

# Intermediate Java Programming

|   |    |
|---|----|
| What You Will Learn.....  | 1  |
| Understanding Object-Oriented Programming.....                  | 2  |
| Working with Classes .....                                      | 3  |
| Understanding the Benefits of Object-Oriented Programming ..... | 3  |
| Working with Objects.....                                       | 4  |
| Creating New Objects.....                                       | 4  |
| Using Variables to Reference Objects .....                      | 5  |
| Working with Dates .....  | 7  |
| Creating <code>Date</code> Objects.....                         | 7  |
| Using the <code>GregorianCalendar</code> Class .....            | 8  |
| Analyzing the Behavior of Reference Variables .....             | 14 |
| Applying What You've Learned: Printing a Monthly Calendar.....  | 16 |
| Exercise 1 .....  | 19 |
| Using Formatters in the <code>java.text</code> Package.....     | 21 |
| Using the <code>NumberFormat</code> Class .....                 | 21 |
| Formatting Dates.....   | 28 |
| Exercise 2.....   | 31 |
| Creating New Classes .....                                      | 33 |
| Defining a New Class .....                                      | 33 |
| Organizing the Class Body .....                                 | 34 |
| Declaring Member Variables (Fields) .....                       | 35 |
| Writing Constructors.....                                       | 37 |
| Writing Methods.....  | 39 |
| Creating New Objects Based on User-Defined Classes .....        | 43 |
| Exercise 3.....   | 46 |
| Expanding the Student Class .....                               | 49 |
| Resolving Parameter Names in Constructors and Methods.....      | 49 |
| Declaring Static Members.....                                   | 50 |
| Using Programming Logic to Implement Your Methods.....          | 53 |
| Overloading Methods.....  | 54 |
| Streamlining Your Code .....                                    | 54 |
| Exercise 4.....   | 56 |
| Working with Collections.....                                   | 59 |
| Creating a New Array List.....                                  | 59 |

|   |     |
|---|-----|
| Populating the Array List.....                              | 60  |
| Retrieving the Number of List Elements .....                | 62  |
| Retrieving Array List Elements .....                        | 62  |
| Using Loops to Work with Collections .....                  | 63  |
| Removing Array List Elements .....                          | 64  |
| Comparing Arrays and Array Lists.....                       | 65  |
| Exercise 5.....   | 66  |
| Designing Effective Applications.....                       | 68  |
| Identifying the Required Classes .....                      | 68  |
| Achieving the Goal of Encapsulation .....                   | 68  |
| Defining Fields.....  | 69  |
| Writing Methods .....                                       | 69  |
| Writing Consistent Code.....                                | 70  |
| Modifying Your Application .....                            | 70  |
| Applying What You’ve Learned: Building a Deck of Cards..... | 70  |
| Exercise 6.....   | 78  |
| Understanding Inheritance.....                              | 79  |
| Using Inheritance in Your Own Classes.....                  | 81  |
| Using Polymorphic Variables .....                           | 88  |
| Using the <b>Object</b> Superclass .....                    | 91  |
| Working with Abstract Classes.....                          | 91  |
| Working with Final Classes (Optional) .....                 | 92  |
| Exercise 7.....   | 93  |
| Organizing Your Classes into Packages .....                 | 96  |
| Documenting Your Classes.....                               | 98  |
| Documenting the <b>Media</b> Class .....                    | 99  |
| Using <b>javadoc</b> to Extract Comments .....              | 100 |
| Viewing Your Documentation.....                             | 101 |
| Documenting Subclasses .....                                | 101 |
| Exercise 8.....   | 103 |
| Creating a JAVA Generic User Interface (GUI).....           | 104 |
| Appendix A: Solutions to Exercises .....                    | 105 |