

PREFACE

This book presents a selection of topics from set theory, logic, combinatorics, graph theory and algebra (both linear and abstract), which we found to be essential and useful for students of mathematics, computer science and computer engineering. It is intended as a textbook for Bachelor and Master of Technology (computer engineering and information technology) and Master of Science (both in computer science and mathematics) levels. As a prerequisite the material presented requires a background in mathematics up to the end of secondary/high school level and a bit of college algebra. The book can be used for a two-semester course in discrete structures where, as for a one-semester course, some topics may be either omitted or not covered in full. The material included has been so chosen as it may be needed for any of the above-mentioned courses of many universities. Our aim in this book has been to present the material in a precise and readable manner, but giving complete logical arguments.

The authors, while teaching a course in discrete mathematics to the students of computer science and computer engineering at various institutes found that most books available on the subject either give too many topics and too much material or sometimes do not cover all the topics needed. The authors then prepared their own notes (separately) for this purpose, joined together to combine these into one set of notes and expanded the same to give the notes the shape of the present book. Care has been taken to include a large number of solved examples for the benefit of students not very sound in the background mathematics. Several unsolved exercises are included in each chapter (at the end of the chapter and also in the body text of the chapter). The presentation, throughout, is very simple and straightforward, but lucid. We expect that the book will be well received by students as well as teachers teaching the course and the ones using such materials in their study.

The term discrete structures/mathematics does not convey a fixed meaning and more topics could have been included here. But due to limitations of time and space, and other reasons, they have not made it into this title. We do intend to add (in a future edition) a chapter each on (a) fuzzy sets and fuzzy logic (necessary for artificial intelligence) and (b) finite automata. Although there are books available on these topics, an introductory chapter on each may be of help.

While teaching the course and preparing our notes, the books by (i) Kenneth H. Rosen (2003/2005), (ii) B. Kolman, R. C. Busby and S. C. Ross (2005), (iii) C. L. Liu (2000), (iv) L. L. Dornhoff and F. E. Hohn (1978), (v) R. Lidl and G. Pilz (1998), (vi) N. Jacobson (1964) were freely used. We would like to place on record our appreciation for these authors.

The authors would like to thank Avneesh Bhasin for typesetting the four chapters containing figures and diagrams. We would like to place on record our appreciation for our colleague Harish Chugh for helping us in converting the material to the format required. Without his help the project may perhaps have taken much longer to complete. The authors would like to thank the authorities of their respective institutes (i) Panipat Institute of Engineering and Technology, Samalkha and (ii) Apeejay Institute of Management, Dwarka, New Delhi, for providing the necessary facilities during the last stages of the project.

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