Institut for Matematik og Datalogi
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JFB

On-Line Algorithms – F10 – Lecture 5

Lecture, April 23

Kim Skak Larsen covered chapter 3 in the textbook and through Theorem 4.1 of chapter 4.

Lecture, April 29, in U49

Kim Skak Larsen will finish chapter 4 in the textbook and I will finish chapter 2 and begin on chapter 6 (introducing chapters 6, 7, and 8).

Lecture, May 6

We will cover chapter 6 in the textbook and possibly 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. In section 2, we will initially only consider definitions 1 and 2 and skip the others. Next we will cover up through Corollary 3 of section 4, and then section 6.

Problems for May 7

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.