This book constitutes the refereed proceedings of the 20th International Conference on Concurrency Theory, CONCUR 2009, held in Bologna, Italy, September 1-4, 2009. The 37 revised full papers presented together with four invited papers were carefully reviewed and selected from 129 submissions. The topics include model checking, process calculi, minimization and equivalence checking, types, semantics, probability, bisimulation and simulation, real-time, and formal languages.

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.

Process Algebra is a formal description technique for complex computer systems, especially those involving communicating, concurrently executing components. It is a subject that concurrently touches many topic areas of computer science and discrete math, including system design notations, logic, concurrency theory, specification and verification, operational semantics, algorithms, complexity theory, and, of course, algebra. This Handbook documents the fate of process algebra since its inception in the late 1970’s to the present. It is intended to serve as a reference source for researchers, students, and system designers and engineers interested in either the theory of process algebra or in learning what process algebra brings to the table as a formal system description and verification technique. The Handbook is divided into six parts spanning a total of 25 chapters. The organization is as follows. Part 1, consisting of four chapters, covers a broad swath of the basic theory of process algebra. Part 2 contains two chapters devoted to the sub-specialization of process algebra known as state-based processes, while the three chapters of Part 3 look at state-based processes, value-passing processes and mobile processes in particular. Part 4, also three chapters in length, explores several extensions to process algebra including real-time, probability and priority. The four chapters of Part 5 examine non-interleaving process algebras, while Part 6’s three chapters address process-algebra tools and applications.

This book constitutes the proceedings of the 10th International Conference on Concurrent Systems Theory, CONCUR’99, held in Eindhoven, The Netherlands in August 1999. 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 constraint programming, typing systems, etc.

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 regards, the theory of traces has led to many interesting problems and significant results. It has made a particularly important 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.

This book constitutes the refereed proceedings of the 22nd International Conference on Concurrency Theory, CONCUR 2011, held in Aachen, Germany, August 29-31, 2011. The 32 revised full papers were carefully reviewed and selected from 94 submissions. The papers are organized in terms such as real-time systems, probabilistic systems, automata, separation logic, π-calculus, Petri nets, process algebra and modeling, verification, games, and bisimulation.

This book constitutes the refereed proceedings of the 27th International Colloquium on Automata, Languages and Programming, ICALP 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.

This book constitutes the proceedings of the 35th International Conference on Application and Theory of Petri Nets and Concurrency, PETRI NETS 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.

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 and the tools to express processes, 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 equivalence for processes, with many examples, 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 exercises 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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In the new book *Concurrency and the Eigenvalue Criterion for Incidence Algebras*, the authors extend their previous work on the theory of automata and computing using incidence algebras. The book is primarily aimed at computer scientists, mathematicians, and researchers who are interested in the mathematical foundations of computer science.

The book is divided into three parts. The first part introduces the basic concepts of incidence algebras and their applications to computer science. The second part focuses on the use of incidence algebras in the study of automata and formal languages. The third part explores the use of incidence algebras in the analysis of algorithms and computational complexity.

This book is an excellent resource for anyone who wants to learn about the mathematical foundations of computer science. It is a must-read for students and researchers in the field.
This book constitutes the thoroughly 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 selected from 97 submissions. The papers are organized in topics such as reachability analysis, qualitative and timed systems; behaviour equivalences; temporal logics; session types; abstraction; mobility and space in process algebras; stochastic systems; probabilistic systems; Petri nets and non-sequential semantics; verification; decidability.

Since the introduction of Hoare's Communicating 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.

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.

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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. The 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/issues 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 nets research.

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.

This book presents their basic form of the most important models of computation, their basic programming paradigms, and their mathematical descriptions, both concrete and abstract. Each model is accompanied by relevant literature for reasoning about models 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.

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 5 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.

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, games 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.

This book constitutes the refereed proceedings of the 13th International Conference on Concurrency Theory, CONCUR 2002, held in Brno, Czech Republic in August 2002. The 32 revised full papers presented together with abstracts of seven invited contributions were carefully reviewed and selected from 101 submissions. The papers are organized in topical sections on verification and model checking, logic, mobility, probabilistic systems, models of computation and process algebra, security, Petri nets, and bisimulation.

This book constitutes the refereed proceedings of the 17th International Conference on Concurrency Theory, CONCUR 2006, held in Bonn, Germany in August 2006. 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.

This book constitutes the refereed 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 - plications, and of the scientific relevance of their foundations. The scope covers all areas of semantics, logics, and verification techniques for concurrent systems. Topics of interest include both theoretical aspects of models of computation, semantic domains, process algebras, Petri nets, event structures, real-time systems, hybrid systems, decidability, model-checking, verification techniques, re/nement te- niques, term and graph rewriting, distributed programming, logic constraint p- gramming, object-oriented programming, typing systems and algorithms, case studies, tools, and environments for programming and verification. The 1rst two CONCUR conferences were held in Amsterdam (NL) in 1990 and 1991. The following ones in Stony Brook (USA), Uppsala (S), 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, 1243, 1466, and 1664.

This book constitutes the refereed proceedings of the 28th International Conference on Applications and Theory of Petri Nets and Other Models of Concurrency, ICATPN 2007, 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 calculus, and standardization of nets.

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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 from a total of 78 submissions. The volume covers all current aspects of 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.

This book constitutes the refereed proceedings of the 10th International Conference on Concurrency Theory, CONCUR 2000, held in Aalborg, Denmark, in August 2000. The 31 revised full papers presented were selected by the program committee from a total of 104 submissions. The volume covers all current aspects of 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.

This book constitutes the 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 were selected by the program committee from a total of 107 submissions. The volume covers all current aspects of 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.

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