Institut for Matematik og Datalogi
Syddansk Universitet

February 18, 2014
JFB

On-Line Algorithms – F14 – Lecture 5

Lecture, February 13

Kim Skak Larsen lectured on chapter 3 and covered put through Theorem 4.1 in chapter 4.

Partial lecture, February 17

We finished chapter 2, covering RMTF and COMB.

Lecture, February 19

Kim Skak Larsen will finish chapter 4.

Lecture, February 24, 15:15-16

We will cover chapter 6 in the textbook.

Problems for February 27

1. Do Exercise 4.2 in the textbook.
2. Do Exercise 4.5 in the textbook.
3. Do Exercise 4.6 in the textbook.
4. Let OPT_k denote OPT using a cache of size k. Consider the function

   $$f(\sigma) = \min\{k \mid \forall k' > k : \mathrm{OPT}_{k'}(\sigma) = \mathrm{OPT}_k(\sigma)\}$$

   The function gives the smallest cache size for which it does not help OPT to get a larger cache. Try to define f without any reference to OPT, i.e., by only considering properties of σ.

5. 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).