A domain-specific debugger for the PetitParser parser framework

Andrei Chiş[1], Tudor Gîrba[2], Oscar Nierstrasz[1]

[1] Software Composition Group, University of Bern, `http://scg.unibe.ch`
[2] CompuGroup Medical Schweiz AG, `tudor@tudorgirba.com`

Abstract   Given the various types of data and domain-specific languages used in today's software systems, the development of parsers has become a common activity. Parser frameworks offer a convenient and fast solution as they can generate parsers from grammar specifications. *PetitParser* [3] is an example of such a framework that makes it possible to model grammars and parsers as objects. It further makes it easy to dynamically reuse, compose, transform and extend grammars. While this improves the creation of parsers it introduces a significant overhead when debugging parsers using the debugger of the host language/IDE. Since the host debugger has no knowledge of parsing it cannot exploit the grammar specification to guide the debugging of the generated parser. Users have to manually recover this link by manipulating low-level concepts like message sends or variable lookups, leading to an inefficient and error-prone debugging effort. To address these problems we developed a domain-specific debugger for PetitParser. This debugger offers, on the one hand, a dedicated user interface that shows parsing related information (*e.g.*, the input being parsed, a graphical representation of the grammar) and, on the other hand, a set of debugging operations at the level of the grammar (*e.g.*, set a breakpoint when a grammar production is exercised) and of the input (*e.g.*, set a breakpoint when a certain part of the input is being parsed). This debugger was created using the *Moldable Debugger* [1,2], a framework for developing domain-specific debuggers (more information can be found at: `scg.unibe.ch/research/moldabledebugger`). In this demo we show the limitations of the host debugger, introduce the new debugger for PetitParser, show how it improves the debugging process by applying it to real-world parsers and discuss several design decisions. A screencast introducing the PetitParser debugger can be found at: `vimeo.com/83017762`.

References

1. Chiş, A., Nierstrasz, O., Gîrba, T.: Towards a moldable debugger. In: Proc. DYLA'13 (2013), `http://scg.unibe.ch/archive/papers/Chis13a-TowardsMoldableDebugger.pdf`
2. Chiş, A., Nierstrasz, O., Gîrba, T.: The moldable debugger: a framework for developing domain-specific debuggers. In: Proc. of SLE. p. to appear (2014)
3. Renggli, L., Ducasse, S., Gîrba, T., Nierstrasz, O.: Practical dynamic grammars for dynamic languages. In: Proc. DYLA'10 (Jun 2010), `http://scg.unibe.ch/archive/papers/Reng10cDynamicGrammars.pdf`