

# 6 Methods: A Deeper Look

## Objectives

In this chapter you'll learn:

- How `static` methods and fields are associated with classes rather than objects.
- How the method-call/return mechanism is supported by the method-call stack.
- About argument promotion and casting.
- How packages group related classes.
- How to use secure random-number generation to implement game-playing applications.
- How the visibility of declarations is limited to specific regions of programs.
- What method overloading is and how to create overloaded methods.

## Outline

1. 6.1 Introduction
2. 6.2 Program Units in Java
3. 6.3 `static` Methods, `static` Fields and Class `Math`
4. 6.4 Methods with Multiple Parameters

5. 6.5 Notes on Declaring and Using Methods
6. 6.6 Method-Call Stack and Activation Records
  1. 6.6.1 Method-Call Stack
  2. 6.6.2 Stack Frames
  3. 6.6.3 Local Variables and Stack Frames
  4. 6.6.4 Stack Overflow
7. 6.7 Argument Promotion and Casting
8. 6.8 Java API Packages
9. 6.9 Case Study: Secure Random-Number Generation
10. 6.10 Case Study: A Game of Chance; Introducing enum Types
11. 6.11 Scope of Declarations
12. 6.12 Method Overloading
  1. 6.12.1 Declaring Overloaded Methods
  2. 6.12.2 Distinguishing Between Overloaded Methods
  3. 6.12.3 Return Types of Overloaded Methods
13. 6.13 (Optional) GUI and Graphics Case Study: Colors and Filled Shapes
14. 6.14 Wrap-Up
  1. Summary
  2. Self-Review Exercises
  3. Answers to Self-Review Exercises
  4. Exercises
  5. Making a Difference