Record Nr. Autore Titolo Pubbl/distr/stampa	UNINA9910826613903321 Shyamasundar Rudrapatna <1950-> Real time programming : languages, specification and verification / / R. K. Shyamasundar, S. Ramesh Singapore ; ; Hackensack, NJ ; ; London, : World Scientific, c2010
ISBN	1-282-76027-0 9786612760273 981-281-402-7
Edizione	[1st ed.]
Descrizione fisica	1 online resource (264 p.)
Altri autori (Persone)	RameshS (Sethu)
Disciplina	004/.33
Soggetti	Real-time programming
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Contents; Preface; Organization of the Monograph; Dependence of the chapters; Acknowledgement; PART I: Real Time Systems - Background; Summary; 1 Real Time System Characteristics; 1.1 Real-time and Reactive Programs; 2 Formal Program Development Methodologies; 2.1 Requirement Specification; 2.1.1 An Example; 2.2 System Specifications; 3 Characteristics of Real-Time Languages; 3.1 Modelling Features of Real-Time Languages; 3.2 A Look at Classes of Real-Time Languages; 4 Programming Characteristics of Reactive Systems; 4.1 Execution of Reactive Programs; 4.2 Perfect Synchrony Hypothesis 4.3 Multiform Notion of Time4.4 Logical Concurrency and Broadcast Communication; 4.5 Determinism and Causality; PART II: Synchronous Languages; Summary; 5 Esterel Language: Structure; 5.1 Top Level Structure; 5.1.1 Signals and Events; 5.1.2 Module Instantiation; 5.2 Esterel Statements; 5.2.3 Derived Statements; 5.5 A Historical Program Behaviour; 5.4 Causality Problems; 5.5 A Historical Perspective; 6 Program Development in Esterel; 6.1 A Simulation Environment; 6.2 Verification Environment 7 Programming Controllers in Esterel7.1 Auto Controllers; 7.1.1 A Very Simple Auto Controller; 7.1.2 A Complex Controller; 7.1.3 A Cruise Controller; 7.1.4 A Train Controller; 7.1.5 A Mine Pump Controller; 8 Asynchronous Interaction in Esterel; 9 Futurebus Arbitration Protocol: A

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	Case Study; 9.1 Arbitration Process; 9.2 Abstraction of the Protocol; 9.3 Solution in Esterel; 10 Semantics of Esterel; 10.1 Semantic Structure; 10.2 Transition Rules; 10.2.1 Rules for Signal Statement; 10.3 Illustrative Examples; 10.4 Discussions; 10.5 Semantics of Esterel with exec PART III: Other Synchronous LanguagesSummary; 11 Synchronous Language Lustre; 11.1 An Overview of Lustre; 11.2 Flows and Streams; 11.3 Equations, Variables and Expressions; 11.4 Program Structure; 11.4.1 Illustrative Example; 11.5 Arrays in Lustre; 11.6 Further Examples; 11.6.1 A Very Simple Auto Controller; 11.6.2 A Complex Controller; 11.6.3 A Cruise Controller; 11.6.4 A Train Controller; 11.6.5 A Mine Pump Controller; 12 Modelling Time-Triggered Protocol (TTP) in Lustre; 12.1 Time-Triggered Protocol; 12.1.1 Clock Synchronization; 12.1.2 Bus Guardian .; 12.2 Modelling TTP in Lustre 13 Synchronous Language Argos13.1 Argos Constructs; 13.2 Illustrative Example; 13.3 Discussions; PART IV: Verification of Synchronous Programs; Summary; 14 Verification of Esterel Programs; 14.1 Transition System Based Veri cationy of Esterel Programs; 14.1.1 Detailed Discussion; 14.2 Esterel Transition System; 14.2.1 Abstraction and Hiding; 14.2.2 Observation Equivalence Reduction; 14.2.3 Context Filtering; 14.3 Temporal Logic Based Verification; 14.4 Observer-based Verification; 14.5 First Order Logic Based Verification; 15 Observer Based Verification of Simple Lustre Programs 15.1 A Simple Auto Controller
Sommario/riassunto	The primary aim of this monograph is to present the current research efforts that have gone into/or going on in the systematic design of real-time programs. Such an effort would help researchers and users in the area to get a clear picture of the issues of specification, verification and design of real-time reactive programs. It will clearly enable us to identify languages that can be used for different kinds of applications. Obviously, in an upcoming area like this, this presentation is far from complete. The quintessence of the monograph can be captured by the following question: How can