Answer Set Programming

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Abstract

Answer Set Programming (ASP; [1], [2], [3], [4]) is a declarative problem solving approach, combining a rich yet simple modeling language with high-performance solving capacities. ASP is particularly suited for modeling problems in the area of Knowledge Representation and Reasoning involving incomplete, inconsistent, and changing information. From a formal perspective, ASP allows for solving all search problems in NP (and NP^{NP}) in a uniform way (being more compact than SAT). Applications of ASP include automatic synthesis of multiprocessor systems, decision support systems for NASA shuttle controllers, Linux package configuration, reasoning tools in systems biology, and many more. The versatility of ASP is also reflected by the ASP solver `clasp` [5], [6], [7], developed at the University of Potsdam, winning first places at first places at ASP, CASC, MISC, PB, and SAT competitions. This short tutorial presents a practical introduction to ASP, aiming at using ASP languages and systems for solving application problems. Starting from the essential formal foundations, it introduces ASP's solving technology, modeling language and methodology, while practically illustrating the overall solving process by examples.

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