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Nested Relations and Complex Objects in Databases

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EDITORS' FOREWORD

This volume was primarily intended to present selected papers from the workshop *Theory and Applications of Nested Relations and Complex Objects* held in Darmstadt (West Germany) on April 6-8, 1987. Other papers were solicited in order to provide a picture of the field as general as possible. All the articles were subjected to the usual reviewing process.

Research on nested relations and complex objects originated in the late seventies. The motivation was to obtain data models and systems which would provide support for so-called complex objects or molecular structures, i.e., for hierarchically organized data, thereby overcoming severe shortcomings of the relational model. This theme of research is now maturing. Systems based on those ideas are beginning to be available. Languages of various natures (algebras, calculi, graphical, logic-oriented) have been designed and a theory is slowly emerging. Finally, new developments in database technology and research are incorporating features of models involving complex objects. For instance, structured objects are important components of the so-called object-oriented database systems, and are also being introduced in rule-based languages. This, in turn, is leading to a variety of implementation issues and theoretical questions.

The primary goal of this volume is to present a snapshot of the research of a rapidly growing field. A variety of approaches is represented in this volume. Therefore, the classification of the articles is a difficult task. The organization we have used is clearly a matter of taste and somewhat arbitrary.

The first three papers present overviews of major pioneering implementation efforts. The paper of P. Pistor and P. Dadam covers the AIM project at IBM Heidelberg. The second paper, by Michel Scholl et al., describes the VERSO project developed at I.N.R.I.A. H.-J. Schek and Marc Scholl discuss two roles of nested relations in the DASDBS project of Darmstadt University. A fourth paper, by A. Deshpande and D. Van Gucht, is devoted to the important issue of implementation of storage structures.

The next three papers propose excursions in the foundations of nested relations and complex objects. The paper by R. Hull is a high-level introduction to the field. A second paper by S. Abiteboul, C. Beeri, M. Gyssens and D. Van Gucht is also an introduction, but deals with the dynamic component of the model, the languages. The paper focuses on the power of the languages. The paper by K. Takeda considers the problem of uniqueness of nesting.

The six papers which follow are all devoted to modeling of complex objects. R.H. Güting and R. Zicari consider the introduction of sequences of tuples, and W. Lamersdorf considers recursive objects. H.F. Korth and M.A. Roth study various query languages and V. Linnemann discusses the problem of recursive queries. Nested relational interfaces for relational and network databases are proposed by Y. Kambayashi, T. Furukawa and H. Yamamoto. Finally, the paper by R. Studer and S. Börner considers the handling of inheritance networks using nested relations.

The area of database design is represented by the last four papers. First, normalization based on nested relations is studied in depth by Z.M. Oszoyoglu and L.-Y. Yuan. Bridges to the Entity-Relationship model and to a semantic database model, respectively, are considered in the papers of C. Parent and S. Spaccapietra, and that of A. Heuer. M. Levene and G. Loizou propose a restructuring of γ-acyclic schemas into nested relations.

We believe that the material of this volume will permit a good overview of nested relations and complex objects for computer scientists who do not specialize in this and will be a valuable source of information for those already working in it. To conclude, we wish to thank the authors and the referees for their efforts.

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