

On-Line Algorithms – F14 – Exam

The material you are responsible for with respect to the exam is as follows:

- *On-line Computation and Competitive Analysis*, by Allan Borodin og Ran El-Yaniv: Chapters: 1, 2, 3, 4, 6, 7, 8, 10.1-10.4, 10.6, 12.1-12.2
- The relative worst order ratio applied to paging, by Joan Boyar, Lene M. Favrholdt og Kim S. Larsen. *Journal of Computer and System Sciences*, 73, 818-843, 2007
- Problems from lecture notes.

The “questions” (topics) for the exam are listed below. Emphasis should be on the analyses and proofs in the following:

1. List accessing with emphasis on **TIMESTAMP**
2. Randomized algorithms for list accessing
3. Upper bounds for marking algorithms and lower bounds for paging in general
4. The paging algorithm **RAND**
5. The paging algorithm **MARK**
6. The relative worst order ratio for paging: definitions and look-ahead.
7. The relative worst order ratio for paging: **RLRU**.
8. **K-server** algorithms on the line
9. Memoryless paging algorithms with emphasis on mixed algorithms
10. Using Yao’s principle to prove a lower bound on randomized paging

11. The algorithm GREEDY for the identical and the restricted machine model for load balancing

The sign-up list cannot be used to exactly calculate an exam time since some students may not show up. Since, as for all classes, the external examiner is only paid for students who are examined, not for sitting and waiting, if a student is not there, the next student on the list who is present will be taken. When there are no more students ready to be taken, the external examiner may leave, so show up plenty early to make sure you are examined. Two hours before your expected exam time is probably safe enough.

You will draw a topic from the list of topics listed above. You will have 30 minutes to prepare your presentation. During this time you may use the book and your notes. You may also make short notes that will help you to organize your presentation, but that will have no other technical content. The exam will take about 30 minutes per person. Prepare your presentation so that it takes about 10 to 15 minutes. Make sure you cover the most important ideas from your topic, though this may mean that you need to skip some details. Your presentation may be interrupted with questions or cut short to go on to other topics. Towards the end of the 30 minute period, you will typically also be asked short questions not related to the material you talked about. You may do your presentation in either Danish or English (though Danish is recommended if that is your native language).