Institut for Matematik og Datalogi
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May 12, 2005
JFB

On-Line Algorithms – F05 – Lecture 14

Lecture, May 10

We looked at the algorithms in sections 10.6 and 10.7, but skipped the proofs. Then we covered through section 12.2.2 of chapter 12.

Lecture, May 17

We will finish chapter 12 and begin on section 13.5.

Lecture, May 24

We will finish up through Theorem 13.9 of section 13.5 and cover the first article on the relative worst order ratio (on the Web page for the course). q

Problems for May 23

1. In section 10.2.2, there is an example where the Greedy algorithm does miserably. How does the WFA perform on this example?

2. Exercise 10.8.

3. (Easy) Show that the makespan problem for identical machines is NP-hard.

4. 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.

5. 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.)

6. 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.

7. Prove Corollary 12.8.

8. Exercise 12.5.