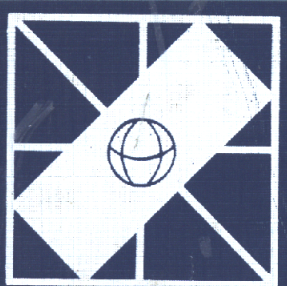
information systems: theoretical and formal aspects

edited by a. sernadas, j. bubenko, jr. and a. olivé



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INFORMATION SYSTEMS:

Theoretical and Formal Aspects

IFIP WG 8.1 Working Conference on
Theoretical and Formal Aspects of Information Systems
Sitges, Barcelona, Spain, 16-18 April, 1985

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Proceedings of the IFIP WG 8.1 Working Conference on
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Sitges, Barcelona, Spain, 16-18 April, 1985

Edited by

A. SERNADAS
The University of Lisbon
Lisbon
Portugal

J. BUBENKO, JR.
The University of Stockholm
Stockholm
Sweden

and

A. OLIVÉ
The Technical University of Barcelona
Barcelona
Spain

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PREFACE

I - Introduction

This volume contains the papers presented at the first working conference Theoretical and Formal Aspects of Information Systems (TFAIS 85). The need for such a conference was long ago recognized in the IFIP Working Group 8.1. After it was decided to schedule the conference in Barcelona, April 85, J. Bubenko agreed to become General Chairman, A. Sernadas Program Chairman and A. Olive Organizing Chairman.

Many people have contributed to the conference and to this volume. We enjoyed the cooperation of the Program Committee consisting of R. Balzer, D. Bjorner, M. Brodie, J. Bubenko jr., S. Ceri, T. Clement, A. Furtado, K. Furukawa, H. Gallaire, B. Hallassy, M. Jackson, H. Kangassalo, C. Kung, R. Lee, E. Lindencrona-Ohlin, J. Mylopoulos, E. Neuhold, J. Nicolas, A. Olive, C. Rolland, H. Schneider, J. Sifakis, A. Solvberg, R. Stamper, P. Stocker, Y. Vassiliou, K. Voss and A. Wasserman. Thanks are also due to many anonymous colleagues that participated in the reviewing process.

The following organizations provided much needed financial assistance: The IFIP, The Systems Development Laboratory (SYSLAB), the University of Lisbon, the Polytechnic University of Barcelona.

We are grateful to the authors for their willingness to adhere to the tight schedule necessary to produce this volume in time for distribution at the conference. Finally, we would like to thank the staff of North-Holland for their help in the preparation of the manuscript.

We received 71 submissions in response to the call for papers, representing authors from five continents. From these papers 15 were selected by the Program Committee.

We hope that you will find the papers included in this volume useful. But most important, we hope that they will stimulate further discussion.

Please note that following a suggestion by M. Brodie, in order to increase the unity and usefulness of the proceedings, the authors were requested to include a short final section on the relevance of their papers to the development of a formal theory of information systems.

II - Overview of the Contributions

Session 1 was entitled "Systems and Languages". Mark and Roussopoulos describe a new architecture framework based on the notions of self-describing and self-documenting databases. Demo, Dileva and Giolito present a query language for the manipulation of an entity-relationship database. Anderson and Claghorn describe a

system that allows the sharing of data layouts, formatting and representation conversions in addition to the sharing of data values.

Session 2 was entitled "Modeling Approaches I". Richter proposes an approach for dealing with the notion of time in system models which are based on general net theory. Pulse generators are introduced to the causal structure of the system instead of modifying the firing rule of Petri nets. Schiel introduces a framework for dealing with space and time objects. Space is a discrete set of points (entities), facts (relationships) and happenings (events). Time objects are either instants (points) or time-intervals.

Session 3 was entitled "Modeling Approaches II". Morgenstern introduces direct edge-labeled hypergraphs to help capturing information about explicit names for relationships and data dependencies. Such hypergraphs serve as named mappings between sets of attributes. Pletat defines a graphtheoretic semantics for the characteristic part of a data definition and manipulation language developed according to the entity-relationship modeling approach. Horndasch, Studer and Yasdi propose a methodology for the dynamic aspects of conceptual schema design for information systems. The information system is described by a behavior graph. Jansson introduces a conceptual framework providing a firm distinction between a generic description or pattern and the set of individuals fulfilling the pattern. The relations between declarative and procedural representations are analyzed.

Session 4 was entitled "Logical Frameworks". Lipeck, Ehrich and Gogolla present a temporal logic as a calculus for expressing integrity constraints which determine the admissibility of dynamic database behavior. Temporal formulas are interpreted in state sequences representing dynamic behavior. Carmo introduces a triggering causal branching logic of events that allows the specification of loosely connected information systems which communicate through messages. Veloso and Furtado propose a methodology for the formal specification of database applications, which is constructive and leads to simpler and shorter specifications. Kung presents a temporal framework for specifying and verifying information systems. The framework includes static and temporal constraints as well as the specification of operations.

Session 5 was entitled "Modeling Approaches III". Bracchi and Pernici propose a framework for the explicit specification of controls in office information systems through rules. Rules are applied to different types of controls to provide a guidance for structural system modifications. Finally, Flint and Leveson present a framework for expressing templates of database activity.

The Editors

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