Institut for Matematik og Datalogi
Syddansk Universitet

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JFB

# On-Line Algorithms – F04 – Lecture 13

## Lecture, April 28

We covered through section 10.4 of chapter 10. We considered the algorithms in sections 10.6 and 10.7, but skipped the proofs. Then we covered through section 12.1 of chapter 12.

## Lecture, May 5

We will cover section 12.2 of chapter 12.

## Lecture, May 12

We will continue with chapter 12.

## Problems for Monday, May 10

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 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.