INFORMATIK

Universität
des
Saarlandes
FR 6.2 Informatik

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Exercises for Online- and Approximation-Algorithms

4. Assignment Due 9. June 2005

Exercise 1 (*Self-organizing lists and randomization,* 6 *Points*)
Consider the algorithm RMTF: Upon a request for an item x, move x to the front with probability 1/2. Argue that RMTF is asyptotically not better than 2-competitive against an oblivious adversary. Hint: compare RMTP to MTF on a suitable input sequence.

Exercise 2 (*Coding using MTF,* 3 *Points*)
Give an example for a text of length $k \geq |\sum| = n$ where the coding with MTF does not result in any savings. In your example can you save more than a constant factor by choosing the initial list order randomly?

Exercise 3 (*Bin packing,* 3 *Points*)
Given n items with sizes $a_1, \ldots, a_n \in (0, 1]$ find a packing in unit-sized bins that minimizes the number of bins used. The online alg. FF (First-Fit) does the following: If there is an open bin that still can accomodate an arriving item i then put i into that bin. Otherwise open a new bin and put i in there. Show that FF is 2-competitive.