# ADVANCES IN DATA BASE THEORY VOLUME 2

Edited by Hervé Gallaire Jack Minker Jean Marie Nicolas

### ADVANCES IN DATA BASE THEORY

Volume 2

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# ADVANCES IN DATA BASE THEORY

## Volume 2

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#### FOREWORD

This is the third book devoted to theoretical issues in databases that we have edited. Each book has been the outgrowth of papers held at a workshop in Toulouse, France. The first workshop, held in 1977 focused primarily on the important topic of logic and databases. The book, *Logic and Databases* was the result of this effort. The diverse uses of logic for databases such as its use as a theoretical basis for databases, for deduction and for integrity constraints formulation and checking was described in the chapters of the book.

The interest generated by the first workshop led to the decision to conduct other workshops focused on theoretical issues in databases. In addition to logic and databases the types of papers were expanded to include other important theoretical issues such as dependency theory which, although it sometimes uses logic as a basis, does not fit with our intended meaning of logic and databases explored at the first workshop. Because of the broader coverage, and because we anticipated further workshops, the second book was entitled, *Advances in Database Theory - Volume 1*. The book "Logic and Databases" should be considered Volume 0 of this series.

The current book, Advances in Database Theory - Volume 2, is an outgrowth of a workshop held in Toulouse, France, December 14-17, 1982. As with the earlier workshops, the meetings were conducted at the Centre d'Etudes et de Recherches de l'Ecole Nationale Superieure de l'Aeronautique et de l'Espace de Toulouse (C.E.R.T.). We are pleased to acknowledge the financial support received from the Direction des Recherches Etudes et Techniques de la Delegation Generale pour l'Armement (D.R.E.T.), and from C.E.R.T. that made the workshop possible.

As was the case for its predecessors, the chapters of this book are based on substantially revised versions of papers presented at the workshop. Each chapter included in the book was reviewed by at least three experts in the field — both individuals who attended the workshop and others who did not attend the workshop. In addition, every paper was reviewed by at least one of the editors who

FOREWORD

was responsible for recommending the paper for inclusion in the book. We are indebted to our referees for their thorough review and constructive comments made on the papers. Their comments served to substantially improve each paper.

This book, as well as the previous books, can be used as the basis of a graduate seminar in computer science. Students should have a first level course in database systems and some background in mathematical logic and algebra.

The book starts with an introductory section which summarizes achievements in each paper. Background material is not covered since it may be found partly in the introductions to the previous volumes and in books that have been published. Following this introduction, the chapters in the book are grouped into five sections devoted respectively to

- (1) Database Schema Design: Cycles and Decomposition
- (2) Integrity Constraints
- (3) Incomplete Information
- (4) Abstract Data Types for Formal Specifications and Views
- (5) Query Language Theory

Our grateful appreciation goes to Constance Engle who typed the the entire book. We also wish to thank Brenda Mauldin, Susan McCandless and Deven McGraw for their assistance with the book and in the development of the subject and name indexes. Support for work on the book was also provided by the Air Force Office of Scientific Research under AFOSR 01-5-28068, and from the National Science Foundation under NSF Grant 01-5-23247.

> H. Gallaire J. Minker J. M. Nicolas October 1983

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