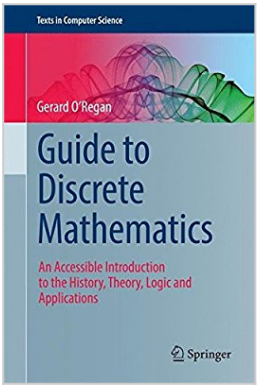

Guide to Discrete Mathematics: An Accessible Introduction to the History, Theory, Logic and Applications (Texts in Computer Science)

By Gerard O'Regan

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This stimulating textbook presents a broad and accessible guide to the fundamentals of discrete mathematics, highlighting how the techniques may be applied to various exciting areas in computing. The text is designed to motivate and inspire the reader, encouraging further study in this important skill.

Features: provides an introduction to the building blocks of discrete mathematics, including sets, relations and functions; describes the basics of number theory, the techniques of induction and recursion, and the applications of mathematical sequences, series, permutations, and combinations; presents the essentials of algebra; explains the fundamentals of automata theory, matrices, graph theory, cryptography, coding theory, language theory, and the concepts of computability and decidability; reviews the history of logic, discussing propositional and predicate logic, as well as advanced topics; examines the field of software engineering, describing formal methods; investigates probability and statistics.

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Editorial Review

Review
“This book is … an encyclopedic overview of topics of and related to discrete mathematics in the broad sense, including many topics from computer science and software engineering. … Each chapter has a summary and a list of review question which help the reader to recapitulate the contents … . for each topic the reader is able to grasp the specific flavor and can move forward to more specific and advanced literature.” (Dieter Riebesehl, zbMATH 1358.68004, 2017)

From the Back Cover

This stimulating textbook/reference presents a broad and accessible guide to the fundamentals of discrete mathematics, highlighting how the techniques may be applied to various exciting areas in computing. The text is designed to motivate and inspire the reader, encouraging further study in this important skill.

Topics and features:

- Provides an introduction to the building blocks of discrete mathematics, including sets, relations and functions
- Describes the basics of number theory, the techniques of induction and recursion, and the applications of mathematical sequences, series, permutations, and combinations
- Presents the essentials of algebra, covering simultaneous and quadratic equations, and the laws of logarithms and indices, in addition to such structures in abstract algebra as monoids, groups, rings, integral domains, fields, and vector spaces
- Explains the fundamentals of automata theory, matrices, graph theory, cryptography, coding theory, language theory, and the concepts of computability and decidability
- Reviews the history of logic, discussing propositional and predicate logic, as well as such advanced topics as fuzzy logic, temporal logic, intuitionistic logic, undefined values, theorem provers, and the applications of logic to AI
- Examines the important field of software engineering, describing formal methods, including the Z specification language
- Investigates probability and statistics, covering discrete random variables, probability distributions, sample spaces, variance and standard deviation, and hypothesis testing

This engaging and clearly written work offers an invaluable overview of discrete mathematics for undergraduate computer science students, and to students of mathematics interested in the rich applications of discrete mathematics to the field of computing.

About the Author

Dr. Gerard O'Regan is a CMMI software process improvement consultant with research interests including software quality and software process improvement, mathematical approaches to software quality, and the

history of computing. He is the author of such Springer titles as *Introduction to the History of Computing*, *Pillars of Computing*, *Introduction to Software Quality*, *Giants of Computing*, and *Mathematics in Computing*.

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