Introduction To Concurrency Theory Transition Systems And Ccs Texts In Theoretical Computer Science An Eatcs Series

This book offers an overview of the key ideas of Petri nets, how they were developed, and how they were applied in diverse applications. The chapters in the first part offer individual perspectives on the impact of Petri's work. The second part of the book contains personal memories from researchers who collaborated with him closely, in particular they recount his unique personality. The chapters in the third part offer more conventional treatments on various aspects of current Petri net research, and the fourth part examines the wide applications of Petri nets, and the relationships with other domains. The editors and authors are the leading researchers in this domain, and this book will be a valuable insight for researchers in computer science, particularly those engaged with concurrency and distributed systems.

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 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.

This book constitutes the refereed proceedings of the 23rd International Symposium on the Mathematical Foundations of Computer Science, MFCS'98, held in Brno, Czech Republic, in August 1998. The 71 revised full papers presented were carefully reviewed and selected from a total of 168 submissions. Also included are 11 full invited surveys by prominent leaders in the area. The papers are organized in topical sections on problem complexity; logic, semantics, and automata; rewriting; automata and transducers; typing; concurrency, semantics, and logic; circuit complexity; programming; structural complexity; formal languages; graphs; Turing complexity and logic; binary decision diagrams, etc..

This book constitutes the refereed proceedings of the 4th International Conference on Theory and Applications of Models of Computation, TAMC 2007, held in Shanghai, China in May 2007. It addresses all major areas in computer science; mathematics, especially logic; and the physical sciences, particularly with regard to computation and computability theory. The papers particularly focus on algorithms, complexity and computability 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, games, infinite systems, probabilistic automata, model checking, model checking and HMSC, security, mobility, compositional methods and real time, and probabilistic models.

This collection of essays reflects the breadth of research in computer science. Following a biography of Robin Milner it contains sections on semantic foundations; programming logic; programming languages; concurrency; and mobility.

This book constitutes the refereed proceedings of the 20th international Conference on Foundations of Software Technology and Theoretical Computer Science, FST TCS 2000, held in New Delhi, India in December 2000. The 36 revised full papers presented were carefully reviewed and selected from a total of 141 submissions; also included are six invited papers. The volume provides broad coverage of the logical and mathematical foundations of computer science and spans the whole range of theoretical computer science.

This volume contains the proceedings of the 20th Conference on Concurrency Theory (CONCUR 2009), held in Bologna, September 1–4, 2009. The purpose of the CONCUR conference is to bring together researchers, developers, and s-dentsinordertoadvancethetheoryofconcurrencyandpromoteitsapplications. This year the CONCUR conference was in its 20th edition, and to celebrate 20 years of CONCUR, the conference program included a special session organized by the IFIP Working Groups 1.8 “Concurrency Theory” and 2.2 “Formal - scriptionofProgrammingConcepts”aswellas aninvitedlecturegivenby Robin Milner, one of the fathers of the concurrency theory research area. This edition of the conference attracted 129 submissions. We wish to thank all their authors for their interest in CONCUR 2009. After careful discussions, the Program Committee selected 37 papers for presentation at the conference. Each of them was accurately refereed by at least three reviewers (four reviewers for papers co-authored by members of the Program Committee), who delivered detailedandinsightfulcommentsandsuggestions.TheconferenceChairswarmly thank all the members of the Program Committee and all their sub-referees for the excellent support they gave, as well as for the friendly and constructive discussions. We would also like to thank the authors for having revised their papers to address the comments and suggestions by the referees. The conference program was enriched by the outstanding invited talks by Martin Abadi, Christel Baier, Corrado Priami and, as mentioned above, Robin Milner.

This book constitutes the refereed proceedings of the 25th 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.

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 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.

This book constitutes the refereed proceedings of the 17th Annual Symposium on Theoretical Aspects of Computer Science, STACS 2000, held in Lille, France in February 2000. The 51 revised full papers presented together with the three invited papers were carefully reviewed

and selected from a total of 146 submissions on the basis of some 700 reviewers' reports. The papers address fundamental issues from all current areas of theoretical computer science including algorithms, data structures, automata, formal languages, complexity, verification, logic, cryptography, graph theory, optimization, etc.

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 were carefully reviewed and selected from 94 submissions. The papers are organized in topics such as real-time systems, probabilistic systems, automata, separation logic, ?-calculus, Petri nets, process algebra and modeling, verification, games, and bisimulation.

This volume contains the proceedings of the 19th International Conference on Concurrency Theory (CONCUR 2008) which took place at the University of TorontoinToronto,Canada,August19–22,2008. CONCUR2008wasco-located with the 27th Annual ACM SIGACT-SIGOPS Symposium on the Principles of Distributed Computing (PODC 2008), and the two conferences shared two invited speakers, some social events, and a symposium celebrating the lifelong research contributions of Nancy Lynch. 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 scienti?c relevance of their foundations. Topics include basic models of concurrency (such as abstract machines, domain theoretic m- els, game theoretic models, process algebras, and Petri nets), logics for c- currency (such as modal logics, temporal logics and resource logics), models of specialized systems (such as biology-inspired systems, circuits, hybrid systems, mobile systems, multi-core processors, probabilistic systems, real-time systems, synchronoussystems, and Web services),veri?cationand analysis techniques for concurrent systems (such as abstract interpretation, atomicity checking, mod- checking, race detection, run-time veri?cation, state-space exploration, static analysis,synthesis,testing, theorem provingand type systems), andrelated p- gramming models (such as distributed or object-oriented). Of the 120 regular and 5 tool papers submitted this year, 33 regular and 2 tool papers were accepted for presentation and areincluded in the present v- ume.

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 compositionality, and games.

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 proceedings of the 10th International Conference on Concurrency 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.

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

This book constitutes the proceedings of the 41st International Conference on Application and Theory of Petri Nets and Concurrency, PETRI NETS 2020, which was supposed to be held in Paris, France, in June 2020. The conference was held virtually due to the COVID-19 pandemic. The 17 regular and 6 tool papers presented together in this volume were carefully reviewed and selected from 56 submissions. The focus of the conference is on following topics: application of concurrency to system design; languages and synthesis; semantics; process mining and applications; extensions and model checking; tools.

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.

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 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.

This book constitutes the refereed proceedings of the 13th International Colloquium on Theoretical Aspects of Computing, ICTAC 2016, held in Taipei, Taiwan, in October 2016. The 23 revised full papers presented together with two short papers, two invited papers and one abstract of an invited paper were carefully reviewed and selected from 60 submissions. The papers are organized in topical sections on program verification; design, synthesis and testing; calculi; specifications; composition and transformation; automata; temporal logics; tool and short papers.

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 is the proceedings of the Structures in Concurrency Theory workshop (STRICT) that was held from 11 th to l3th May 1995 in Berlin, Germany. It includes three invited contributions - by J. de Bakker, E. Best et aI, and E. R. Olderog and M. Schenke - 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. The aim of this workshop was to present and compare different formalisms and results in Concurrency Theory. STRICT was organized by the Humboldt-University Berlin and the ESPRIT Basic Research Working Group CALIBAN. 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 Algebras, 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.

The present volume contains the proceedings of the Third IPM International Conference on Fundamentals of Software Engineering (FSEN), Kish, Iran, April 15–17, 2009. FSEN 2009 was organized by the School of Computer Science at the Institute for Studies in Fundamental Sciences (IPM) in Iran, in cooperation with the ACM SIGSOFT and IFIP WG 2.2. This conference brought together around 100 researchers and practitioners working on di?erent aspects of formal methods in software engineering from 15 di?erentcountries.ThetopicsofinterestinFSENspanoverallaspects offormal methods,especiallythoserelatedtoadvancingtheapplicationofformalmethods in software industry and promoting their integration with practical engineering techniques. The Program Committee of FSEN 2009 consisted of top researchers from 24 di?erent academic institutes in 11 countries. We received a total of 88 submissions from 25 countries out of which the Program Committee selected 22 as regular papers, 5 as short papers, and 7 as poster presentations in the conferenceprogram.Eachsubmissionwasreviewedbyatleastthreeindependent referees, for its quality, originality, contribution, clarity of presentation, and its relevance to the conference topics. This volume contains the revised versions of the regular and short papers presented at FSEN 2009. Three distinguished keynote speakers delivered their lectures at FSEN 2009 on models of computation: automata and processes (Jos Baeten), veri?cation, performanceanalysisandcontrollersynthesisforreal-timesystems(KimLarsen), and theory and tool for component-based model-driven development in rCOS (Zhiming Liu). Our invited speakers also contributed to this volume by s- mitting their keynote papers, which were accepted after they were reviewed by independent referees.

This Festschrift volume is published in honor of Pierpaolo Degano on the occasion of his 65th birthday and is the outcome of a colloquium held in Pisa, Italy, in June 2015. Pierpaolo Degano has worked on a large variety of topics including formal program semantics, concurrency theory, systems biology and security. The volume contains 22 refereed papers and one extended abstract, including personal memoirs and regular research papers by close collaborators and friends and a laudatio illustrating his distinguished career and his main scientific contributions. The papers deal with the main research topics explored by Pierpaolo Degano and those still under his investigation.

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 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.

This book constitutes the refereed proceedings of the 27th International Conference on the Foundations of Software Technology and Theoretical Computer Science, FSTTCS 2007, held in New Delhi, India, in December 2007. The 40 revised full papers presented together with five invited papers were carefully reviewed. They provide original research results in fundamental aspects of computer science and reports from the frontline of software technology and theoretical computer science.

This book constitutes the refereed proceedings of the 15th International Conference on Concurrency Theory, CONCUR 2004, held in London, UK in August/September 2004. The 29 revised full papers presented together with 4 invited papers were carefully reviewed and selected from 134 submissions. Among the topics covered are 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, term and graph rewriting, distributed programming, constraint logic programming, object-oriented programming, typing systems and algorithms, case studies, tools, and environments for programming and verification.

Intheworldweliveinconcurrencyisthenorm.Forexample,thehumanbody isamassivelyconcurrentsystem,comprisingahugenumberofcells,allsim- taneously evolving and independently engaging in their individual biological processing.Inaddition,inthebiologicalworld,trulysequentialsystemsrarely arise. However, they are more common when manmade artefacts are cons- ered. 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 concurrent, systems. Thus, we use sequentiality as a device to simplify the design process. However, the need for increasingly powerful, ?exible and usable computer systems mitigates against simplifying sequentiality assumptions. A good - ample of this is the all-powerful position held by the Internet, which is highly concurrent at many di?erent levels of decomposition. Thus, the modern c- puter scientist (and indeed the modern scientist in general) is forced to think aboutconcurrentsystemsandthesubtleandintricatebehaviourthatemerges from the interaction of simultaneously evolving components. Over a period of 25 years, or so, the ?eld of concurrency theory has been involved in the development of a set of mathematical techniques that can help system developers to think about and build concurrent systems. These theories are the subject matter of this book.

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.

ETAPS 2002 is the ?fth instance of the European Joint Conferences on Theory and Practice of Software. ETAPS is an annual federated conference that was established in 1998by combining a number of existing and new conferences. This year it comprises

?ve conferences (FOSSACS, FASE, ESOP, CC, TACAS), thirteen satellite workshops (ACL2, AGT, CMCS, COCV, DCC, INT, LDTA, SC, SFEDL, SLAP, SPIN, TPTS and VISS), eight invited lectures (not including those that are speci?c to the satellite events), and several tutorials. The events that comprise ETAPS address various aspects of the system - velopment process, including speci?cation, design, implementation, analysis and improvement. The languages, methodologies and tools which support these - tivities are all well within its scope. Di?erent blends of theory and practice are represented, with an inclination towards theory with a practical motivation on one hand and soundly-based practice on the other. Many of the issues involved in software design apply to systems in general, including hardware systems, and the emphasis on software is not intended to be exclusive.

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.

This book constitutes the refereed proceedings of the 43rd International Conference on Current Trends in Theory and Practice of Computer Science, SOFSEM 2017, held in Limerick, Ireland, in January 2017. The 34 papers presented in this volume were carefully reviewed and selected from 41 submissions. They were organized in topical sections named: foundations in computer science; semantics, specification and compositionality; theory of mobile and distributed systems; verification and automated system analysis; petri nets, games and relaxed data structures; graph theory and scheduling algorithms; quantum and matrix algorithms; planar and molecular graphs; coloring and vertex covers; algorithms for strings and formal languages; data, information and knowledge engineering; and software engineering: methods, tools, applications.

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 moduls of computation and semantic domains, process algebras, Petri Nets, event structures, real-time systems, hybrid systems, model checking, verification techniques, refinement, rewriting, typing systems and algorithms, etc..

This book constitutes the refereed proceedings of the 16th International Conference on Concurreny 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.

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.

??This Festschrift was published in honor of Catuscia Palamidessi on the occasion of her 60th birthday. It features 6 laudations, which are available in the front matter of the volume, and 25 papers by close collaborators and friends. The papers are organized in topical sections named: concurrency; logic and constraint programming; security and privacy; and models and puzzles. These contributions are a tribute to Catuscia Palamidessi’s intellectual depth, vision, passion for science, and tenacity in solving technical problems. They also reflect the breadth and impact of her work. Her scientific interests include, in chronological order, principles of programming languages, concurrency theory, security, and privacy.

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.

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 - plications, and of the scienti?c relevance of their foundations. The scope covers all areas of semantics, logics, and veri?cation 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, veri?cation 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 veri?cation. The ?rst two CONCUR conferences were held in Amsterdam (NL) in 1990 and 1991. The following ones in Stony Brook (USA), Hildesheim (D), 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.