Transactions on Pattern Languages of Programming II
Special Issue on Applying Patterns

Editors-in-chief: J. Noble, R. Johnson

The Transactions on Pattern Languages of Programming subline aims to publish papers on patterns and pattern languages as applied to software design, development, and use, throughout all phases of the software life cycle, from requirements and design to implementation, maintenance and evolution. The primary focus of this LNCS Transactions subline is on patterns, pattern collections, and pattern languages themselves. The journal also includes reviews, survey articles, criticisms of patterns and pattern languages, as well as other research on patterns and pattern languages. This book, the second volume in the Transactions on Pattern Languages of Programming series, presents five papers that have been through a careful peer review process involving both pattern experts and domain experts. The papers demonstrate techniques for applying patterns in an industrial or research setting. Some have confronted the topic within software engineering; others offer approaches in other pattern domains, which is an indication of the diverse fields where patterns are applied.

Features
- High quality selected papers
- Unique visibility
- State of the art research

Fields of interest
Software Engineering/Programming and Operating Systems; Programming Techniques; Programming Languages, Compilers, Interpreters

Target groups
Research

Type of publication
Collected works

Due February 2011

2011. IX, 125 p. (Lecture Notes in Computer Science / Transactions on Pattern Languages of Programming, Volume 6510) Softcover

- € 46,00 | £41.99
- approx.* € (D) 49,22 | € (A) 50,60 | sFr 66,00
ISBN 978-3-642-19431-3

New Series

Springer Series on Touch and Haptic Systems

The Synthesis of Three Dimensional Haptic Textures: Geometry, Control, and Psychophysics

The sense of touch is fundamental during the interaction between humans and their environment; in virtual reality, objects are created by computer simulations and they can be experienced through haptic devices. In this context haptic textures are fundamental for a realistic haptic perception of virtual objects. This book formalizes the specific artefacts corrupting the rendering of virtual haptic textures and offers a set of simple conditions to guide haptic researchers towards artefact-free textures. The conditions identified are also extremely valuable when designing psychophysical experiments and when analyzing the significance of the data collected. The Synthesis of Three Dimensional Haptic Textures, Geometry, Control, and Psychophysics examines the problem of rendering virtual haptic textures with force feedback devices. The author provides an introduction to the topic of haptic textures that covers the basics of the physiology of the skin, the psychophysics of roughness perception, and the engineering challenges behind haptic textures rendering. The book continues with the presentation of a novel mathematical framework that characterizes haptic devices, texturing algorithms and their ability to generate realistic haptic textures. Finally, two psychophysical experiments link the perception of roughness with the parameters of the haptic rendering algorithms.

Features
- The literature review is a synthetic and complete introduction to haptic textures for the researchers unfamiliar with the field
- The mathematical analysis of the texture algorithms guides the design of stable (non vibrating) haptic textures and yields a very practical design tool
- It provides analytical tools for understanding the range of textures that a haptic device can render

Fields of interest
Simulation and Modeling; Mechatronics

Target groups
Research

Type of publication
Monograph

Due July 2011

2011. XVIII, 172 p. 120 illus. (Springer Series on Touch and Haptic Systems, Tentative volume 1) Hardcover

- approx. € 79,95 | £59.95
- approx.* € (D) 85,55 | € (A) 87,95 | sFr 115,00
ISBN 978-0-85729-575-0

G. Campion, Montreal, QC, Canada
Identity-Based Encryption

Identity Based Encryption (IBE) is a type of public key encryption and has been intensely researched in the past decade. Identity-Based Encryption summarizes the available research for IBE and the main ideas that would enable users to pursue further work in this area. This book will also cover a brief background on Elliptic Curves and Pairings, security against chosen Cipher text Attacks, standards and more. Advanced-level students in computer science and mathematics who specialize in cryptography, and the general community of researchers in the area of cryptography and data security will find Identity-Based Encryption a useful book. Practitioners and engineers who work with real-world IBE schemes and need a proper understanding of the basic IBE techniques, will also find this book a valuable asset.

Features

- Practitioners and engineers who have to implement real-world IBE schemes, and need a proper understanding of the basic IBE techniques, will find this book a valuable asset
- Covers Elliptic Curves and Pairings, obtaining security against chosen Cipher text Attacks, standards and more
- Peter Wild, Editor and Chief of Springer's Journal Designs Codes and Cryptography, remarks "This is a very active area, and it would be useful to have a reference text and to provide a common basis for the study of these systems. This would be a pioneering contribution in book form."

Human Aspects of Visualization

Second IFIP WG 13.7 Workshop on Human-Centric Interaction and Visualization, HCIV (INTERACT) 2009, Uppsala, Sweden, August 24, 2009, Revised Selected Papers

This book constitutes the refereed proceedings of the Second IFIP WG 13.7 International Workshop on Human Aspects of Visualization, HCIV 2009, held in Uppsala, Sweden, in August 2009, as a satellite workshop of INTERACT 2009. The 11 revised full papers presented were carefully reviewed and selected from numerous submissions. These articles in this book give an overview of important issues concerning human-computer interaction and information visualization. They highlight the research required to understand what aspects of analysis match human capabilities most closely and how interactive visual support should be designed and adapted to make optimal use of human capabilities in terms of information perception and processing.

Features

- High quality selected papers
- Unique visibility
- State of the art research

Fields of interest

User Interfaces and Human Computer Interaction; Computer Graphics; Image Processing and Computer Vision

Target groups

Professional/practitioner

Type of publication

Collected works

Data Management and Query Processing in Semantic Web Databases

The Semantic Web, which is intended to establish a machine-understandable Web, is currently changing from being an emerging trend to a technology used in complex real-world applications. A number of standards and techniques have been developed by the World Wide Web Consortium (W3C), e.g., the Resource Description Framework (RDF), which provides a general method for conceptual descriptions for Web resources, and SPARQL, an RDF querying language. Recent examples of large RDF data with billions of facts include the UniProt comprehensive catalog of protein sequence, function and annotation data, the RDF data extracted from Wikipedia, and Princeton University's WordNet. Clearly, querying performance has become a key issue for Semantic Web applications. In his book, Gropper details various aspects of high-performance Semantic Web data management and query processing. His presentation fills the gap between Semantic Web and database books, which either fail to take into account the performance issues of large-scale data management or fail to exploit the special properties of Semantic Web data models and queries. After a general introduction to the relevant Semantic Web standards, he presents specialized indexing and sorting algorithms, adapted approaches for logical and physical query optimization, optimization possibilities when using the parallel database technologies of today's multicore processors, and visual and embedded query languages. Gropper primarily targets researchers, students, and developers of large-scale Semantic Web applications.

Features

- First book on performance issues for Semantic Web data management
- Author was a member of the W3C working group that defined the standard query language SPARQL
- Additional teaching and demonstration material available on author's book website

Fields of interest

Database Management; Information Storage and Retrieval; Artificial Intelligence (incl. Robotics)

Target groups

Research

Type of publication

Monograph
Concise Guide to Computation Theory

This textbook presents a thorough foundation to the theory of computation. Combining intuitive descriptions and illustrations with rigorous arguments and detailed proofs for key topics, the logically structured discussion guides the reader through the core concepts of automata and languages, computability, and complexity of computation. Topics and features: presents a detailed introduction to the theory of computation, complete with concise explanations of the mathematical prerequisites; provides end-of-chapter problems with solutions, in addition to chapter-opening summaries and numerous examples and definitions throughout the text; draws upon the author’s extensive teaching experience and broad research interests; discusses finite automata, context-free languages, and pushdown automata; examines the concept, universality and limitations of the Turing machine; investigates computational complexity based on Turing machines and Boolean circuits, as well as the notion of NP-completeness.

Features
► Presents a detailed introduction to the theory of computation, complete with concise explanations of the mathematical prerequisites ► Provides end-of-chapter problems with solutions, in addition to chapter-opening summaries and numerous examples and definitions throughout the text ► Draws upon the author’s extensive teaching experience and broad research interests

From the contents

Fields of interest
Theory of Computation; Computational Science and Engineering

Target groups
Lower undergraduate

Type of publication
Undergraduate textbook

Due June 2011

2011. XVIII, 250 p. Hardcover
► approx. € 54,95 | £45.00
► approx. $ (D) 58,80 | $ (A) 60,45 | SFr 79,00
ISBN 978-3-642-05347-3

Organic Computing — A Paradigm Shift for Complex Systems

Organic Computing has emerged as a challenging vision for future information processing systems. Organic Computing is based on the insight that we will soon be surrounded by large collections of autonomous systems, which are equipped with sensors and actuators, aware of their environment, communicating freely, and organising themselves in order to perform the actions and services that are required by the users. The presence of networks of intelligent systems in our environment opens fascinating application areas but, at the same time, bears the problem of their controllability. Hence, we have to construct such systems - which we increasingly depend on - as robust, safe, flexible, and trustworthy as possible. In particular, a strong orientation towards human needs as opposed to a pure implementation of the technologically possible seems absolutely central. In order to achieve these goals, our technical systems will have to act more independently, flexibly, and autonomously, i.e. they will have to exhibit life-like properties. We call those systems “organic”. Hence, an “Organic Computing System” is a technical system, which adapts dynamically to the current conditions of its environment. It will be self-organising, self-configuring, self-optimising, self-healing, self-protecting, self-explaining, and context-aware.

Features
► Summarizes new developments in topics like adaptivity, reconfigurability, emergence of new properties, and self-organization ► Presents research inspired by an analysis of information processing in biological systems ► Addresses fundamental challenges in the design of specific concepts and tools

Fields of interest
Computer Systems Organization and Communication Networks

Target groups
Research

Type of publication
Contributed volume

Due May 2011

2011. XV, 590 p. 100 illus., 10 in color. (Autonomic Systems, Volume 1) Softcover
► € 109,95 | £99.00
► $ (D) 117,65 | $ (A) 120,95 | SFr 158,00
ISBN 978-3-642-01794-4

Engineering of Software
The Continuing Contributions of Leon J. Osterweil

Software engineering research can trace its roots to a few highly influential individuals. Among that select group is Leon J. Osterweil, who has been a major force in driving software engineering from its infancy to its modern reality. For more than three decades, Prof. Osterweil's work has fundamentally defined or significantly impacted major directions in software analysis, development tools and environments, and software process— all critical parts of software engineering as it is practiced today. His exceptional contributions to the field have been recognized with numerous awards and honors through his career, including the ACM SIGSOFT Outstanding Research Award, in recognition of his extensive and sustained research impact, and the ACM SIGSOFT Influential Educator Award, in recognition of his career-long achievements as an educator and mentor. In honor of Prof. Osterweil's profound accomplishments, this book was prepared for a special honorary event held during the 2011 International Conference on Software Engineering (ICSE). It contains some of his most important published works to date, together with several new articles written by leading authorities in the field, exploring the broad impact of his work in the past and how it will further impact software engineering research in the future. These papers, part of the core software engineering legacy and now available in one commented volume for the first time, are grouped into three sections: flow analysis for software dependability, the software lifecycle, and software process.

Features
► State-of-the-art research ► Compiles Prof. Osterweil’s most important published works to date ► Includes several new articles exploring the broad impact of his work in the past

Fields of interest
Software Engineering; Management of Computing and Information Systems

Target groups
Research

Type of publication
Commemorative publication

Due April 2011

2011. 400 p. Hardcover
► approx. € 99,95 | £90.00
► approx. $ (D) 106,45 | $ (A) 109,95 | SFr 143,50
ISBN 978-3-642-15872-7