clasp: A Conflict-Driven Answer Set Solver

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clasp combines the high-level modeling capacities of Answer Set Programming (ASP; [1]) with state-of-the-art techniques from the area of Boolean constraint solving. Hence, it is originally designed and optimized for conflict-driven ASP solving [2–4]. However, given the proximity of ASP to SAT, *clasp* can also deal with formulas in CNF via an additional DIMACS frontend. As such, it can be viewed as a chaff-type Boolean constraint solver [5].

From a technical perspective, *clasp* is implemented in C++ and was submitted in its source code, which is publicly available at [6]. Formulas in CNF are pre-processed internally relying on concepts borrowed from SatElite [7] as used in MiniSat 2.0 but implemented in a rather different way. Most innovative algorithms and data structures aim at ASP solving and are thus outside the scope of SAT solving. Among them, *clasp* supports further ASP-oriented preprocessing techniques and native support of aggregates, such as cardinality and weight constraints [8].

References

1. Baral, C.: Knowledge Representation, Reasoning and Declarative Problem Solving. Cambridge University Press (2003)
2. Gebser, M., Kaufmann, B., Neumann, A., Schaub, T.: Conflict-driven answer set solving. In Veloso, M., ed.: Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI'07), AAAI Press (2007) 386–392
3. Gebser, M., Kaufmann, B., Neumann, A., Schaub, T.: clasp: A conflict-driven answer set solver. [9] 260–265
4. Gebser, M., Kaufmann, B., Neumann, A., Schaub, T.: Conflict-driven answer set enumeration. [9] 136–148
5. Moskewicz, M., Madigan, C., Zhao, Y., Zhang, L., Malik, S.: Chaff: Engineering an efficient SAT solver. In: Proceedings of the Thirty-eighth Conference on Design Automation (DAC'01), ACM Press (2001) 530–535
6. `http://www.cs.uni-potsdam.de/clasp`
7. Eén, N., Biere, A.: Effective preprocessing in SAT through variable and clause elimination. In Bacchus, F., Walsh, T., eds.: Proceedings of the Eigth International Conference on Theory and Applications of Satisfiability Testing (SAT'05). Volume 3569 of Lecture Notes in Computer Science., Springer-Verlag (2005) 61–75
8. Simons, P., Niemelä, I., Soininen, T.: Extending and implementing the stable model semantics. Artificial Intelligence **138**(1-2) (2002) 181–234
9. Baral, C., Brewka, G., Schlipf, J., eds.: Proceedings of the Ninth International Conference on Logic Programming and Nonmonotonic Reasoning (LPNMR'07). Volume 4483 of Lecture Notes in Artificial Intelligence., Springer-Verlag (2007)

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