Rodin 3.10 and its plug-ins

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1 Introduction

The Rodin platform [1] is an integrated development environment for designing software with Event-B [2]. Based on Eclipse, it is designed to be extensible with plug-ins. Thanks to support from the French ANR project Event-B Rodin Plus (EBRP, ANR-19-CE25-0010), Rodin and many of its plug-ins are actively updated. We present the evolutions of the platform since ABZ 2024.

2 Rodin 3.10

As usual, some new proof rules have been added:

- a rewrite rule for direct product: $(f \otimes g)(x) \equiv f(x) \mapsto g(x)$
- a rewrite rule for parallel product: $(f \parallel g)(x) \equiv f(prj1(x)) \mapsto g(prj2(x))$
- an inference rule on bounds of upto that deduces $a = c \wedge b = d$ from a hypothesis $a..b = c..d$, provided that $a \leq b$

The *abstract expression* tactic has been extended again. Now, in addition to a single name, users can also do simple pattern matching:

- with maplets such as $a \mapsto b = e$; the patterns can be arbitrarily complex, for example $(a \mapsto (b \mapsto c)) \mapsto (d \mapsto e) = x$;
- with a datatype constructor if its datatype only has one constructor; this is particularly useful for record-like datatypes: given a record like $R = C(a \oftype \mathbb{Z}, b \oftype \mathbb{Z}, c \oftype BOOL)$, one can provide as input for *ae* expressions like $C(x, y, z) = r$.

The *oftype* operator could only be applied to atomic expressions. It can now also be applied to extensions that cannot be typed by themselves (typically datatype constructors and operators from the Theory plug-in). For instance, $\text{Either}(A, B) = \text{Left}(a \oftype A) \mid \text{Right}(b \oftype B)$ was unusable: given $\text{Left}(x)$, type parameter A could be deduced from the type of x, but B could not be inferred and conversely for Right. Now, one can use *oftype*, e.g., $\text{Left}(0) \oftype \text{Either}(\mathbb{Z}, BOOL)$.

Peter Riviere found a breaking bug in the translation of datatypes to set theory for SMT provers. Luckily, this bug seems to have a rather limited impact: it appears that the only SMT prover that could use that erroneous translation to prove false is Alt-Ergo, which is not installed by default. Only those who manually added Alt-Ergo and used the Theory plug-in were potentially affected by this issue.

Finally, miscellaneous issues have fixed, particularly to make Rodin a bit more user-friendly:

- a warning is now displayed for expressions matching $\exists X \cdot P \Rightarrow Q$: an implication in an existentially quantified predicate is typically a mistake;
- external provers are now checked several times at startup if they seem to not be working; this will prevent error messages about provers failing due to a timeout: it was caused by a slow startup, but provers actually worked well after the first (slow) execution;
- the text area input in Proof Control is now always saved in the history and cleared when a tactic is executed (the behaviour used to depend on the type of tactic applied);
- the tactic profile dialog has been fixed: one of the parts was too narrow and could only be seen after manually resizing the window.

3 Plug-ins

3.1 Atelier B plug-in

In collaboration with Clearsy, we released two new versions of the Atelier B plug-in for Rodin. Version 2.4.0 updated the provers to include those from the latest release (24.04.2) of Atelier B. Version 2.4.1 fixed a breaking bug with some Chinese editions of Windows.

3.2 SMT provers plug-in

The SMT provers plug-in is currently being updated. The release will feature:

- updated provers (CVC4 from version 1.5 to 1.8 and Z3 from version 4.4.1 to 4.14.1);
- a new prover, CVC5 (version 1.2.1);
- Apple Silicon builds of the provers, in addition to the 64-bit Intel ones.

3.3 Compatibility updates

Although Eclipse and Rodin offer a very stable platform for plug-in development, some very old plug-ins ended up not working with the latest Rodin releases. The following plug-ins have been updated to work with recent Rodin releases:

- B2Latex (release 0.8)
- Renaming Refactory (release 1.4.0)
- Generic Instantiation (Soton) (release 1.1.0)

4 Conclusion

Rodin is under active development and new versions are released yearly. The development team is also updating many plug-ins to ensure that they keep working with new versions of Rodin.

References

[1] Jean-Raymond Abrial, Michael Butler, Stefan Hallerstede, Thai Son Hoang, Farhad Mehta, and Laurent Voisin. *Rodin: an open toolset for modelling and reasoning in Event-B.* International Journal on Software Tools for Technology Transfer, 12(6):447–466, Nov 2010.

[2] Jean-Raymond Abrial. *Modeling in Event-B: System and Software Engineering.* Cambridge University Press, New York, NY, USA, 1st edition, 2010.