Lecture Notes in Computer Science

Edited by G. Goos and J. Hartmanis

335

F.H. Vogt (Ed.)

CONCURRENCY 88

International Conference on Concurrency Hamburg, FRG, October 18–19, 1988 Proceedings



Springer-Verlag

Berlin Heidelberg New York London Paris Tokyo

Editorial Board

D. Barstow W. Brauer P. Brinch Hansen D. Gries D. Luckham C. Moler A. Pnueli G. Seegmüller J. Stoer N. Wirth

Editor

Friedrich H. Vogt Fachbereich Informatik, Universität Hamburg Bodenstedtstr. 16, D-2000 Hamburg 50, FRG

CR Subject Classification (1987): D.1.3, D.2.1, D.2.4, F.3.1-2, H.2.4, I.2.2

ISBN 3-540-50403-6 Springer-Verlag Berlin Heidelberg New York ISBN 0-387-50403-6 Springer-Verlag New York Berlin Heidelberg

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in other ways, and storage in data banks. Duplication of this publication or parts thereof is only permitted under the provisions of the German Copyright Law of September 9, 1965, in its version of June 24, 1985, and a copyright fee must always be paid. Violations fall under the prosecution act of the German Copyright Law.

© Springer-Verlag Berlin Heidelberg 1988 Printed in Germany

Printing and binding: Druckhaus Beltz, Hemsbach/Bergstr. 2145/3140-543210

Foreword

CONCURRENCY 88, the international conference on formal methods for distributed systems, was held October 18-19, 1988, in Hamburg, Federal Republic of Germany.

This conference was presented in connection with the annual conference of the German Society for Computer Science (GI), dedicated this year to complex and distributed systems.

CONCURRENCY 88 was held in response to great interest in the field of formal methods as a means to master the complexity of distributed systems. One of the goals of the conference was to compare and contrast various methodologies, such as constructive or property oriented. Major topics included the practical implications of formal specification techniques.

Particularly in Europe, proponents of different methods often consider themselves to be more or less competitors; investigation of possible integration, combination and unification of the various methodologies has been neglected. In the United States, on the other hand, the discussion and cooperation among representatives of different methods is considerably more prevalent.

The CONCURRENCY 88 addressed the following topics:

- Specification Languages
- Models for Distributed Systems
- Verification and Validation
- Knowledge Based Protocol Modelling
- Fault Tolerance
- Distributed Databases.

The presented papers include 12 invited, and 14 selected by the program committee. Contributions were presented by authors from Austria, the Federal Republic of Germany, France, Israel, Italy, the Netherlands, the United Kingdom and the United States.

Program Committee

- H. Barringer (U Manchester)
- M. Broy (U Passau)
- D. Hogrefe (U Hamburg)
- B. Mahr (TU Berlin)
- G. Roucairol (Louveciennes)
- R. Schwartz (Belmont)
- R. Valk (U Hamburg)
- F. Vogt (U Hamburg), chairman

Contents

Invited Papers 1
While Waiting for the Millennium: Formal Specification and Verification of Concurrent Systems Now (Abstract)
A Framework for the Synthesis of Reactive Modules
Modelling Knowledge and Action in Distributed Systems
Requirement and Design Specification for Distributed Systems 33 M. BROY (University of Passau, FRG)
Data Base Distribution and Concurrency for End-Users (Abstract) 63 R. SCHWARTZ (Borland International, Belmont, U.S.A.)
On Safety and Timeliness in Distributed Data Management 64 D. DOLEV, H. R. STRONG (IBM Almaden Research Center, San Jose, U.S.A.)
An Automata-Theoretic Approach to Protocol Verification (Abstract) .73 M. Y. VARDI (IBM Almaden Research Center, San Jose, U.S.A.)
On the Power of Cooperative Concurrency
Executing Temporal Logic: Review and Prospects (Abstract) 104 H. BARRINGER (The University of Manchester), D.GABBAY (Imperial College, London, U.K.)
A Graphical Representation of Interval Logic
Temporal Logic and Causality in Concurrent Systems
Data in a Concurrent Environment

Selected Papers	161
The Scope and Limits of Synchronous Concurrent Computation 1 K. MEINKE, J. V. TUCKER (University of Leeds, U.K.)	163
A Logic-Functional Approach to the Execution of CCS Specifications Modulo Behavioural Equivalences S. GNESI, P. INVERARDI, M. NESI (IEI-CNR, Pisa, Italy)	l 81
A Top-down Step-wise Refinement Methodology for Protocol Specification	l 97
A State Transformation Equivalence for Concurrent Systems: Exhibited Functionality-equivalence	222
External Behaviour Equivalence between two Petri Nets	237
Weighted Basic Petri Nets	257
Total Algorithms	277
Semantics of Real-time Distributed Programs	292
An Example of Communicating Production Systems	307
Assertional Verification of a Majority Consensus Algorithm for Concurrency Control in Multiple Copy Databases	320
Analysis of ESTELLE Specifications	335
Optimal Synchronization of ABD Networks	353
Adequacy-Preserving Transformations of COSY Path Programs 3 M. KOUTNY (The University of Newcastle upon Tyne, U.K.)	368
Deterministic Systems of Sequential Processes: Theory and Tools Y. SOUISSI (Bull Research Laboratory, Louveciennes), N. BELDICEANU, (MASI Laboratory, Paris, France)	380
·	401