Institut for Matematik og Datalogi
Syddansk Universitet

May 5, 2009
JFB

On-Line Algorithms – F09 – Lecture 5

Lecture, April 29

After finishing the problems, I lectured, finishing chapter 2 in the textbook.

Lecture, May 1

Kim Skak Larsen lectured on chapter 3 and up through Theorem 4.1 in chapter 4 in the textbook.

Lecture, May 4

After finishing the problems, I lectured, introducing chapters 6, 7, and 8, and began on chapter 6.

Lecture, May 6

Kim Skak Larsen will finish chapter 4 and I will finish chapter 6 of the textbook.

Lecture, May 13

We will begin looking at the paper, "The relative worst order ratio applied to paging", by J. Boyar, L.M. Favrholdt, and K.S. Larsen, in *Journal of Computer and System Sciences*, volume 73, pages 817–843, 2007. You get this through the electronic journals SDU's library has.

Problems for May 15

1. Do Exercise 4.2 in the textbook.

2. Do Exercise 4.3 in the textbook (for $h = k$).

3. Do Exercise 4.5 in the textbook.

4. Do Exercise 4.6 in the textbook.

5. Consider an optimal offline paging algorithm. Find arbitrarily long request sequences with more than k pages for which OPT faults an arbitrary number of times, but it does not help OPT if it has more than k pages in its fast memory (i.e. OPT should have the same number of page faults with k pages as it would have with more pages).

6. Consider an algorithm with look-ahead s, meaning that when deciding what to do about the current page request, the algorithm can see the next s requests before deciding what to do.

   - Prove that any such deterministic algorithm has competitive ratio at least k.
   - Consider LRU(s), the algorithm which uses the LRU rule, ignoring (and never evicting) any page in the next s requests. Show that it does at least as well as LRU on any request sequence (assuming they start with the same pages in fast memory). This is not so easy.