

Automatic Translation from UML Specifications to B

– *PhD Thesis Abstract* –

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The research to merge the relatively simple and graphical nature of UML [10] with the firm semantics bases of B [1] has been mentioned several time in the literature [3, 8, 9]. The goal is to propose automatic derivation schemes from UML to B specifications. Then, the construction of UML specifications is rigorously controlled by analyzing derived B specifications thanks to powerful B support tools.

Dealing with the modeling UML behavioral diagrams in B, which has not been treated so far, is the main objective of the current work. We emphasize on the translation from use case [2], interaction [6, 5] and state-chart [7] diagrams into B specifications. We formalize each class operation, use case, event as a B operation which is encapsulated in a B abstract machine where are modeled the class data involved by the class operation, use case or event in question. In order to get the derived B specification more structured, we consider the class operation calling-called dependency, the use case structuring and the relation between events and its triggered transition. To complete the derivation schemes, we have proposed three derivation procedures based on class operations, use case and events

In addition, we have envisaged the following verifications on UML specifications [4]: (i) the consistency of the class invariant; (ii) the conformity of object and state-chart diagrams regarding the class diagrams; (iii) the conformity of class operations, use cases regarding the class invariant; (iv) the class operation calling-called dependency and (v) the use case structuring.

We study also the possibility for formalizing the UML refinement dependency by the B refinement. Currently, we follow the Catalysis view point about the object refinement. So we distinguish between three types of object refinement: the use case refinement; the operation refinement and the model refinement. We have found that the approach for modeling use cases in B can be applied with the B formalization of the use case refinement; the approach for modeling class operation can also be applied for the B formalization of the operation refinement. It remains to formalize in B the model refinement. This work becomes using B refinement to model the refinement link between two object

models in which one is supposed to refine the other[3].

Finally, the support tool for automatic derivation from UML notations into B [8], is extended to take into account the new UML-B derivation schemes.

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