Institut for Matematik og Datalogi
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JFB

On-Line Algorithms – F05 – Lecture 5

Lecture, March 1

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

Lecture, March 8

Kim Skak Larsen will finish chapter 4 in the textbook, and I will begin on chapter 6.

Lecture, March 15

We will finish chapter 6 and may begin looking at the article "The relative worst order ratio applied to paging", at http://www.imada.sdu.dk/~joan/online/paging.pdf. In section 2, we will initially only consider definitions 1 and 2 and skip the others. Next we will cover Lemmas 6 and 7 and Theorem 5, followed by Lemmas 3, 4, and 5 and Theorem 4. Then we will cover section 5.

Problems for March 14

1. Do Exercise 4.2 in the textbook.
2. Do Exercise 4.3 in the textbook.
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 it does not help OPT if it had 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).