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# Research Challenges and Opportunities in Knowledge Representation, Section 2.4.2 Advances in satisfiability and answer set programming

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### 2.4.2 Advances in satisfiability and answer set programming

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Declarative problem solving is another area of significant algorithmic and representation advances in the past decade. The best example in this area is Answer Set Programming (ASP, for short). Answer Set Programming (Brewka et al., 2011) is a declarative programming paradigm stemming from knowledge representation and reasoning formalism based on the answer set semantics of logic programs. Answer set programming offers a simple, yet powerful, modeling language for optimization and search problems. It is particularly useful in solving search problems where the goal is to find a solution among a finite, but very large, number of possibilities. Problems of this kind are encountered in many areas of science and technology. Typically, determining whether such a problem is solvable is NP--hard. Indeed, answer set programming has close connections to another prominent field of knowledge representation—satisfiability (Gomes et al., 2008). Satisfiability and answer set programming in the past decade have seen ever faster computational tools, and a growing list of successful practical applications. For example, satisfiability solvers are used as general purpose tools in areas such as software and hardware verification, automatic test pattern generation, planning, and scheduling (Gomes et al., 2008). Advances in algorithmic techniques developed for satisfiability then enable advances in other areas of automated reasoning including answer set programming, satisfiability modulo theory, first order model building, constraint programming. At the same time, answer set programming is increasingly leaving its mark in tackling applications in science, humanities, and industry (Brewka et al., 2011).