The ProB Animator and Model Checker

(Redirected from Main Page (/stups/prob/index.php?title=Main_Page&redirect=no))

ProB is an animator, constraint solver and model checker for the B-Method (http://en.wikipedia.org/wiki/B-Method) (see the B-Method site of Clearsy (http://www.clearsy.com/en/our-specific-know-how/b-method/?lang=en)). It allows fully automatic animation of B specifications, and can be used to systematically check a specification for a wide range of errors. The constraint-solving capabilities of ProB can also be used for model finding, deadlock checking (/stups/prob/index.php/Constraint_Based_Checking) and test-case generation (/stups/prob/index.php/Test_Case_Generation).

The B language is rooted in predicate logic, arithmetic and set theory and provides support for data structures such as (higher-order) relations, functions and sequences. In addition to the B language, ProB also supports Event-B (http://www.event-b.org/), CSP-M (http://en.wikipedia.org/wiki/Communicating_sequential_processes), TLA+ (http://research.microsoft.com/en-us/um/people/lamport/tla/tla.html), and Z (http://en.wikipedia.org/wiki/Z_notation). ProB can be installed within Rodin (http://sourceforge.net/projects/rodin-b-sharp/), where it comes with BMotionStudio (http://www.stups.uni-duesseldorf.de/BMotionStudio/) to easily generate domain specific graphical visualizations.

ProB is being used within Siemens, Alstom, and several other companies for data validation (http://www.data-validation.fr) of complicated properties for safety critical systems. Commercial support is provided by the spin-off company Formal Mind (http://www.formalmind.com) or by Nobreach (http://nobreach.se). It can be used within Atelier-B as a disprover and prover (http://www.atelierb.eu/en/2016/02/18/atelier-b-4-3-1-is-available-for-maintenance-holders/).

Part of the research and development was conducted within various research projects, such as the EPSRC (http://www.epsrc.ac.uk/default.htm) funded projects ABCD (http://users.ecs.soton.ac.uk/phh/abcd/) and iMoc (http://users.ecs.soton.ac.uk/mal/ISM.html), the EU funded projects Rodin (http://rodin.cs.ncl.ac.uk/), Deploy (http://www.deploy-project.eu/) and Advance (http://www.advance-ict.eu/) as well as the DFG (http://www.dfg.de/) project Gepavas (http://www.gepavas.de/).

Automatically generated test coverage reports are available (http://nightly.cobra.cs.uni-duesseldorf.de/coverage/html/).

News

20/10/2016 ProB 1.6.1 (/stups/prob/index.php/Download) is available. Highlights: Latex document generation (/stups/prob/index.php/Generating_Documents_with_ProB_and_Latex), LET and IF-THEN-ELSE for expressions and predicates, XML logging and data import, performance improvements.

22/4/2016 ProB 1.6.0 (/stups/prob/index.php/Download) is available. Highlights: directed model checking (/stups/prob/index.php/Tutorial_Directed_Model_Checking), Z3 available as backend (/stups/prob/index.php/Using_ProB_with_Z3), B line comments and unicode symbols, improved error messages, performance improvements.

19/2/2015 ProB 1.5.0 (/stups/prob/index.php/DownloadPriorVersions) is available. Highlights: improved random enumeration, static symmetry reduction for deferred set elements, MC/DC coverage analysis for guards and invariants, improved TLC interface (/stups/prob/index.php/TLC), bug fixes and improvements.

3/6/2014 ProB supports Event-B Theories (/stups/prob/index.php/Event-B_Theories).

30/03/2012 A first version of the online ProB Logic Calculator (/stups/prob/index.php/ProB_Logic_Calculator) is available.

More in Release History (/stups/prob/index.php/Download#Short_Release_History)

Implementation

The core of ProB is implemented in SICStus Prolog (http://www.sics.se/isl/sicstuswww/site/index.html) (but can be run without a SICStus Prolog license). The ProB constraint solver is implemented using co-routining and the CLP(FD) finite domain library of SICStus. An alternate constraint solver based on Kodkod (and thus SAT) (/stups/prob/index.php/Using_ProB_with_KODKOD) is also available within ProB, as is an integration with the SMT solver Z3 (/stups/prob/index.php/Using_ProB_with_Z3). An alternate model checking engine (using TLC) (/stups/prob/index.php/TLC) well-suited for lower level B specifications is also available. The ProB Licence can be found here (/stups/prob/index.php/ProBLicence).

Features

ProB covers a large part of B (/stups/prob/index.php/Summary_of_B_Syntax), and we are striving towards full coverage of Atelier B and B4Free constructs. ProB supports B features such as non-deterministic operations, ANY statements, operations with complex arguments, sets, sequences, functions, lambda abstractions, set comprehensions, records, constants and properties, and many more. Not supported are some of the Atelier B tree operations and there are restrictions on DEFINITIONS. ProB does support multiple machines, refinements, and implementations. ProB can also be used for automated refinement checking (/stups/prob/index.php/Refinement_Checking) and LTL model checking (/stups/prob/index.php/LTL_Model_Checking). It also supports almost full CSP-M (/stups/prob/index.php/CSP-M) process descriptions, to be used on their own or to guide B machines for specification and property validation. The state space of

the specifications can be graphically visualized (/stups/prob/index.php/Graphical_Viewer). ProB also supports Z specifications (ProB in this context is sometimes called ProZ (/stups/prob/index.php/ProZ)) as well as TLA+ specifications (/stups/prob/index.php/TLA). We now also have an online ProB Logic Calculator (/stups/prob/index.php/ProB_Logic_Calculator).