Queueing Theory for Telecommunications
Discrete Time Modelling of a Single Node System

Queueing theory applications can be discovered in many walks of life including; transportation, manufacturing, telecommunications, computer systems and more. However, the most prevalent applications of queueing theory are in the telecommunications field. Queueing Theory for Telecommunications: Discrete Time Modelling of a Single Node System focuses on discrete time modelling and illustrates that most queueing systems encountered in real life can be set up as a Markov chain. This feature is very unique because the models are set in such a way that matrix-analytic methods are used to analyze them. Queueing Theory for Telecommunications: Discrete Time Modelling of a Single Node System is the most relevant book available on queueing models designed for applications to telecommunications. This book presents clear concise theories behind how to model and analyze key single node queues in discrete time using special tools that were presented in the second chapter. The text also delves into the types of single node queues that are very frequently encountered in telecommunication systems modeling, and provides simple methods for analyzing them. Where appropriate, alternative analysis methods are also presented.

Features
- Covers algorithmic aspects of queue for practical problems based on Markov chain models
- Key references for major proofs provided to ensure mathematical equations
- Useful and easy for practitioners who want numerical answers for the purpose of creating a good system design

Fields of interest
Probability and Statistics in Computer Science; System Performance and Evaluation; Models and Principles

Target groups
Research

Discount group
P

Rigorous Software Development
An Introduction to Program Verification

The use of mathematical methods in the development of software is essential when reliable systems are sought; in particular they are now strongly recommended by the official norms adopted in the production of critical software. Program Verification is the area of computer science that studies mathematical methods for checking that a program conforms to its specification. This text is a self-contained introduction to program verification using logic-based methods, presented in the broader context of formal methods for software engineering. The idea of specifying the behaviour of individual software components by attaching contracts to them is now a widely followed approach in program development, which has given rise notably to the development of a number of behavioural interface specification languages and program verification tools. A foundation for the static verification of programs based on contract-annotated routines is laid out in the book. These can be independently verified, which provides a modular approach to the verification of software.

Features
- Self-contained, offering a concise introduction to formal methods together with an in-depth coverage of model-based and Hoare logic-based methods
- Focuses on two approaches: the Coq proof assistant and the B suite, both of which have proved effective and relevant for industry
- Includes exercises and solutions making it suitable as a course text and for self-study

From the contents

Fields of interest
Software Engineering: Logics and Meanings of Programs; Symbolic and Algebraic Manipulation

Target groups
Lower undergraduate

Discount group
P

Introduction to the Theory of Programming Languages

The design and implementation of programming languages, from Fortran and Cobol to Caml and Java, has been one of the key developments in the management of ever more complex computerized systems. Introduction to the Theory of Programming Languages gives the reader the means to discover the tools to think, design, and implement these languages. It proposes a unified vision of the different formalisms that permit definition of a programming language: small steps operational semantics, big steps operational semantics, and denotational semantics, emphasising that all seek to define a relation between three objects: a program, an input value, and an output value. These formalisms are illustrated by presenting the semantics of some typical features of programming languages: functions, recursion, assignments, records, objects, ... showing that the study of programming languages does not consist of studying languages one after another, but is organized around the features that are present in these various languages. The study of these features leads to the development of evaluators, interpreters and compilers, and also type inference algorithms, for small languages.

Features
- Introduction to the Theory of Programming Languages gives the reader the means to discover the tools to think, design, and implement programming languages
- Proposes a unified vision of the different formalisms that permit definition of a programming language
- Presents in a synthetic way what all computer scientists, whatever their speciality is, should know

From the contents

Fields of interest
Theory of Computation; Logics and Meanings of Programs

Target groups
Graduate

Discount group
P
Inductive Databases and Constraint-Based Data Mining

This book presents inductive databases and constraint-based data mining, emerging research topics lying at the intersection of data mining and database research. The book provides an overview of the state-of-the-art in this novel research area. Of special interest are the recent methods for constraint-based mining of global models for prediction and clustering, the unification of pattern mining approaches through constraint programming, the clarification of the relationship between mining local patterns and global models, and the proposed integrative frameworks and approaches for inductive databases. On the application side, applications to practically relevant problems from bioinformatics are presented to attract additional attention from a wider audience. The primary audience consists of scientists and graduate students in computer science and bioinformatics. Potential readers are likely to attend conferences on databases, data mining/machine learning, and bio-informatics.

Features
- Provides a broad and unifying perspective on the field of data mining in general and inductive databases in particular
- Includes constraint-based mining of predictive models for structured data/outputs, integration/unification of pattern and model mining at the conceptual level
- Discusses applications to practically relevant problems in bioinformatics

From the contents
Part 1 Introduction & Framework. - Twelve Years After: A Historical Perspective on Inductive Databases. - A Data Mining Framework and Ontology: Data Mining Query Languages, Mining Views, and Algebras.

Fields of interest
Database Management; Data Mining and Knowledge Discovery; Artificial Intelligence (incl. Robotics)

Target groups
Research

Discount group
P

Preserving Privacy in Data Outsourcing

Privacy requirements have an increasing impact on the realization of modern applications. Commercial and legal regulations demand that privacy guarantees be provided whenever sensitive information is stored, processed, or communicated to external parties. Current approaches encrypt sensitive data, thus reducing query execution efficiency and preventing selective information release. Preserving Privacy in Data Outsourcing presents a comprehensive approach for protecting highly sensitive information when it is stored on systems that are not under the data owner’s control. The approach illustrated combines access control and encryption, enforcing access control via structured encryption. This solution, coupled with efficient algorithms for key derivation and distribution, provides efficient and secure authorization management on outsourced data, allowing the data owner to outsource not only the data but the security policy itself. To reduce the amount of data to be encrypted the book also investigates data fragmentation as a possible way to protect privacy of data associations and provide fragmentation as a complementary means for protecting privacy: associations broken by fragmentation will be visible only to users authorized (by knowing the proper key) to join fragments. The book finally investigates the problem of executing queries over possible data distributed at different servers and which must be controlled to ensure sensitive information and sensitive associations be visible only to parties authorized for that.

Features
- Addresses the problem of protecting information in the emerging data outsourcing scenarios
- Presents relevant and critical novel problems and novel techniques for their solution
- Provides a comprehensive overview of the state of the art and an easy to grasp illustration of the data protection problem in outsourcing scenarios, as well as a rigorous analysis and formalization of the problem and solutions

Fields of interest
Systems and Data Security; Data Encryption; Data Structures, Cryptology and Information Theory

Target groups
Research

Discount group
P

Social Understanding
On Hermeneutics, Geometrical Models and Artificial Intelligence

The operation of understanding is the fundamental methodical procedure of hermeneutics and is usually seen as contradiction to scientific explanation by the usage of mathematical models. Yet understanding is the basic way in which humans organize their everyday practice, namely by understanding other people and social situations. In this book the authors demonstrate how an integration of hermeneutical understanding and scientific explanation can be done via the construction of suited geometrical models with neural networks of processes of understanding. In this sense the authors develop some kind of mathematical hermeneutics.

Connecting links for the integration of the two methodical poles are the developments of particular models of Artificial Intelligence (AI), which are able to perform certain tasks of understanding.

Features
- Integration of hermeneutics and mathematics
- Development of AI-systems
- Goal of a unified science
- New insights into human cognitive processes

Fields of interest
Computer Appl. in Social and Behavioral Sciences; Artificial Intelligence (incl. Robotics); Simulation and Modeling

Discount group
P

Due November 2010
► approx. $99.00

Due November 2010
► approx. $99.00
ISBN 978-1-4419-7658-1

Due December 2010
► $139.00
Handbook of Open Source Tools

Handbook of Open Source Tools introduces a comprehensive collection of advanced open source tools useful in developing software applications. The book contains information on more than 200 open-source tools which include software construction utilities for compilers, virtual-machines, database, graphics, high-performance computing, OpenGL, geometry, algebra, graph theory, GUIs and more. Special highlights for software construction utilities and application libraries are included. Each tool is covered in the context of a real like application development setting. This unique handbook presents a comprehensive discussion of advanced tools, a valuable asset used by most application developers and programmers; includes a special focus on Mathematical Open Source Software not available in most Open Source Software books, and introduces several tools (e.g. ACL2, CLIPS, CUDA, and COIN) which are not known outside of select groups, but are very powerful.

Features
- Presents a comprehensive discussion of more than 200 advanced tools, a valuable asset used by most application developers and programmers
- Includes a special focus on Mathematical Open Source Software not available in most Open Source Software books
- Introduces several tools (e.g ACL2 and COIN) which are not known outside of select groups, but are very powerful

From the contents

Fields of interest
Software Engineering/Programming and Operating Systems; Programming Techniques; Information Systems Applications (incl.Internet)

Target groups
Research

Discount group
P

Information Retrieval Architecture and Algorithms

This text presents a theoretical and practical examination of the latest developments in Information Retrieval and their application to existing systems. By starting with a functional discussion of what is needed for an information system, the reader can grasp the scope of information retrieval problems and discover the tools to resolve them. The book takes a system approach to explore every functional processing step in a system from ingest of an item to be indexed to displaying results, showing how implementation decisions add to the information retrieval goal, and thus providing the user with the needed outcome, while minimizing their resources to obtain those results. The text stresses the current migration of information retrieval from just textual to multimedia, expounding upon multimedia search, retrieval and display, as well as classic and new textual techniques. It also introduces developments in hardware, and more importantly, search architectures, such as those introduced by Google, in order to approach scalability issues.

Features
- A first course text for advanced level courses, providing a survey of information retrieval system theory and architecture, complete with challenging exercises
- Approaches information retrieval from a practical systems view in order for the reader to grasp both scope and solutions
- Features what is achievable using existing technologies and investigates what deficiencies warrant additional exploration

Contents

Fields of interest
Information Storage and Retrieval; Data Storage Representation

Target groups
Graduate

Discount group
P

Handbook of Natural Language Processing and Machine Translation

DARPA Global Autonomous Language Exploitation

This comprehensive handbook, written by leading experts in the field, details the groundbreaking research conducted under the breakthrough GALE program—the Global Autonomous Language Exploitation within the Defense Advanced Research Projects Agency (DARPA), while placing it in the context of previous research in the fields of natural language and signal processing, artificial intelligence and machine translation. The most fundamental contrast between GALE and its predecessor programs was its holistic integration of previously separate or sequential processes. In earlier language research programs, each of the individual processes was performed separately and sequentially: speech recognition, language recognition, transcription, translation, and content summarization. The GALE program employed a distinctly new approach by executing these processes simultaneously. Speech and language recognition algorithms now aid translation and transcription processes and vice versa.

Features
- Written by leading experts in machine translation
- Provides intricate machine translation discussions ranging from text, speech, distillation, evaluation, operational engines, data acquisition and linguistic resources
- Comprises the largest comprehensive effort in the field
- Equips researchers with the latest technologies in natural language, speech and signal processing, and machine translation

Fields of interest
Language Translation and Linguistics; Artificial Intelligence (incl. Robotics); Signal, Image and Speech Processing

Target groups
Graduate

Discount group
P
Technological and Organizational Perspectives

Evolving Towards the Internetworked Enterprise

A new model of business has emerged within the Digital-Economy called Internetworked Enterprise (IE); it's a model that posits networks, communities of individuals and refusal of a centralized mindset as the core elements of the new frame of reference. Internetworked Enterprises are called by some scholars 'Extended' Enterprises, which use digital network to co-operate and compete with other e-business community partners by exchanging knowledge and information across trans-national borders.

Evolving Towards the Internetworked Enterprise: Technological and Organizational Perspectives is an edited volume based on a three year research project financed by the Italian Ministry of Research and Education. Researchers for this project are located at Polytechnic of Milan, University of Milano, University of Chieti, Engineering S.P.A and ISUFI-University of Salento. This book presents an overview of IE business methodologies, models, and an interpretative framework analyzing the sector and organizational contingencies that influence the digitalization of organizational processes in networks of SMEs (Small and Medium Enterprise). A set of case studies that provide empirical evidence on the IE phenomenon is included as well.

Features

- End-to-end methodology for helping enterprises in the transition toward the IE paradigm
- Technologies and approaches supporting the IE
- Case studies providing empirical evidence on the IE phenomenon

From the contents

Towards an Internetworked Enterprise: some issues to be discussed.- A methodology aimed at fostering and sustaining the development processes of an IE-based industry.

Fields of interest

e-Commerce/e-business; Information Systems Applications (incl.Internet); Management of Computing and Information Systems

Discount group

Professional/practitioner

Reliable and Autonomous Computational Science

International Conference, RACS 2010, Atlanta, GA, USA, October 27-30, 2010

Increasing size and complexity of software and hardware systems makes it harder to ensure their reliability. At the same time, the issues of autonomous computing become more critical as we more and more rely on software systems in our daily life. Such complexity is getting even more critical with the ubiquitous computing of embedded devices and other pervasive systems. These trends ask for techniques and tools for developing reliable and autonomous software which can support software engineers in their efforts. This book summarizes the state of the art of research in the diverse fields concerned, including novel designs, case studies and experimental as well as theoretical results.

Features


Contents


Fields of interest

Software Engineering

Discount group

Research

Web Mining and Social Networking

Techniques and Applications

This book examines the techniques and applications involved in the Web Mining, Web Personalization and Recommendation and Web Community Analysis domains, including a detailed presentation of the principles, developed algorithms, and systems of the research in these areas. The applications of web mining, and the issue of how to incorporate web mining into web personalization and recommendation systems are also reviewed. Additionally, the volume explores web community mining and analysis to find the structural, organizational and temporal developments of web communities and reveal the societal sense of individuals or communities.

The volume will benefit both academic and industry communities interested in the techniques and applications of web search, web data management, web mining and web knowledge discovery, as well as web community and social network analysis.

Features

- Systematically discusses the principles, algorithms, prototypes of the addressed approaches engaged in the domains of Web mining, Web community and social networks

Discount group

Professional/practitioner
Quantum Attacks on Public-Key Cryptosystems

The cryptosystems based on the Integer Factorization Problem (IFP), the Discrete Logarithm Problem (DLP) and the Elliptic Curve Discrete Logarithm Problem (ECDLP) are essentially the only three types of practical public-key cryptosystems in use. The security of these cryptosystems relies on the three infeasible number-theoretic problems; no polynomial-time algorithms exist for these three problems. However, quantum polynomial-time algorithms for IFP, DLP and ECDLP do exist, provided that a practical quantum computer exists.

Quantum Attacks on Public-Key Cryptosystems introduces the basic concepts and ideas of quantum computing and quantum computational complexity. The book discusses quantum algorithms for IFP, DLP and ECDLP, based on Shor’s seminal work. It also presents some possible alternative post-quantum cryptosystems to replace the IFP, DLP and ECDLP based cryptosystems.

Features
- Discusses almost all known quantum attacks on IFP, DLP and ECDLP based public-key cryptosystems
- Covers many alternative post-quantum cryptosystems to replace the classic IFP, DLP and ECDLP based cryptosystems
- Cryptographers and professionals working in quantum computing,
- cryptography and network security will find this book a valuable asset

Contents
Chapter 1 Quantum Information and Computation
Chapter 2 Quantum Attacks on Integer Factoring Based Cryptosystems
Chapter 3 Quantum Attacks on Discrete Logarithm Based Cryptosystems
Chapter 4 Quantum Attacks on Elliptic Curve Based Cryptosystems
Chapter 5 Post Quantum Cryptography

Fields of interest
Data Structures, Cryptology and Information Theory; Data Encryption; Algorithm Analysis and Problem Complexity

Target groups
Research

Discount group
P

Due November 2010

approx. $99.00