

BART: A Tool for Automatic Refinement^{*}

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1 Extended Abstract

Refining a B specification into an implementation can be a complex and time consuming process. This process can usually be separated in two distinct parts: the specification part, where the refinement is used to introduce new properties and specification details, and the implementation, where refinement is used to convert a detailed B specification into a B0 implementation. The first part requires human interaction, since it corresponds to writing the specification. However, the implementation part is more mechanical, and usually corresponds to apply known refinement schemes.

The BART tool aims to provide helps for this second part of the B development, by automatically refining machines or refinements to B0 implementations.

To refine a specification, the tool uses rules describing refinement patterns using pattern matching. Those rules allows the refinement of both data and algorithm: abstract variables are refined to concrete variables, and the substitutions used within the abstract machines are refined into equivalent B0 substitutions.

A set of default refinement rules is provided with the tool, however, users can also write new refinement rules to handle more complex refinements. Rules can be customized safely, as the proof of the generated machines still has to be performed. So, an incorrect refinement rule will lead to an incorrect refinement, which will be detected during the proof.

Using an automatic refinement tool provides several benefits: the most obvious is that it automatizes repetitive tasks. However, it is also a way of reusing refinement patterns, and capitalizing on refinement experience, and can also simplify the proof of the generated components by using well-known refinement patterns. The BART tool is currently in development and will be integrated in the next major version of Atelier B.

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