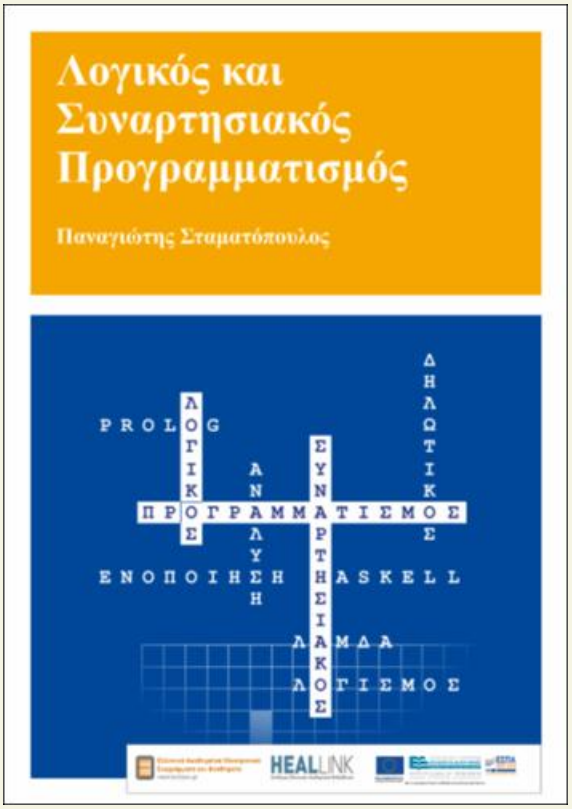

METADATA

Title: Logic and Functional Programming

Other Titles: -

Language: Greek

ISBN: 978-960-603-335-3

Subject: MATHEMATICS AND COMPUTER SCIENCE

Keywords: Logic Programming / Functional Programming / Logic / Programming Languages / Functions

Bibliographic Reference: Stamatopoulos, P. (2015). Logic and Functional Programming [Undergraduate textbook]. Kallipos, Open Academic Editions. http://dx.doi.org/10.57713/kallipos-648

Abstract

Two programming paradigms are presented in the book, quite different from procedural programming. We discuss logic programming and functional programming, two problem solving methodologies which, although quite different from each other, share the common characteristic of supporting a declarative way of programming. These methodologies are applied in practice through specific programming languages, but at the same time, they also have strict theoretical foundations. Initially, the concept of declarative programming is introduced and contrasted with procedural programming, mainly through examples of solving specific problems. Subsequently, an introductory description of the philosophy of logic programming is given, and the logic programming language Prolog is presented as a typical representative of this philosophy. A brief reference is made to issues related to the implementation of Prolog systems, topics concerning the capabilities of parallel processing in Prolog programming environments are discussed, and the concept of constraints in logic programming is introduced. Elements from first-order logic, which is the mathematical background of logic programming, are provided, and various approaches to studying the semantics of logic programs are presented at a relatively high level. In the next part of the book, the second declarative programming methodology, that of functional programming, is introduced, and a representative functional programming language, Haskell, is presented. Finally, some topics related to the theoretical background of functional programming, such as lambda calculus and combinators, are touched upon, as well as others related to the implementation techniques of functional programming languages, such as reduction orders and graph reduction.

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.