Institut for Matematik og Datalogi — May 10, 2006
Syddansk Universitet — JFB

On-Line Algorithms – F06 – Lecture 15

Announcement

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 sprgsmål, så henvend dig gerne på IMADA. Ansøgningsproceduren er beskrevet på www.jobs.sdu.dk. Hvis du allerede er ansat som instruktor i efteråret 2006, leverer du ansøgning om tildeling af timer ind på IMADA's sekretariat (se opslaget omkring bilag mm.). Ansøgningsfrist: 24. maj 2006 kl. 12:00.

Announcement

There will be a ”pizza-meeting” for all students of Imada on Thursday, May 18 at 16.00-18.30 in room U49. At the meeting Imada will give general information on the Bachelor and Candidate studies, and specific information on the elective courses in Mathematics and Computer Science planned for the next semester. The meeting will end with a free pizza, beer, and soft drink session.

Lecture, May 10

We finished section 12.2 of chapter 12 and barely began on section 12.3.

Lecture, May 17

We will finish section 12.3 and cover the Robin Hood algorithm of section 12.4. We may have time to go on to section 13.5.

Lecture, May 24

We will finish section 13.5 and have a review for the exam if you have any questions.

Problems for May 16

1. (Easy) Show that the makespan problem for identical machines is NP-hard.
2. Suppose that GREEDY is allowed n identical machines, while OPT is only allowed to use $m < n$ machines. Give a sequence showing that the ratio of GREEDY's performance to OPT's can be at least $1 + \frac{m-1}{n}$ for the makespan problem. Then show that GREEDY can always achieve this ratio against such a bounded OPT.
3. Consider remark 12.1 on page 208. What is meant here? Why is there no problem if the loads can be greater than 1? (Do not try to prove the desired result for loads of at most 1.)
4. Define POST-GREEDY with release dates as the algorithm which assigns a new job (given at its release date) to the first processor which becomes free. (Jobs have processing times which may be unknown, and only one job may be running on a processor at a time. There are m processors.) Show that POST-GREEDY is $(2 - \frac{1}{m})$-competitive.
5. Prove Corollary 12.8.
6. Exercise 12.5.

Problems for May 23

1. Exercise 12.10.
2. Prove that the Next-Fit algorithm for Classical Bin Packing has competitive ratio 2. The Next-Fit algorithm maintains one open bin. If an item fits in that bin, it is put there. Otherwise, that bin is closed and a new, empty bin is opened and the item is put there.
3. Exercise 13.9.

4. Exercise 13.10 – Just do the first part, ignoring everything after "Hence".
5. Exercise 13.11.