INFORMATIK

Universität
des
Saarlandes
FR 6.2 Informatik

Dr. Ulrich Meyer **WS 2003/4**

Exercises for Parallel and Distributed Algorithms

4. Assignment Due 24. Nov. 2003

Exercise 1 (3 *Points*)
Show that a CRCW PRAM algorithm that takes t steps, p PUs, and uses m memory cells can be simulated on an EREW PRAM in $O(t(m^\epsilon + \log p))$ time with $O(pt)$ operations for any fixed $\epsilon > 0$.
Hint: Let the PUs generate "Read- and Writerequests" and sort these with appropriate keys.

Exercise 2 (2 *Points*)
When merging two sorted sequences A and B we identified subproblems by ranking some elements from A in B and vice versa. Show that these subproblems do not overlap (i.e., show the arrows in the respective picture can't cross).

Exercise 3 (2 *Points*)
Assume you want to rank each element of an unordered set A of size $O(\log n)$ in an ordered set B of size n. Show how to do this in time $O(\log n)$ on an EREW PRAM.

Exercise 4 (1^* *point*)
Ask your favorite question concerning the content of the previous lectures.