Chapter 7
Mappings of MOF Metamodels and Object-Oriented Languages

INTRODUCTION

This chapter discusses the main steps for transforming NEREUS constructions into object oriented languages. As an example, we use the Eiffel language that allows integrating specifications with Eiffel contracts (Meyer, 1992). Figure 1 shows the main steps.

The Eiffel code is constructed gradually. First, associations and operation signature are translated. The transformation is supported by reusable components. From OCL and NEREUS specifications it is possible to construct contracts on Eiffel and/or feature implementations by applying heuristics.

MAPPING CLASSES AND ASSOCIATIONS

For generating code from some NEREUS specification we need transformation rules. For each class in NEREUS an Eiffel class is built. If a NEREUS class is incomplete, i.e., it contains sorts and operations in the clause DEFERRED, the keyword class in Eiffel is preceded by the keyword deferred. NEREUS and Eiffel have the same syntax for declaring class parameters. Then, this transformation is reduced to a trivial translation.

The relation introduced in NEREUS using the clause IMPORTS will be translated into a client relation in Eiffel. The relation expressed through the keyword INHERITS in NEREUS will become an inheritance relation in Eiffel. This provides the mechanism to carry out modifications on the inherited classes that will allow adaptation. Also, subsortings will become inheritance relations.

Associations are transformed by instantiating schemes that exist in the reusable component Association. A component is defined in three levels of abstraction that integrate NEREUS incomplete algebraic specifications, complete algebraic specifications and object oriented code.

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Figure 1. From NEREUS to object oriented languages

Figure 2 depicts a specific Association component including schemes for the Eiffel language. It describes taxonomy of associations classified according to kind, degree, navigability and multiplicity.

The first level describes a hierarchy of incomplete specifications of associations using NEREUS and OCL. Every leaf in this level corresponds to sub-components at the second level.

A realization sub-component is a tree of algebraic specifications: the root is the most abstract definition and the internal nodes correspond to different realizations of the root. For example, for a “binary,
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