

Abstract

This dissertation presents a formal tool for Modular Structural Operational Semantics (MSOS), based on the conversion from MSOS to Rewriting Logic recently developed by Braga and Meseguer. The implementation, named *Maude MSOS Tool* (MMT), was written in Maude, a high-performance implementation of Rewriting Logic. The development of MMT attempts not only to provide an MSOS interpreter that uses a specification language that is closer to the domain of MSOS specifications than to Maude specifications, but also to demonstrate what can be accomplished when one develops a formal tool in the Maude environment, since it allows the use of other formal tools already available with MSDF specifications. We have demonstrated this by simulating and model checking concurrent programs and distributed algorithms. Another aim is to provide an example of a non-trivial extension of Full Maude and to create a tool that is itself extensible.