1. Record Nr.   UNINA9910805576003321

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   Titolo   Petri Net Primer : A Compendium on the Core Model, Analysis, and
                      Synthesis / / by Eike Best, Raymond Devillers

   Pubbl/distr/stampa Cham : , : Springer Nature Switzerland : , : Imprint : Birkhäuser, , 2024

   ISBN   3-031-48278-6

   Edizione   [1st ed. 2024.]

   Descrizione fisica 1 online resource (548 pages)

   Collana   Computer Science Foundations and Applied Logic, , 2731-5762

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   Disciplina   004.0151

   Soggetti   Computer science - Mathematics
                      Discrete mathematics
                      Dynamics
                      Mathematical models
                      Stochastic models
                      Discrete Mathematics in Computer Science
                      Dynamical Systems
                      Mathematical Modeling and Industrial Mathematics
                      Stochastic Modelling

   Lingua di pubblicazione Inglese

   Formato   Materiale a stampa

   Livello bibliografico Monografia

   Nota di contenuto Preface -- 1 First Steps in Petri Nets -- 2 Languages of Petri Nets -- 3
                      Reachability and Coverability -- 4 Linear-algebraic Structure of Petri
                      Nets -- 5 Graph-theoretical Structure of Petri Nets -- 6 More Structure
                      Theory -- 7 Program Verification Using Traps -- 8 Fairness,
                      Simulations, and Inhibitor Arcs -- 9 Unfoldings and Reachability
                      Checking -- 10 Petri Net Computers -- 11 Synthesis of Petri Nets from
                      Labelled Transition Systems -- 12 Persistent Transition Systems and
                      Choice-free Petri Nets -- 13 Divide-and-Conquer Methods for
                      Synthesis -- 14 Marked Graph Synthesis -- 15 Bounded Choice-free
                      Net Synthesis -- 16 Model Checking Safe, Strongly Persistent Petri Nets
                      -- 17 Semilinearity -- 18 Decidability of the reachability problem -- 19
                      The Box Algebra 1/2: Refinement and Recursion -- 20 The Box Algebra
                      2/2: Iteration and Data -- 21 High-level Petri Nets -- Biblyography --
                      Index.

Sommario/riassunto

Petri nets model concurrent and distributed systems where active components communicate through the production and absorption of various kinds of resources. Although the dynamic properties of such systems may be very complex, they may sometimes be connected to the static structure of a Petri net. Many properties are decidable, but their complexity may be huge. It is often opportune to restrict oneself to classes of systems, to partial algorithms, and to similar but simpler properties. Instead of analysing a given system, it is also possible to search for a system satisfying some desired properties by construction. This comprehensive textbook/reference presents and discusses these issues in-depth in the context of one of the most fundamental Petri net models, called place/transition nets. The presentation is fortified by means of many examples and worked exercises. Among topics addressed: • In which order may actions may be generated and scheduled? • What states and configurations may be reached in a concurrent system? • Which interesting classes of systems can be analysed relatively efficiently? • Is it possible to synthesise a system of some class from its behaviour? • How can systems be represented algebraically, compositionally, and concisely? This unique text, based on introductory as well as on advanced courses on distributed systems, will serve as an invaluable guide for students and (future) researchers interested in theoretical—as well as in practical—aspects of Petri nets and related system models. Eike Best has been a full professor (now retired) affiliated to Carl von Ossietzky Universität Oldenburg, Germany. Raymond Devillers has been a full professor (now retired) affiliated to Université Libre de Bruxelles, Belgium. The authors have a long record as collaborators in the fields of Petri nets and the semantics of concurrency.