35.6) and randomized rounding for MAX-SAT from the notes from Motwani and Raghavan's book *Randomized Algorithms*. We will also begin on branch-and-bound from the notes by Jens Clausen.

Lecture, December 7

We will finish with branch-and-bound from the notes and begin on heuristics (also from the notes), covering up through and including section 10.4.2 on genetic algorithms.

Problems to be discussed in week 48

1. 35.4-1, 35.4-2, 35.4-3, 35.4-4.

2. 35-2. (Note that these k-tuples can have repeated vertices. In the second part, just try for "polynomial", rather than "fully polynomial".)

3. A 0-1 integer linear programming formulation of MAX-SAT is as follows: Let F be a CNF formula with clauses $C_1, C_2, ..., C_m$. Let C_j^+ be the set of indices of vaiables that appear uncomplemented in clause C_j, and C_j^- be the set of indices of the complemented variables in C_j.

$$\text{maximize} \sum_{j=1}^{m} z_j$$

subject to

$$\sum_{i \in C_j^+} y_i + \sum_{i \in C_j^-} (1 - y_i) \geq z_j \quad (\forall j)$$

$$y_i, z_j \in \{0, 1\} \qquad (\forall i \text{ and } j)$$

In the linear relaxation, the variables y_i and z_j are only restricted to be in the interval $[0, 1]$. Why would one use randomized rounding here rather than simple rounding as for Weighted Vertex Cover in the textbook?