# Preface

## Writing This Book

Dear Reader, what you hold in your hand is the result of a meticulous high-tech operation that took many months and required inspecting many parts, removing certain parts, retrofitting some old parts, and adding many new parts to our previous book on an earlier Java programmer certification exam, until we were completely satisfied with the result. After you have read the book and passed the exam, we hope that you will appreciate the TLC (tender loving care) that has gone into this operation. This is how it all came about.

Learning the names of Java certifications and the required exams is the first item on the agenda. This book provides coverage for the exam to earn *Oracle Certified Associate (OCA), Java SE 8 Programmer Certification* (also know as OCAJP8). The exam required for this certification has the name *Java SE 8 Programmer I Exam* (*Exam number 1Z0-808*). It is the first of two exams required to obtain *Oracle Certified Professional (OCP), Java SE 8 Programmer Certification* (also known as OCPJP8). The second exam required for this professional certification has the name *Java SE 8 Programmer II Exam* (*Exam number 1Z0-809*). To reiterate, this book covers only the topics for the *Java SE 8 Programmer I Exam* that is required to obtain OCAJP8 certification.

A book on the new Java SE 8 certification was a long time coming. The mantle of Java had been passed on to Oracle and Java 7 had hit the newsstand. We started out to write a book to cover the topics for the two exams required to earn the *Oracle Certified Professional, Java SE 7 Programmer Certification*. Soon after the release of Java 8, Oracle announced the certification for Java SE 8. We decided to switch to the new version. It was not a difficult decision to make. Java 8 marks a watershed when the language went from being a pure object-oriented language to one that also incorporates features of functional-style programming. As the saying goes, Java 8 changed the whole ballgame. Java passed its twentieth birthday in 2015. Java 8, released a year earlier, represented a significant milestone in its history. There was little reason to dwell on earlier versions.

The next decision concerned whether it would be best to provide coverage for the two Java SE 8 Programmer Certification exams in one or two books. Pragmatic reasons dictated two books. It would take far too long to complete a book that covered both exams, mainly because the second exam was largely revamped and would require a lot of new material. We decided to complete the book for the first exam. Once that decision was made, our draft manuscript went back on the operating table.

Our approach to writing this book has not changed from the one we employed for our previous books, mainly because it has proved successful. No stones were left unturned to create this book, as we explain here.

The most noticeable changes in the exam for OCAJP8 are the inclusion of the core classes in the new Date and Time API and the writing of predicates using lambda expressions. The emphasis remains on analyzing code scenarios, rather than individual language constructs. The exam continues to require actual experience with the language, not just mere recitation of facts. We still claim that proficiency in the language is the key to success.

Since the exam emphasizes the core features of Java, this book provides in-depth coverage of topics related to those features. As in our earlier books, supplementary topics are also included to aid in mastering the exam topics.

This book is no different from our previous books in one other important aspect: It is a one-stop guide, providing a mixture of theory and practice that enables readers to prepare for the exam. It can be used to learn Java and to prepare for the exam. After the exam is passed, it can also come in handy as a language guide.

Apart from including coverage of the new topics, our discussions of numerous topics from the previous exam were extensively revised. All elements found in our previous books (e.g., sections, examples, figures, tables, review questions, mock exam questions) were closely scrutinized. New examples, figures, tables, and review questions were specifically created for the new topics as well as for the revised ones. We continue to use UML (Unified Modeling Language) extensively to illustrate concepts and language constructs, and all numbered examples continue to be complete Java programs ready for experimenting.

Feedback from readers regarding our previous books was invaluable in shaping this book. Every question, suggestion, and comment received was deliberated upon. We are grateful for every single email we have received over the years; that input proved invaluable in improving this book.

Dear Reader, we wish you all the best should you decide to go down the path of Java certification. May your loops terminate and your exceptions get caught!

## About This Book

This book provides extensive coverage of the core features of the Java programming language and its core application programming interface (API), with particular

emphasis on its syntax and usage. The book is primarily intended for professionals who want to prepare for the *Java SE 8 Programmer I* exam, but it is readily accessible to any programmer who wants to master the language. For both purposes, it provides in-depth coverage of essential features of the language and its core API.

The demand for well-trained and highly skilled Java programmers remains unabated. Oracle offers many Java certifications that professionals can take to validate their skills (see `http://education.oracle.com`). The certification provides members of the IT industry with a standard to use when hiring such professionals, and it allows professionals to turn their Java skills into credentials that are important for career advancement.

The book provides extensive coverage of all the objectives defined by Oracle for the *Java SE 8 Programmer I* exam. The exam objectives are selective, however, and do not include many of the essential features of Java. This book covers many additional topics that every Java programmer should master to be truly proficient. In this regard, the book is a comprehensive primer for learning the Java programming language. After mastering the language by working through this book, the reader can confidently sit for the exam.

This book is *not* a complete reference for Java, as it does not attempt to list every member of every class from the Java SE platform API documentation. The purpose is not to document the Java SE platform API. The emphasis is more on the Java programming language features—their syntax and correct usage through code examples—and less on teaching programming techniques.

The book assumes little background in programming. We believe the exam is accessible to any programmer who works through the book. A Java programmer can easily skip over material that is well understood and concentrate on parts that need reinforcing, whereas a programmer new to Java will find the concepts explained from basic principles.

Each topic is explained and discussed thoroughly with examples, and backed by review questions and exercises to reinforce the concepts. The book is not biased toward any particular platform, but provides platform-specific details where necessary.

## Using This Book

The reader can choose a linear or a nonlinear route through the book, depending on his or her programming background. Non-Java programmers wishing to migrate to Java can read Chapter 1, which provides a short introduction to object-oriented programming concepts, and the procedure for compiling and running Java applications. For those preparing for *Java SE 8 Programmer I* exam, the book has a separate appendix (Appendix A) providing all the pertinent information on preparing for and taking the exam.

Cross-references are provided where necessary to indicate the relationships among the various constructs of the language. To understand a language construct, all

pertinent details are provided where the construct is covered, but in addition, cross-references are provided to indicate its relationship to other constructs. Sometimes it is necessary to postpone discussion of certain aspects of a topic if they depend on concepts that have not yet been covered in the book. A typical example is the consequences of object-oriented programming concepts (for example, inheritance) on the member declarations that can occur in a class. This approach can result in forward references in the initial chapters of the book.

The table of contents; listings of tables, examples, and figures; and a comprehensive index facilitate locating topics discussed in the book.

In particular, we draw attention to the following features of the book:

**Programmer I Exam Objectives**

0.1 Exam objectives are stated clearly at the beginning of every chapter.
0.2 The number in front of the objective identifies the exam objective, as defined by Oracle, and can be found in Appendix B.
0.3 The objectives are organized into major sections, detailing the curriculum for the exam.
0.4 The objectives for the *Java SE 8 Programmer I* exam are reproduced verbatim in Appendix B, where for each section of the syllabus, references are included to point the reader to relevant topics in the book.

**Supplementary Objectives**

- Supplementary objectives cover topics that are *not* on the exam, but which we believe are important for mastering the topics that *are* on the exam.
- Any supplementary objective is listed as a bullet at the beginning of the chapter.

## Review Questions

Review questions are provided after every major topic to test and reinforce the material. The review questions predominantly reflect the kind of multiple-choice questions that can be asked on the actual exam. On the exam, the exact number of answers to choose for each question is explicitly stated. The review questions in this book follow that practice.

Many questions on the actual exam contain code snippets with line numbers to indicate that complete implementation is not provided, and that the necessary missing code to compile and run the code snippets can be assumed. The review questions in this book provide complete code implementations where possible, so that the code can be readily compiled and run.

Annotated answers to the review questions are provided in Appendix C.

**Example 0.1** *Example Source Code*

We encourage readers to experiment with the code examples to reinforce the material from the book. These examples can be downloaded from the book website (see p. xxxiv).

Java code is presented in a `monospaced font`. Lines of code in the examples or in code snippets are referenced in the text by a number, which is specified by using a single-line comment in the code. For example, in the following code snippet, the call to the method `doSomethingInteresting()` at (1) does something interesting:

```
// ...
doSomethingInteresting();                                    // (1)
// ...
```

Names of classes and interfaces start with an uppercase letter. Names of packages, variables, and methods start with a lowercase letter. Constants are in all uppercase letters. Interface names begin with the prefix `I`, when it makes sense to distinguish them from class names. Coding conventions are followed, except when we have had to deviate from these conventions in the interest of space or clarity.

## Chapter Summary

Each chapter concludes with a summary of the topics covered in the chapter, pointing out the major concepts that were introduced.

## Programming Exercises

Programming exercises at the end of each chapter provide the opportunity to put concepts into practice. Solutions to the programming exercises are provided in Appendix D.

### *Mock Exam*

The mock exam in Appendix E should be attempted when the reader feels confident about the topics on the exam. It is highly recommended to read Appendix A before attempting the mock exam, as Appendix A contains pertinent information about the questions to expect on the actual exam. Each multiple-choice question in the mock exam explicitly states how many answers are applicable for a given question, as is the case on the actual exam. Annotated answers to the questions in the mock exam are provided in Appendix F.

### *Java SE Platform API Documentation*

A vertical gray bar is used to highlight methods and fields found in the classes of the Java SE Platform API.

Any explanation following the API information is also similarly highlighted.

To obtain the maximum benefit from using this book in preparing for the *Java SE 8 Programmer I* exam, we strongly recommend installing the latest version (Release 8 or newer) of the JDK and its accompanying API documentation. The book focuses solely on Java 8, and does not acknowledge previous versions.

## Book Website

This book is backed by a website providing auxiliary material:

```
www.ii.uib.no/~khalid/ocajp8/
```

The contents of the website include the following:

- Source code for all the examples in the book
- Solutions to the programming exercises in the book
- Annotated answers to the reviews questions in the book
- Annotated answers to the mock exam in the book
- Table of contents, sample chapter, and index from the book
- Errata for the book
- Links to miscellaneous Java resources (e.g., certification, discussion groups, tools)

Information about the Java Standard Edition (SE) and its documentation can be found at the following website:

```
www.oracle.com/technetwork/java/javase/overview/index.html
```

The current authoritative technical reference for the Java programming language, *The Java® Language Specification: Java SE 8 Edition* (also published by Addison-Wesley), can be found at this website:

```
http://docs.oracle.com/javase/specs/index.html
```

## Request for Feedback

Considerable effort has been made to ensure the accuracy of the content of this book. All code examples (including code fragments) have been compiled and tested on various platforms. In the final analysis, any errors remaining are the sole responsibility of the authors.

Any questions, comments, suggestions, and corrections are welcome. Let us know whether the book was helpful (or not) for your purpose. Any feedback is valuable. The principal author can be reached at the following email address:

```
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```

Register your copy of *A Programmer's Guide to Java® SE 8 Oracle Certified Associate (OCA)* at informit.com for convenient access to downloads, updates, and corrections as they become available. To start the registration process, go to informit.com/register and log in or create an account. Enter the product ISBN (9780132930215) and click Submit. Once the process is complete, you will find any available bonus content under "Registered Products."

## About the Authors

### *Khalid A. Mughal*

Khalid A. Mughal is an associate professor at the Department of Informatics at the University of Bergen, Norway, where he has been responsible for designing and implementing various courses in informatics. Over the years, he has taught programming (primarily Java), software engineering (object-oriented system development), databases (data modeling and database management systems), compiler techniques, web application development, and software security courses. For 15 years, he was responsible for developing and running web-based programming courses in Java, which were offered to off-campus students. He has also given numerous courses and seminars at various levels in object-oriented programming and system development using Java and Java-related technologies, both at the University of Bergen and for the IT industry.

Mughal is the principal author and solely responsible for the contents of this book. He is also the principal author of three books on previous versions of the Java programmer certification—*A Programmer's Guide to Java™ SCJP Certification: A Comprehensive Primer, Third Edition* (0321556054); *A Programmer's Guide to Java™ Certification: A Comprehensive Primer, Second Edition* (0201728281); and *A Programmer's Guide to Java™ Certification* (0201596148)—and three introductory textbooks on programming in Java: *Java Actually: A First Course in Programming* (1844804186); *Java Actually: A Comprehensive Primer in Java Programming* (1844809331); and *Java som første programmeringsspråk/Java as First Programming Language, Third Edition* (8202245540).

Mughal currently works on security issues related to mobile data collection systems for delivering health services in low- and middle-income countries.

### *Rolf W. Rasmussen*

Rolf W. Rasmussen is a system development manager at Vizrt, a company that develops solutions for the TV broadcast industry, including real-time 3D graphic renderers, and content and control systems. Rasmussen works mainly on control and automation systems, video processing, typography, and real-time visualization. He has worked on clean-room implementations of the Java class libraries in the past and is a contributor to the Free Software Foundation.

Over the years, Rasmussen has worked both academically and professionally with numerous programming languages, including Java. He was primarily responsible for developing the review questions and answers, the programming exercises and their solutions, the mock exam, and all the practical aspects related to taking the exam in our three previous books on Java programmer certification. Selected earlier content has been utilized in this book. Together with Mughal, he is also a coauthor of three introductory textbooks on programming in Java.

## Acknowledgments

At Addison-Wesley, Greg Doench was again our editor, who effectively managed the process of publishing this book. Regular dialog with him in recent months helped to keep this project on track. Julie Nahil was the in-house contact at Addison-Wesley, who professionally managed the production of the book. Anna Popick was the project editor, who diligently handled the day-to-day project management for this book. Jill Hobbs did a truly marvelous job copy editing the book. The folks at The CIP Group performed the typesetting wizardry necessary to materialize the book. We would like to extend our sincere thanks to Greg, Julie, Anna, Jill, the folks at The CIP Group, and all those behind the scenes at Addison-Wesley, who helped to put this publication on the bookshelf.

For the technical review of the book, we were lucky that Roel De Nijs agreed to take on the task. If you drop in on `CodeRanch.com`, you are bound to find him executing his duties as a Sheriff, especially helping greenhorns find their bearing in the Java certification corrals. He is a freelance Java developer with many IT companies as clients and a multitude of Java certification accolades under his belt (SCJA, SCJP, SCJD, OCAJP7). And not least, he is a Technical Reviewer Par Excellence. Without doubt, Roel has a meticulous eye for detail. It is no exaggeration to say that his exhaustive feedback has been invaluable in improving the quality of this book at all levels. Roel, you have our most sincere thanks for your many excellent comments and suggestions, and above all, for weeding out numerous pesky errors in the manuscript.

Over the years, we have also been lucky to have our own personal manuscript quality controller: Marit Seljeflot Mughal. As diligently as with our previous books, she tirelessly proofread several chapter drafts for this book, and put her finger on many unmentionable mistakes and errors in the manuscript. Her valuable comments and suggestions have also been instrumental in improving the quality of this book. If Marit, who has no IT background, could make sense of the Java jargon we wrote, then we were confident our readers would as well. Our most sincere thanks.

Great effort has been made to eliminate mistakes and errors in this book. We accept full responsibility for any remaining oversights. We hope that when our Dear Readers find any, they will bring them to our attention.

Many family occasions have been missed while working on this book. Without family support, this book would not have seen the light of day. Khalid is ever grateful to his family for their love, support, and understanding—but especially when he is working on a book. Now that this book is out the door, he is off to play with his three grandchildren.

—Khalid A. Mughal

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