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Foreword

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This issue consists of five articles which are based on research papers selected from those presented at the International Conference on Database Theory (ICDT) 2007. The conference took place in Barcelona, Spain, January 10–12, 2007, and had a program consisting of 25 papers. The authors of the selected papers were asked to significantly extend their work to include substantially new material, and all submissions went through a thorough review process.

Motivated by considerations from Data Privacy, *Query evaluation on a database given by a random graph* by Nilesh Dalvi studies asymptotic conditional probabilities of conjunctive queries over sparse relational databases. In a nutshell, it is interested in the probabilities of facts expressed by a conjunctive query assuming the knowledge of a conjunctive view over the underlying database. The paper shows that these asymptotic conditional probabilities always exist, it exhibits explicit formulas for them, and studies the (non-trivial) computational complexity of their computation.

Database query processing using finite cursor machines by Martin Grohe, Yuri Gurevich, Dirk Leinders, Nicole Schweikardt, Jerzy Tyszkiewicz and Jan Van den Bussche introduces and studies a computational model, Finite Cursor Machines, which is intended to model cursor-based algorithms where each cursor is allowed to scan sequentially through some relation of a database. The paper provides non-trivial upper and lower bounds on the internal memory needed to compute relational algebra queries. In particular, it shows that every query of the semijoin algebra (where joins are restricted to semijoins) can be computed without internal memory if intermediate sorting is allowed, but there exists a simple semijoin query that cannot be computed with sub-linear memory in the absence of intermediate sorting.

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The other three articles are concerned with semistructured data and XML. *Axiomatizing the logical core of XPath 2.0* by Balder ten Cate and Maarten Marx defines a clean and meaningful abstraction, Core XPath 2.0, of the navigational part of the XML query language XPath 2.0. The main contribution is a complete equational axiomatization of query equivalence for this language. Such an axiomatization can turn out very useful for the optimization of XPath queries, in particular, it might help to rewrite queries with FOR-loops into equivalent but more efficient queries without FOR-loops.

Whereas this paper uses a set-based semantics for XML query languages, *Structural recursion as a query language on lists and ordered trees* by Edward L. Robinson, Lawrence V. Saxton, Dirk van Gucht and Stijn Vansummeren investigates an approach based on lists and ordered trees. It studies a query language $\mathcal{NTL}$ similar to XQuery but with a cleaner and simpler structural recursion mechanism with vertical recursion along the tree structure and horizontal recursion along lists of trees. The authors show that the resulting language captures exactly the queries that can be computed in primitive recursive time. Thus the language is quite powerful but avoids the Turing completeness of XQuery. By generalizing ideas of Caseiro for unordered trees, a fragment of $\mathcal{NTL}$ is found which exactly captures the polynomial time computable queries.

A combination of relational and semistructured database theory can be found in *Modulo constraints and the complexity of typechecking XML views* by Jerzy Marcinkowski and Piotr Wieczorek. This work shows an elementary upper bound for the problem to test whether a given transformation from relational databases to XML always produces valid documents with respect to a given type specification. For the transformation and the type specification language considered only non-elementary upper bounds were known before. The main step of the proof yields a complexity result for the satisfiability test of modulo constraints for conjunctive queries, which is interesting in its own right.

We would like to thank the authors for their efforts to extend the papers according to the high standards required for *Theory of Computing systems*, the conference and journal reviewers for their work, and the committee members for their help in selecting the papers.