



The Unified Modeling Language User Guide (2nd Edition)

By Grady Booch, James Rumbaugh, Ivar Jacobson

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In this eagerly anticipated revision of the best-selling and definitive guide to the use of the UML, the creators of the language provide a tutorial to its core aspects in a two-color format designed to facilitate learning. Starting with an overview of the UML, the book explains the language gradually by introducing a few concepts and notations in each chapter. It also illustrates the application of the UML to complex modeling problems across a variety of application domains. The in-depth coverage and example-driven approach that made the first edition of *The Unified Modeling Language User Guide* an indispensable resource remain unchanged. However, content has been thoroughly updated to reflect changes to notation and usage required by UML 2.0.

Highlights include:

- A new chapter on components and internal structure, including significant new capabilities for building encapsulated designs
- New details and updated coverage of provided and required interfaces, collaborations, and UML profiles
- Additions and changes to discussions of sequence diagrams, activity diagrams, and more
- Coverage of many other changes introduced by the UML 2.0 specification

With this essential guide, you will quickly get up to speed on the latest features of the industry standard modeling language and be able to apply them to your next software project.

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Editorial Review

Amazon.com Review

One of the most important recent developments in software engineering is the Unified Modeling Language (UML) standard for documenting software designs. Written by UML's inventors (the so-called Three Amigos of software engineering), *The Unified Modeling Language User Guide* provides a very appealing guide to all the fundamentals of using UML effectively. The book opens with a basic tour of the essential concepts and modeling diagrams used in UML, including class diagrams, use case diagrams, and basic modeling principles. The authors pay close attention to modeling classes (and documenting the relationships between classes) as well as use case diagrams (which show how software will be used by various actors in a system). This book mixes in a little software-engineering theory, too, but it makes use of clear examples and actual UML diagrams to illustrate key concepts.

Later in the book, the authors discuss more difficult notational diagrams (such as state diagrams and activity diagrams, which can be used to model behavior in a system). Whatever your background in software engineering, you'll no doubt appreciate the author's clear explanations of basic (and advanced) modeling concepts, as well as the nuts-and-bolts details of today's powerful UML. With its combination of expert modeling advice and excellent detail on the specifics of UML, this book will be absolutely essential reading for anyone who wants to use UML for real-world software design. --*Richard Dragan*

From the Inside Flap

The Unified Modeling Language (UML) is a graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system. The UML gives you a standard way to write a system's blueprints, covering conceptual things, such as business processes and system functions, as well as concrete things, such as classes written in a specific programming language, database schemas, and reusable software components.

This book teaches you how to use the UML effectively. Goals

In this book, you will

Learn what the UML is, what it is not, and why the UML is relevant to the process of developing software-intensive systems Master the vocabulary, rules, and idioms of the UML and, in general, learn how to "speak" the language effectively Understand how to apply the UML to solve a number of common modeling problems

The user guide provides a reference to the use of specific UML features. However, it is not intended to be a comprehensive reference manual for the UML; that is the focus of another book, *The Unified Modeling Language Reference Manual* (Rumbaugh, Jacobson, Booch, Addison-Wesley, 1999).

The user guide describes a development process for use with the UML. However, it is not intended to provide a complete reference to that process; that is the focus of yet another book, *The Unified Software Development Process* (Jacobson, Booch, Rumbaugh, Addison-Wesley, 1999).

Finally, this book provides hints and tips for using the UML to solve a number of common modeling problems, but it does not teach you how to model. This is similar to a user guide for a programming language

that teaches you how to use the language but does not teach you how to program. Audience

The UML is applicable to anyone involved in the production, deployment, and maintenance of software. The user guide is primarily directed to members of the development team who create UML models. However, it is also suitable to those who read them, working together to understand, build, test, and release a software-intensive system. Although this encompasses almost every role in a software development organization, the user guide is especially relevant to analysts and end users (who specify the required structure and behavior of a system), architects (who design systems that satisfy those requirements), developers (who turn those architectures into executable code), quality assurance personnel (who verify and validate the system's structure and behavior), librarians (who create and catalogue components), and project and program managers (who generally wrestle with chaos, provide leadership and direction, and orchestrate the resources necessary to deliver a successful system).

The user guide assumes a basic knowledge of object-oriented concepts. Experience in an object-oriented programming language or method is helpful but not required. How to Use This Book

For the developer approaching the UML for the first time, the user guide is best read linearly. You should pay particular attention to Chapter 2, which presents a conceptual model of the UML. All chapters are structured so that each builds upon the content of the previous one, thus lending itself to a linear progression.

For the experienced developer seeking answers to common modeling problems using the UML, this book can be read in any order. You should pay particular attention to the common modeling problems presented in each chapter. Organization and Special Features

The user guide is organized into seven major sections:

Section 1 Getting Started Section 2 Basic Structural Modeling Section 3 Advanced Structural Modeling
Section 4 Basic Behavioral Modeling Section 5 Advanced Behavioral Modeling Section 6 Architectural
Modeling Section 7 Wrapping Up

The user guide contains three appendices: a summary of the UML notation, a list of standard UML elements, and a summary of the Rational Unified Process. A glossary of common terms is also provided.

Each chapter addresses the use of a specific UML feature, and most are organized into the following four sections:

Getting Started Terms and Concepts Common Modeling Techniques Hints and Tips

The third section introduces and then solves a set of common modeling problems. To make it easy for you to browse the guide in search of these use cases for the UML, each problem is identified by a distinct heading.

Each chapter begins with a summary of the features it covers, as in the following example.

In this chapter

Active objects, processes, and threads Modeling multiple flows of control Modeling interprocess
communication Building thread-safe abstractions

Similarly, parenthetical comments and general guidance are set apart as notes, as in the following example.

Note: You can specify more complex multiplicities by using a list, such as 0..1, 3..4, 6..*, which would mean "any number of objects other than 2 or 5."

The UML is semantically rich. Therefore, a presentation about one feature may naturally involve another. In such cases, cross references are provided in the left margin. Blue highlights are used in figures to distinguish text that explains a model from text that is part of the model itself. Code is distinguished by displaying it in a monospace font, as in this example. A Brief History of the UML

Object-oriented modeling languages appeared sometime between the mid 1970s and the late 1980s as methodologists, faced with a new genre of object-oriented programming languages and increasingly complex applications, began to experiment with alternative approaches to analysis and design. The number of object-oriented methods increased from fewer than 10 to more than 50 during the period between 1989 and 1994. Many users of these methods had trouble finding a modeling language that met their needs completely, thus fueling the so-called method wars. Learning from experience, new generations of these methods began to appear, with a few clearly prominent methods emerging, most notably Booch, Jacobson's OOSE (Object-Oriented Software Engineering), and Rumbaugh's OMT (Object Modeling Technique). Other important methods included Fusion, Shlaer-Mellor, and Coad-Yourdon. Each of these was a complete method, although each was recognized as having strengths and weaknesses. In simple terms, the Booch method was particularly expressive during the design and construction phases of projects, OOSE provided excellent support for use cases as a way to drive requirements capture, analysis, and high-level design, and OMT-2 was most useful for analysis and data-intensive information systems.

A critical mass of ideas started to form by the mid 1990s, when Grady Booch (Rational Software Corporation), Ivar Jacobson (Objectory), and James Rumbaugh (General Electric) began to adopt ideas from each other's methods, which collectively were becoming recognized as the leading object-oriented methods worldwide. As the primary authors of the Booch, OOSE, and OMT methods, we were motivated to create a unified modeling language for three reasons. First, our methods were already evolving toward each other independently. It made sense to continue that evolution together rather than apart, eliminating the potential for any unnecessary and gratuitous differences that would further confuse users. Second, by unifying our methods, we could bring some stability to the object-oriented marketplace, allowing projects to settle on one mature modeling language and letting tool builders focus on delivering more useful features. Third, we expected that our collaboration would yield improvements for all three earlier methods, helping us to capture lessons learned and to address problems that none of our methods previously handled well.

As we began our unification, we established three goals for our work:

To model systems, from concept to executable artifact, using object-oriented techniques
To address the issues of scale inherent in complex, mission-critical systems
To create a modeling language usable by both humans and machines

Devising a language for use in object-oriented analysis and design is not unlike designing a programming language. First, we had to constrain the problem: Should the language encompass requirements specification? Should the language be sufficient to permit visual programming? Second, we had to strike a balance between expressiveness and simplicity. Too simple a language would limit the breadth of problems that could be solved; too complex a language would overwhelm the mortal developer. In the case of unifying existing methods, we also had to be sensitive to the installed base. Make too many changes, and we would confuse existing users; resist advancing the language, and we would miss the opportunity of engaging a much broader set of users and of making the language simpler. The UML definition strives to make the best trade-offs in each of these areas.

The UML effort started officially in October 1994, when Rumbaugh joined Booch at Rational. Our project's initial focus was the unification of the Booch and OMT methods. The version 0.8 draft of the Uni

From the Back Cover

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Users Review

From reader reviews:

Steven Clayton:

Nowadays reading books become more than want or need but also get a life style. This reading habit give you lot of advantages. The advantages you got of course the knowledge even the information inside the book that improve your knowledge and information. The details you get based on what kind of reserve you read, if you want attract knowledge just go with education and learning books but if you want really feel happy read one using theme for entertaining like comic or novel. The The Unified Modeling Language User Guide (2nd Edition) is kind of guide which is giving the reader unpredictable experience.

Ian Ashlock:

The e-book with title The Unified Modeling Language User Guide (2nd Edition) has a lot of information that you can study it. You can get a lot of benefit after read this book. This specific book exist new expertise the

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Monica Ceja:

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Michael Scott:

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