



TRANSITION GUIDE TO

JAVA Illuminated

An Active Learning Approach

SIXTH EDITION

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SUMMARY

Written for the one- to three-term introductory programming course, the sixth edition of **Java Illuminated** provides learners with an interactive, user-friendly approach to learning the Java programming language. Comprehensive but accessible, the text takes a progressive approach to object-oriented programming, allowing students to build on established skills to develop new and increasingly complex classes. **Java Illuminated** follows an activity-based active learning approach that ensures student engagement and interest. In addition, the text presents other topics of interest, including graphical user interfaces (GUI), data structures, file input and output, and graphical applications.

- New section at the beginning of the book showing examples of Python syntax and its Java equivalent to help students coming from Python
- Recognizing today's students' growing interest in visualization, an example using either animation or graphical output is included in most chapters

- Each chapter includes one or two Programming Activities, which are designed to provide visual feedback to the students so that they can assess the correctness of their code
- Each chapter is supplemented with a browser-based module that animates sample code, visually illustrating concepts such as the assignment of variable values, evaluation of conditions, and flow of control

APPLICABLE COURSES

- | | |
|-------------------------|-------------------------------|
| ■ Computer Programming | Fundamentals |
| ■ Programming Languages | ■ Object-Oriented Programming |
| ■ Programming Concepts | ■ Programming in Java |
| ■ Programming | |

INSTRUCTOR RESOURCES

- | | |
|---------------------------------------|-------------------------------|
| ■ Programming activity solution code | ■ Slides in PowerPoint format |
| ■ Answers to end-of-chapter exercises | ■ Test Bank |

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KEY CHAPTER-BY-CHAPTER UPDATES

CHAPTER 1 Introduction to Programming and the Java Language

- Added how to run a program in one step, without compiling, and how to retrieve the version of *javac* and *java*

CHAPTER 2 Programming Building Blocks – Java Basics

- Added how to use text blocks, for example, to display a menu

CHAPTER 3 Object-Oriented Programming, Part 1: Using Classes

- Eliminated the *SimpleDate* class
- Now using the *String* class to explain how to instantiate objects and call methods.
- Added more examples using the *String* class, such as parsing an email address

CHAPTER 4 Introduction to Graphical Applications

- No significant update

CHAPTER 5 Flow of Control, Part 1: Selection

- Explained the new *switch* syntax and how to use *switch* expressions

CHAPTER 6 Flow of Control, Part 2: Looping

- No significant update

CHAPTER 7 Object-Oriented Programming, Part 2: User-Defined Classes

- In addition to the *Auto* class, added a new example: a *Rational* class.
- Added explanations showing how *this* is the object reference that called a method.
- Covered the new syntax of the *instanceof* operator

CHAPTER 8 Single-Dimensional Arrays

- No significant update

CHAPTER 9 Multidimensional Arrays and the ArrayList and HashMap Classes

- Added coverage of the HashMap class

CHAPTER 10 Object-Oriented Programming, Part 3: Inheritance, Interfaces and Polymorphism

- No significant update

CHAPTER 11 Exceptions and Input/Output Operations

- Converted some of the examples to using the *Record* class and explained how it works well if all we needed is a class to store data (that we read from a file).
- Changed the example reading data from a remote location to a simpler example

CHAPTER 12 Recursion (formerly GUI)

- Added merge sort and quick sort, including examples and explanations

CHAPTER 13 An Introduction to Data Structures (formerly Recursion)

- Now using the *compareTo* method in the sorted linked list example

CHAPTER 14 RunningTime Analysis (formerly An Introduction to Data Structures)

- Added simulation code counting comparison statements for insertion sort, merge sort, and quick sort, including when the array is already sorted

CHAPTER 15 General Trees, Binary Trees, and Binary Search Trees

- Added this new chapter, replacing the old Chapter 12 (Graphical User Interfaces), which has been moved online.
- Starts with general trees and tree concepts (e.g., root, height, level, and leaves), then covering binary trees, including pre order, in order, and post order traversals.
- Discusses the motivation for binary search trees and cover binary search trees, including an analysis of running times for search, insert, and delete methods.
- Also covers the need to rebalance the tree and implementing and discussing a rebalancing recursive method

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CHAPTER OUTLINE

This chapter outline has been created to help you easily transition to the sixth edition.

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- CHAPTER 1** Introduction to Programming and the Java Language
- CHAPTER 2** Programming Building Blocks- Java Basics
- CHAPTER 3** Object-Oriented Programming, Part 1: Using Classes
- CHAPTER 4** Introduction to Graphical Applications
- CHAPTER 5** Flow of Control, Part 1: Selection
- CHAPTER 6** Flow of Control, Part 2: Looping
- CHAPTER 7** Object-Oriented Programming, Part 2: User-Defined Classes
- CHAPTER 8** Single-Dimensional Arrays
- CHAPTER 9** Multidimensional Arrays and the ArrayList Class
- CHAPTER 10** Object-Oriented Programming, Part 3: Inheritance, Polymorphism, and Interfaces
- CHAPTER 11** Exceptions, and Input/ Output Operations
- CHAPTER 12** Graphical User Interfaces Using Java FX
- CHAPTER 13** Recursion
- CHAPTER 14** An Introduction to Data Structures
- CHAPTER 15** Running Time Analysis
- CHAPTER 16** Graphical User Interfaces (available online in the ebook)
- CHAPTER 17** Graphical User Interfaces Using JavaFX (available online in the ebook)
- APPENDIX A** Java Reserved Words and Keywords
- APPENDIX B** Operator Precedence
- APPENDIX C** The Unicode Character Set
- APPENDIX D** Solutions to Selected Exercises

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- APPENDIX C** The Unicode Character Set
- APPENDIX D** Representing Negative Integers