Part III Factoring Models and Designs

Part II was about the basic Catalysis tools for modeling the statics, dynamics, and interactions of objects. When faced with complex systems, we need to decompose the problem into smaller parts. We use the basic tools to separately model and understand the parts; then we need a means of putting them back together, to model and understand how the parts interact.

Part III is about tools for separating the various aspects of a problem or a design and then rejoining them.

One of the most natural ways to deal with a complex system is to step back from the details, specifying only its essential aspects—an abstraction. However, when faced with the detailed version—a refinement—you must understand how it relates to the abstract version, and you must test that an implementation correctly meets the abstract specification. Chapter 6, Abstraction, Refinement, and Testing, shows how these fit together, using four specific kinds of refinement.

It also helps to separate aspects of the system that are mostly independent; they can be worked on, managed, and version-controlled separately. Chapter 7, Using Packages, shows how all descriptions are grouped into units called packages. The *import* relationship between packages determines which definitions depend on which others and how implementations and specifications are related. Every modeling statement is made within a package. Catalysis offers specific mechanisms for extending definitions across packages.

Chapter 8, Composing Models and Specifications, discusses what it means to compose models that have partial definitions from different views or packages, paying special attention to specifying exceptions.

Chapter 9, Model Frameworks and Template Packages, shows how recurring patterns of types, collaborations, and refinement can be captured using the idea of a framework: a template package. The resulting model can then be used as a skeletal model that is applied with various specializations to different problems. Frameworks enable you to define new modeling constructs.