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Declarative Programming and Knowledge Management

Conference on Declarative Programming, DECLARE 2017
Unifying INAP, WFLP, and WLP
Würzburg, Germany, September 19–22, 2017
Revised Selected Papers

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Preface

This volume contains a selection of the papers presented at the International Conference on Declarative Programming Declare 2017. The joint conference was held in Würzburg, Germany, during September 19–22, 2017. It consisted of the 21st International Conference on Applications of Declarative Programming and Knowledge Management (INAP), the 31st Workshop on Logic Programming (WLP), and the 25th Workshop on Functional and (Constraint) Logic Programming (WFLP), and it was accompanied by a one-week summer school on Advanced Concepts for Databases and Logic Programming for students and PhD students.

Declarative programming is an advanced paradigm for modeling and solving complex problems, which has attracted increased attention over the last decades, e.g., in the domains of data and knowledge engineering, databases, artificial intelligence, natural language processing, modeling and processing combinatorial problems, and for establishing knowledge-based systems for the web. The conference Declare 2017 aimed to promote the cross-fertilizing exchange of ideas and experiences among researchers and students from the different communities interested in the foundations, applications, and combinations of high-level, declarative programming and related areas.

The INAP conferences provide a forum for intensive discussions of applications of important technologies around logic programming, constraint problem solving, and closely related advanced software. They comprehensively cover the impact of programmable logic solvers in the Internet society, its underlying technologies, and leading edge applications in industry, commerce, government, and societal services. Previous INAP conferences have been held in Japan, Germany, Portugal, and Austria. The Workshops on Logic Programming (WLP) are the annual meeting of the German Society for Logic Programming (GLP e.V.). They bring together international researchers interested in logic programming, constraint programming, and related areas like databases and artificial intelligence. Previous WLP workshops have been held in Germany, Austria, Switzerland, and Egypt. The International Workshop on Functional and Logic Programming (WFLP) brings together researchers interested in functional programming, logic programming, as well as the integration of these paradigms. Previous WFLP editions have been held in Germany, France, Spain, Italy, Estonia, Brazil, Denmark, and Japan. The topics of the papers of this year's joint conference Declare concentrated on three currently important fields: constraint programming and solving, functional and logic programming, and declarative programming.

The declarative programming paradigm expresses the logic of a computation in an abstract way. Thus, the semantics of a declarative language becomes easier to grasp for domain experts. Declarative programming offers many advantages for data and knowledge engineering, such as, e.g., security, safety, and shorter development time. During the last couple of years, a lot of research has been conducted on the usage of declarative systems in areas like answer set programming, reasoning, meta-programming, and deductive databases. Reasoning about knowledge wrapped in rules, databases, or the

Semantic Web allows to explore interesting hidden knowledge. Declarative techniques for the transformation, deduction, induction, visualization, or querying of knowledge have the advantage of high transparency and better maintainability compared to procedural approaches.

Many problems which occur in large industrial tasks are intractable, invalidating their solution by exact or even many approximate constructive algorithms. One approach which has made substantial progress over the last few years is constraint programming. Its declarative nature offers significant advantages, from a software engineering standpoint and in the specification, implementation, and maintenance phases. Several interesting aspects are in discussion: how can this paradigm be improved or combined with known, classical methods; how can real-world situations be modelled as constraint problems; what strategies may be pursued to solve a problem once it has been specified; or what is the experience of applications in really large industrial planning, simulation, and optimisation tasks?

Another area of active research is the use of declarative programming languages, in particular, functional and logic languages, to implement more reliable software systems. The closeness of these languages to logical models provides new methods to test and verify programs. Combining different programming paradigms is beneficial from a software engineering point of view. Therefore, the extension of the logic programming paradigm and its integration with other programming concepts are active research branches. The successful extension of logic programming with constraints has already been mentioned. The integration of logic programming with other programming paradigms has been mainly investigated for the case of functional programming, so that types, modules, higher-order operators, or lazy evaluation can also be used in logic-oriented computations.

The three events INAP, WLP, and WFLP were jointly organized by the University of Würzburg and the Society for Logic Programming (GLP e.V.). We would like to thank all authors who submitted papers and all conference participants for the fruitful discussions. We are grateful to the members of the Program Committee and the external referees for their timely expertise in carefully reviewing the papers. We would like to express our thanks to the German Federal Ministry of Education and Research (BMBF) for funding the summer school on Advanced Concepts for Databases and Logic Programming (under 01PL16019) and to the University of Würzburg for hosting the conference in the new Central Lecture Building Z6 and for providing the Tuscany Hall in the Baroque style Würzburg Residence Palace for a classical music concert in honor of Jack Minker, a pioneer in deductive databases and disjunctive logic programming and the longtime mentor of the first editor, who celebrated his 90th birthday in 2017.

July 2018

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