Answer Set Programming

- The chapters on the art of programming and on mathematical foundations will include many cross-references. They will help the reader appreciate the importance of clear mathematical thinking for the practice of declarative programming.
- The book will be self-contained and accessible to undergraduates majoring in computer science. It will discuss some of the ideas presented in technical conferences over the last five years. This combination of accessibility with covering cutting-edge research will make the book attractive to many readers.
- Examples of ASP programs in the book will emphasize the programming style proposed by the author in the September 2017 issue of Theory and Practice of Logic Programming.

Answer set programming (ASP) is a programming methodology oriented towards combinatorial search problems. In such a problem, the goal is to find a solution among a large but finite number of possibilities. The idea of ASP came from research on artificial intelligence and computational logic. ASP is a form of declarative programming: an ASP program describes what is counted as a solution to the problem, but does not specify an algorithm for solving it. Search is performed by sophisticated software systems called answer set solvers. Combinatorial search problems often arise in science and technology, and ASP has found applications in diverse areas—in historical linguistic, in bioinformatics, in robotics, in space exploration, in oil and gas industry, and many others. The importance of this programming method was recognized by the Association for the Advancement of Artificial Intelligence in 2016, when AI Magazine published a special issue on answer set programming. The book will introduce the reader to the theory and practice of ASP. It will describe the input language of the answer set solver CLINGO, which was designed at the University of Potsdam in Germany and is used today by ASP programmers in many countries. It will include numerous examples of ASP programs and present the mathematical theory that ASP is based on. There will be many exercises with complete solutions.

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