

DM205 – On-Line Algorithms – Lecture 8

Lecture, September 23

- Started on “The Relative Worst Order Ratio Applied to Paging” (available via the course home page).

In section 2, we considered Definitions 1 and 2 and skipped the others. Next, we covered up through Corollary 3 of Section 4, and then Section 6.

Lecture, September 28

- Finishing “The Relative Worst Order Ratio Applied to Paging”.

We will cover Sections 3 and 6, the definitions for relatedness and weakly comparable in Section 2, and Theorem 7 of Section 5.

Lecture, October 4

- Borodin & El-Yaniv, Chapter 6 and 7, skipping most proofs.

Exercises, October 5

All references are to “The Relative Worst Order Ratio Applied to Paging”.

1. In the definition of RLRU, in the case where p is requested, but there is no fault, the algorithm only marks the next page if it is different from the previous. What happens to the results on RLRU if this check is removed and the page is always marked? What if it is never marked?
2. In the definition of RLRU, what if you change the condition starting a new phase to be “the $(k + 2)$ nd different page since the start of the last phase was found” or “this was the $(k + 2)$ nd fault since the start of the last phase”? What happens to the results on RLRU?
3. How would you define a “strict relative worst order ratio”?

4. Using relative worst order analysis, compare First-Fit and Worst-Fit for the classical bin packing problem (trying to minimize the number of bins used). Worst-Fit is the algorithm which places an item in the most empty open (already used) bin, if it fits in any open bin. Otherwise it opens a new bin.