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PhD state exam

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Reply-To: pavel.tvrdik@fit.cvut.cz

To: Dzmitry Makatun <d.i.makatun@gmail.com>

On 06/10/15 15:29, Dzmitry Makatun wrote:

Dear prof. Tvrđik,

I am preparing for the state PhD exam now and would like to ask you what is the scope of the topics or a list of questions that I should renew from your subject. Could you, please, provide some recommendations for the preparation. Thank you in advance.

The exam scope is defined by the following FSE thematical areas:

Criteria for evaluating the complexity of parallel computations. Optimal and scalable algorithms, isoefficiency functions.

Parallel Random Access Machine models and their simulations.

Interconnection networks for parallel computers (taxonomy, properties, direct interconnection networks – orthogonal and sparse hypercubic networks, multistage indirect networks). Embedding, simulation and computational equivalence of interconnection networks.

Routing algorithms, flow control techniques, the deadlock problem and its solution.

Collective communication operations (permutation, one-to-all and all-to-all broadcast and scatter, multicast) in orthogonal and hypercubic networks (lower and upper complexity bounds, optimality).

Fundamental parallel algorithms on PRAMs and networks of computers (parallel reduction and parallel prefix scan of an array and of a linked list, Euler tour technique).

Parallel sorting networks, 0-1 sorting lemma. Mesh and hypercubic parallel sorting algorithms.

Parallel algorithms for linear algebra (matrix transposition, matrix-vector multiplication, matrix-matrix multiplication, solving systems of linear equations).

Parallel algorithms for combinatorial search. Parallel branch-and-bound search.

I assume that you have my lecture notes book in English.

Pavel Tvrđik