The Theory and Practice ofConcurrency

- CONCUR 2010 - Concurrency Theory
- CONCUR 2006 - Concurrency Theory
- Introduction to Concurrency Theory
- CONCUR 2013 -- Concurrency Theory
- Transitions and Trees
- Communicating and Mobile Systems
- CONCUR 2001 - Concurrency Theory
- CONCUR '90: Theories of Concurrency: Unification and Extension
- Transition Systems and CCS Texts in Theoretical Computer Science An EATCS Series
- Theory and Practice of Concurrency
- The introduction of Hoare’s Communicating Sequential Processes notation, powerful new tools have transformed CSP into a practical way of describing industrial-sized problems. This book gives you the fundamental grasp of CSP concepts you’ll need to take advantage of those tools. Part I provides a detailed foundation for working with CSP, using as little mathematics as possible. It introduces the ideas behind operational, denotational and algebraic models of CSP. Parts II and III go into greater detail about theory and practice. Topics include: parallel operators, hiding and renaming, piping and enslavement, buffers and communication, termination and sequencing, and semantic theory. Three detailed practical case studies are also presented. For anyone interested in modeling sequential processes.

- CONCUR 2010 - Concurrency Theory
- This book presents the fundamentals of concurrency theory with clarity and rigor. The authors start with the semantic structure, namely labelled transition systems, which provides us with the means to understand how processes interact, and to compose them, and to prove properties they enjoy. The rest of the book relies on Milner’s Calculus of Communicating Systems, tailored versions of which are used to study various notions of equality between systems, and to investigate in detail the expressive power of the models considered. The authors proceed from very basic results to increasingly complex issues, with many examples and exercises that help to reveal the many subtleties of the topic. The book is suitable for advanced undergraduate and graduate students in computer science and engineering, and scientists engaged with theories of concurrency.

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- CONCUR 2006 - Concurrency Theory
- Introduction to Concurrency Theory
- This book deals with the problem of finding suitable languages that can represent specific classes of Petri nets, the most studied and widely accepted model for distributed systems. Hence, the contribution of this book amounts to the alphabetization of some classes of distributed systems. The book also suggests the need for a generalization of Turing computability theory. It is important for graduate students and researchers engaged with the concurrent semantics of distributed communicating systems. The author assumes some prior knowledge of formal languages and theoretical computer science.

- CONCUR 2013 – Concurrency Theory
- This book presents 12 papers on Petri nets and other models of concurrency, ranging from theoretical work to tool support and industrial applications. Covers model checking and system verification, synthesis, work on specific classes of Petri nets and more.

- Transitions and Trees
- This Festschrift volume, published in honor of Ugo Montanari on the occasion of his 65th birthday, contains 43 papers that examine the research areas to which he has contributed, from logic programming to software engineering, as well as his many achievements.

- Communicating and Mobile Systems
- Presents a collection of papers that were presented at the International Conference on Concurrency Theory covering such topics as logic, probabilistic systems, models of computation, and Petri nets.

- CONCUR 2001 - Concurrency Theory
- This book constitutes the refereed proceedings of the 9th International Conference on Concurrency Theory, CONCUR’98, held in Nice, France, in September 1998. The 35 revised full papers presented were carefully selected from a total of 104 submissions. Also presented are five invited contributions. Among the topics covered are computational and semantic issues, probabilistic models, Petri nets, event structures, real-time systems, hybrid systems, model checking, verification techniques, refinement, rewriting, typing systems, algorithmic issues, etc.

- CONCUR '90: Theories of Concurrency: Unification and Extension
- The semantics of concurrent systems is one of the most vigorous areas of research in theoretical computer science, but suffers from disagree ment due to different, and often incompatible, attitudes towards abstracting non-sequential behaviour. When confronted with process algebras, which give rise to very elegant, highly abstract and com positional models, traditionally based on the interleaving abstraction, some argue that the wealth of contribution they have made is partially offset by the difficulty in dealing with topics such as fairness. On the other hand, the non-interleaving approaches, based on causality, although easing problems with fairness and confusion, still lack structure, compositionality, and the elegance of the interleaving counterpart. Since both these approaches have undoubtedly provided important contributions towards understanding of concurrent systems, one should concentrate on what they have in common, rather than the way they differ. The International Workshop on Semantics for Concurrency held at the University of Leicester on 23-25 July 1990 was organised to help overcome this problem. Its main objective was not to be divisive, but rather to encourage discussions leading towards the identification of the positive objective features of
the main approaches, in the hope of furthering common understanding. The Workshop met with an excel lent response, and attracted contributions from all over the world. The result was an interesting and varied programme, which was a com bination of invited and refereed papers. The invited speakers were: Prof. dr. E. Best (Hildesheim University) and Prof. dr. A.

Application and Theory of Petri Nets and Concurrency This book constitutes the proceedings of the 38th International Conference on Application and Theory of Petri Nets and Concurrency, PETRI N ET S 2014, held in Tunis, Tunisia, in June 2014. The 15 regular papers and 4 tool papers presented in this volume were carefully reviewed and selected from 48 submissions. In addition the book contains 3 invited talks in full paper length. The papers cover various topics in the field of Petri nets and related models of concurrency.

CONCUR 2003 - Concurrency Theory This book constitutes the refereed proceedings of the 8th International Conference on Applications and Theory of Petri Nets and Other Models of Concurrency, ICATPN 2003, held in Siedlce, Poland. It covers all current issues on research and development in the area of Petri nets and modeling of concurrent systems including system design and verification, structure and behavior of nets, logical and algebraic calculi, and standardization of nets.

CONCUR 2012 - Concurrency Theory This book is the proceedings of the Structures in Concurrency Theory workshop (STRICT) that was held from 11th to 13th May 1995 in Berlin, Germany. It includes three invited contributions - by J. de Bakker, E. Best et al., and R. Oldenborgh and M. Scherke - and all papers which were submitted and accepted for presentation. Concurrency Theory deals with formal aspects of concurrent systems. It uses partly competing and partly complementary formalisms and structures. This workshop was to present and compare different formalisms and results in Concurrency Theory. STRICT was organized by the Humboldt-University Berlin and the ESF/BR Foundation Working Group CALIBRAN. Original papers had been sought from all scientists in the field of Concurrency Theory. The Programme Committee selected twenty contributions with various different topics, including Petri Nets, Process Algebra, Distributed Algorithms, Formal Semantics, and others. I am grateful to the Programme Committee and to the other referees for the careful evaluation of the submitted papers.

Structures in Concurrency Theory This book constitutes the refereed proceedings of the 23rd International Conference on Concurrency Theory, CONCUR 2014, held in Rome, Italy in September 2014. The 35 revised full papers presented together with 5 invited talks were carefully reviewed and selected from 124 submissions. The focus of the conference is on the following topics: process calculi, model checking and abstraction, synthesis, quantitative models, automata and multithreading, complexity, process calculi and types, categories, graphs and quantum systems, automata and time, and games.

Transactions on Petri Nets and Other Models of Concurrency I This book constitutes the refereed proceedings of the 12th International Conference on Concurrency Theory, CONCUR 2001, held in Aalborg, Denmark in August 2001. The 32 revised full papers presented together with six invited contributions were carefully reviewed and selected from 78 submissions. The papers are organized in topical sections on mobility, probabilistic systems, model checking, process algebra, unfoldings and prefixes, logic and compositional, and games.

Transactions on Petri Nets and Other Models of Concurrency VI This book constitutes the refereed proceedings of the 23rd International Conference on Concurrency Theory, CONCUR 2012, held in Newcastle upon Tyne, UK, September 4-7, 2012. The 35 revised full papers presented together with 4 invited talks were carefully reviewed and selected from 97 submissions. The papers are organized in topics such as reachability analysis; qualitative and timed systems; behavioural equivalences; temporal logics; session types; abstraction; mobility and space in process algebras; stochastic systems; probabilistic systems; Petri nets and non-sequential semantics; verification; decidability.

Transactions on Petri Nets and Other Models of Concurrency V This book constitutes the refereed proceedings of the 22nd International Conference on Concurrency Theory, CONCUR 2011, held in Aachen, Germany, September 5-10, 2011. The 32 revised full papers presented together with four invited contributions were carefully reviewed and selected from 94 submissions. The papers are organized in topics such as real-time systems, probabilistic systems, automata, separation logic, λ-calculus, Petri nets, process algebra and modeling, verification, games, and bisimulation.

Handbook of Process Algebra This volume contains revised and extended versions of a selection of key papers from workshops held at the 28th International Conference on Applications and Theory of Petri Nets and Other Models of Concurrency, which took place in Siedlce, Poland, June 2007.

CONCUR '94: Concurrency Theory This book constitutes the proceedings of the 10th International Conference on Concurrency Theory, CONCUR '94, held in Eindhoven, The Netherlands in August 1994. The 32 revised full papers presented together with four invited contributions were selected from a total of 91 submissions. The papers address all areas of semantics, logics, and verification techniques for concurrent systems, in particular process algebras, Petri nets, event structures, real-time systems, hybrid systems, stochastic systems, decidability, model-checking, verification, refinement, term and graph rewriting, distributed programming, logic constraints and programming, typing systems, etc.
Finite Transition Systems This is the first review of spatial uncertainty that moves outside the arena of geographical information systems. It tackles the prediction and interpolation of spatial phenomena, as well as examining uncertainty from linguistic and spatial perspectives.

Transactions on Petri Nets and Other Models of Concurrency V This book constitutes the refereed proceedings of the 16th International Conference on Concurrency Theory, CONCUR 2005, held in San Francisco, CA, USA in August 2005. The 38 revised full papers presented together with 4 invited papers were carefully reviewed and selected from 100 submissions. Among the topics covered are concurrency related aspects of models of computation, Petri nets, model checking, game semantics, process algebras, real-time systems, verification techniques, secrecy and authenticity, refinement, distributed programming, constraint logic programming, typing systems and algorithms, case studies, tools, and environment for programming and verification.

CONCUR '96: Concurrency Theory This volume constitutes the proceedings of the Fifth International Conference on Concurrency Theory, CONCUR '94, held at Uppsala, Sweden in August 1994. In total, 29 refereed research papers selected from 108 submissions for the conference are presented together with full papers or abstracts of the 5 invited talks by prominent speakers. The book contains recent results on all relevant aspects of concurrency research and thus competently documents the progress of the field since the predecessor conference CONCUR '93, the proceedings of which are published as LNCS 715.

Models of Computation This book constitutes the refereed proceedings of the 20th International Conference on Concurrency Theory, CONCUR 2010, held in Paris, France, August 31 - September 3, 2010. The 35 revised full papers were carefully reviewed and selected from 107 submissions. The topics include: - Basic models of concurrency such as abstract machines, domain theoretic models, game theoretic models, process algebras, and Petri nets. - Logics for concurrency such as modal logics, probabilistic and stochastic logics, temporal logics, and resource logics. - Models of specialized systems such as biology-inspired systems, circuits, hybrid systems, mobile and collaborative systems, multi-core processors, probabilistic systems, real-time systems, service-oriented computing, and synchronous systems. - Verification and analysis techniques for concurrent systems such as abstract interpretation, atomicity checking, model checking, race detection, pre-order and equivalence checking and run-time verification.

CONCUR'99: Concurrency Theory The theory of traces employs techniques and tackles problems from quite diverse areas which include formal language theory, combinatorics, graph theory, algebra, logic, and the theory of concurrent systems. In all these areas the theory of traces has led to interesting problems and significant results. It has made an especially big impact in formal language theory and the theory of concurrent systems. In both these disciplines it is a well-recognized and dynamic research area. Within formal language theory, it yields the theory of partially commutative monoids, and provides an important connection between languages and graphs. Within the theory of concurrent systems it provides an important formal framework for the analysis and synthesis of concurrent systems. This monograph covers all important research lines of the theory of traces; each chapter is devoted to one research line and is written by leading experts. The book is organized in such a way that each chapter can be read independently and hence it is very suitable for advanced courses or seminars on formal language theory, the theory of concurrent systems, the theory of semigroups, and combinatorics. An extensive bibliography is included. At present, there is no other book of this type on trace theory.

Application and Theory of Petri Nets and Concurrency This book constitutes the thoroughly refereed proceedings of the 24th International Conference on Concurrency Theory, CONCUR 2013, held in Buenos Aires, Argentina, August 27-30, 2013. The 34 revised full papers presented together with 4 invited talks were carefully reviewed and selected from 115 submissions. The papers are organized in topics such as process semantics and modal transition systems, VAS and pushdown systems, Pi calculus and interaction nets, linearizability and verification of concurrent programs, verification of infinite models, model measure and reversibility, stochastic models, message-based interaction processes, principles of automatic verification, and games and control synthesis.

Process Algebras for Petri Nets This book constitutes the refereed proceedings of the 8th International Conference on Concurrency Theory, CONCUR 97, held in Warsaw, Poland, in July 1997. The 24 revised full papers presented were selected by the program committee for inclusion in the conference in the volume from a total of 41 high-quality submissions. The volume covers all current topics in the science of concurrency theory and its applications, such as reactive systems, hybrid systems, model checking, partial orders, state charts, program logic calculi, infinite state systems, verification, and others.

CONCUR 2002 - Concurrency Theory This volume gives the proceedings of the conference CONCUR '99. This is the first conference organized by ESPRIT Basic Research Action 3006, CONCUR (Theories of Concurrency: Unification and Extension), started in September 1989. The principal aims of the action are to explore the relationships among the different approaches to algebraic concurrency theory, and to develop a formalism applicable to a wide range of case studies. The articles in this volume describe the state of the art in concurrency theory, the theory of communicating concurrent (or distributed) systems.

Models of Computation Structural operational semantics is a simple, yet powerful mathematical theory for describing the behaviour of programs in an implementation-independent manner. This book provides a self-contained introduction to structural operational semantics, featuring semantic definitions using big-step and small-step semantics of many standard programming language constructs, including control structures, structured declarations and objects, parameter mechanisms and procedural abstraction, concurrency, nondeterminism and the features of functional programming languages. Along the way, the text introduces and applies the relevant proof techniques, including forms of induction and notions of semantic equivalence (including bisimilarity). Thoroughly class-tested, this book has evolved from lecture notes used by the author over a 10-year period at Aalborg University to teach undergraduate and graduate students. The result is a thorough introduction that makes the subject clear to students and computing professionals without sacrificing its rigour. No experience with any specific programming language is required.

Automata, Languages and Programming In this book the authors introduce unfoldings, an approach to model checking which alleviates the state explosion problem by means of concurrency theory. They offer an introduction to the basics of the method and detail an unfolding-based algorithm for model checking concurrent systems against properties specified as formulas of linear temporal logic (LTL). The book will be of value to researchers and graduate students engaged in automatic verification and concurrency theory.

Semantics for Concurrency This book constitutes the refereed proceedings of the 19th International Conference on Concurrency Theory, CONCUR 2008, held in Toronto, Canada, August 19-22, 2008. The 33 revised full papers presented together with 2 tool papers were carefully reviewed and selected from 120 submissions. The topics include model checking, process calculi, minimization and equivalence checking, types, semantics, probability, bisimulation and simulation, real time, and formal languages.
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Unfoldings This book constitutes the refereed proceedings of the 27th International Colloquium on Automata, Languages and Programming, IC ALP 2000, held in Geneva, Switzerland in July 2000. The 69 revised full papers presented together with nine invited contributions were carefully reviewed and selected from a total of 196 extended abstracts submitted for the two tracks on algorithms, automata, complexity, and games and on logic, semantics, and programming theory. All in all, the volume presents an unique snapshot of the state-of-the-art in theoretical computer science.

Petri Nets and Other Models of Concurrency - I C TPN 2007 These Transactions publish archival papers in the broad area of Petri nets and other models of concurrency, ranging from theoretical work to tool support and industrial applications. ToPNoC issues are published as LNCS volumes, and hence are widely distributed and indexed. This journal has its own Editorial Board which selects papers based on a rigorous two-stage refereeing process. ToPNoC contains - Revised versions of a selection of the best papers from workshops and tutorials at the annual Petri net conferences - Special sections/issue within particular subareas (similar to those published in the Advances in Petri Nets series) - Other papers invited for publication in ToPNoC - Papers submitted directly to ToPNoC by their authors. The sixth volume of ToPNoC includes revised versions of selected papers from workshops and tutorials held at the 32nd International Conference on Application and Theory of Petri Nets and Concurrency. It also contains a special section on Networks, Protocols, and Services, as well as a contributed paper submitted through the regular submission track of ToPNoC. The 14 papers cover a diverse range of topics including model checking and system verification, synthesis, foundational work on specific classes of Petri nets, and innovative applications of Petri nets and other models of concurrency. Thus this volume gives a good view of ongoing concurrent systems and Petri net research.

CONCUR 2014 - Concurrency Theory In the world of concurrency, the norm, for example, the human body is a massively concurrent system, comprising a hughumber of cells, all simultaneously evolving and independently engaging in their individual biological processes. In addition, the biological world, truly sequential systems rarely arise. However, they are more common when man-made artefacts are concerned. In particular, computer systems are often developed from a sequential perspective. Why is this? The simple reason is that it is easier for us to think about sequential, rather than con. Current systems, thus. We thus consider concurrency as a device to simplify the design process. However, the need for increasingly powerful, flexible and usable computer systems mitigates against simplifying sequentiality assumptions. A good example of this is the all-powerful position held by the Internet, which is highly concurrent at many different levels of decomposition. Thus, the modern computer scientist (and indeed the modern scientist in general) is forced to think about concurrent systems and their interaction. Over a period of 25 years, or so, the field of concurrency theory has been involved in the development of a set of mathematical techniques that can help system developers think about and build concurrent systems. These theories are the subject matter of this book.

Concurrency Theory A Concise Introduction to Computation Models and Computability Theory provides an introduction to the essential concepts in computability, using several models of computation, from the standard Turing machines and Recursive Functions, to the modern computation models inspired by quantum physics. An in-depth analysis of the basic concepts underlying each model of computation is provided. Divided into two parts, the first highlights the traditional computation models used in the first studies on computability: - Automata and Turing machines; - Recursive functions and the Lambda-Calculus; - Logic-based computation models, and the second part covers object-oriented and interaction-based models. There is also a chapter on concurrency, and a final chapter on emergent computation models inspired by quantum mechanics. After the end of each chapter there is a discussion on the use of computation models in the design of programming languages.

CONCUR 2000 - Concurrency Theory This book constitutes the refereed proceedings of the 17th International Conference on Concurrency Theory, CONCUR 2000, held in Bonn, Germany in August 2000. The 29 revised full papers presented together with 5 invited papers were carefully reviewed and selected from 101 submissions. The papers are organized in topical sections on model checking, process calculi, minimization and equivalence checking, types, semantics, probability, bisimulation and simulation, real time, and formal languages.

CONCUR ’98 Concurrency Theory This volume contains the proceedings of the 11th International Conference on Concurrency Theory (CONCUR 2000) held in State College, Pennsylvania, USA, during 22-25 August 2000. The purpose of the CONCUR conferences is to bring together researchers, developers, and students in order to advance the theory of concurrency and promote its applications. Interest in this topic is continuously growing, as a consequence of the importance and ubiquity of concurrent systems and their applications, and of the scientific relevance of their foundations. The scope covers all areas of semantics, logic, and verification techniques for concurrent systems. Topics include concurrency related aspects of: models of computation, semantic domains, process algebras, Petri nets, event structures, real-time systems, hybrid systems, decidability, model-checking, verification techniques, refinement techniques, term and graph rewriting, distributed programming, logic constraint programming, object-oriented programming, type systems and algorithms, case studies, tools, and environments for programming and verification. The first two CONCUR conferences were held in Amsterdam (NL) in 1990 and 1991. The following ones in Stony Brook (USA), Hildesheim (DE), Uppsala (SE), Philadelphia (USA), Pisa (I), Warsaw (PL), Nice (F), and Eindhoven (NL). The proceedings have appeared in Springer LNCS, as Volumes 458, 527, 630, 715, 836, 962, 1119, 1249, 1466, and 1664.

CONCUR 2011 – Concurrency Theory This book constitutes the refereed proceedings of the 14th International Conference on Concurrency Theory, CONCUR 2003, held in Marseille, France in September 2003. The 29 revised full papers presented together with 4 invited papers were carefully reviewed and selected from 107 submissions. The papers are organized in topical sections on partial orders and asynchronous systems, process algebras, infinite systems, probabilistic automata, model checking, model checking and HMSC, security, mobility, compositional methods and real time, and probabilistic languages.

CONCUR 2005 - Concurrency Theory This book presents in their basic form the most important models of computation, their basic programming paradigms, and their mathematical descriptions, both concrete and abstract. Each model is accompanied by relevant formal techniques for reasoning on it and for proving some properties. After preliminary chapters that introduce the notions of structure and meaning, semantic methods, inference rules, and logic programming, the authors arrange their chapters into parts on IMP, a simple imperative language; HOFL, a higher-order functional language; concurrent, nondeterministic and interactive models; and probabilistic/stochastic models. The authors have class-tested the book content over many years, and it will be valuable for graduate and advanced undergraduate students of theoretical computer science and distributed systems, and for researchers in this domain. Each chapter of the book concludes with a list of exercises addressing the key techniques introduced, solutions to selected exercises are offered at the end of the book.

The Book of Traces First account of new theory of communication in computing which describes networks, as well as parts of computer systems.

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