METADATA

Title: Algorithmic Graph Theory

Other Titles: -

Language: Greek

ISBN: 978-960-603-365-0

Subject: MATHEMATICS AND COMPUTER SCIENCE

Keywords: Graphs / Algorithms / Applications / Computer Networks / Combinatorics

Bibliographic Reference: Nikolopoulos, S., Georgiadis, L., & Palios, L. (2015). Algorithmic Graph Theory [Undergraduate textbook]. Kallipos, Open Academic Editions. http://dx.doi.org/10.57713/kallipos-803

Abstract

The proposed book covers the basic topics and algorithms of Graph Theory, as well as specific topics on Perfect Graphs, with presentations of applications and examples. Specifically, it introduces the fundamental concepts of Graph Theory and the basic techniques for designing and analyzing algorithms, the main topics of Graph Theory (trees, connectivity, distances and paths, Eulerian and Hamiltonian graphs, planar graphs, coloring), and topics and algorithms for recognition and optimization, along with applications in significant categories of Perfect Graphs (triangulated, transitively orientable, permutation, interval graphs). Due to their properties, many complex problems admit efficient algorithms. The chapters include constructive proofs, analysis of the algorithm complexity to measure their performance, examples that aid in understanding the concepts and algorithms, applications in fields such as operational research, archaeology, genetics, etc., and exercises for comprehension and assimilation of the material. The algorithms are described in a way that allows them to be easily implemented in any programming language. The book's subject matter makes it a valuable teaching tool for courses in graph theory, discrete mathematics, and algorithms. It is intended for undergraduate and graduate students in Computer Science and Applied Mathematics, researchers in these fields, as well as professionals interested in understanding related topics. Studying this book provides the reader with the background to: Understand topics and techniques in graph theory and model a wide range of applications, Apply algorithmic graph theory techniques to practical problems, Use graph algorithms to solve complex problems, and Develop efficient algorithms, as well as problem-solving methodologies and techniques.

The Project is funded by the National Development Programme 2021-2025 of the Ministry of Education and Religious Affairs and implemented by the Special Account for Research Funds of the National Technical University of Athens and the Hellenic Academic Libraries Link.