Java Programming I

# Course Summary

Students explore programming fundamentals, variables and assignments, conditional expressions, selection statements, loops, arrays, methods, string manipulation, program troubleshooting, and the basics of class design, object creation, and object interaction. Students use Oracle’s Java programming language throughout this course.

# Course Learning Objectives

Set up a programming environment using an IDE and the Java Development Kit

Write, compile, troubleshoot, and execute simple Java programs

Control program behavior with selection statements and loops

Define methods, call methods, and handle values returned from methods

Store and manipulate data in one- and two-dimensional arrays

Write classes with constructors, instance variables, and instance methods

Create objects and interact with objects through reference variables

# Required Reading

Introduction to Java Programming, Comprehensive Version, 10th Edition, by Y. Daniel Liang. ISBN: 0133761312. ISBN-13: 978-0133761313

# Grading

Coursework will be weighted using the following criteria.

| **Participation** | **Quizzes** | **Discussions** | **Portfolios** | **Test** | **Total** |
| --- | --- | --- | --- | --- | --- |
| 5% | 30% | 5% | 60% | 0% | **100%** |

# Course Outline

| **Lesson #** | **Lesson Name** | **Readings** | **Assessment** |
| --- | --- | --- | --- |
| **1** | Introduction to Computers, Programs, and Java, Part I | |  |  | | --- | --- | | 1.1 Introduction, p. 2 |  | | 1.2 What Is a Computer?, pp. 2–6 |  | | 1.3 Programming Languages, pp. 7–8 |  | | 1.4 Operating Systems, p. 9 |  | | 1.5 Java, the World Wide Web, and Beyond, pp. 10–11 |  | | 1.6 The Java Language Specification, API, JDK, and IDE, pp. 11–12 |  | | Quiz |
| **2** | Introduction to Computers, Programs, and Java, Part II | |  | | --- | | 1.7 A Simple Java Program, pp. 12–15 | | 1.8 Creating, Compiling, and Executing a Java Program, pp. 15–18 | | 1.10 Programming Style and Documentation, pp. 18–19 | | 1.11 Programming Errors, pp. 20–22 | | Portfolio |
| **3** | Elementary Programming, Part I | |  | | --- | | 2.1 Introduction, p. 34 | | 2.2 Writing a Simple Program, pp. 34–36 | | 2.3 Reading Input from the Console, pp. 37–39 | | 2.4 Identifiers, pp. 39–40 | | 2.5 Variables, pp. 40–41 | | 2.6 Assignment Statements and Assignment Expressions, pp. 41–42 | | 2.7 Named Constants, p. 43 | | 2.8 Naming Conventions, p. 44 | | 2.9 Numeric Data Types and Operators, pp. 44–48 | | 2.10 Numeric Literals, pp. 48–50 | | Quiz |
| **4** | Elementary Programming, Part II | |  | | --- | | 2.11 Evaluating Expressions and Operator Precedence, pp. 50–51 | | 2.12 Case Study: Displaying the Current Time, pp. 51–53 | | 2.13 Augmented Assignment Operators,  p. 54 | | 2.14 Increment and Decrement Operators, pp. 55–56 | | 2.15 Numeric Type Conversions, pp. 56–58 | | 4.3 Character Data Type and Operations, pp. 125–128 | | 4.4 The String Type, pp. 130–137 | | Quiz |
| **5** | Selections, Part I | |  | | --- | | 3.1 Introduction, p. 76 | | 3.2 boolean Data Type, pp. 76–77 | | 3.3 if Statements, pp. 78–80 | | 3.4 Two-Way if-else Statements, pp. 80–81 | | 3.5 Nested if and Multi-Way if-else Statements, pp. 81–82 | | 3.6 Common Errors in Selection Statements, pp. 83–86 | | Quiz |
| **6** | Selections, Part II | |  | | --- | | 3.7 Generating Random Numbers, pp. 87–88 | | 3.8 Case Study: Computing Body Mass Index, p. 89 | | 3.10 Logical Operators, pp. 93–96 | | 3.11 Case Study: Determining Leap Year, pp. 97–98 | | 3.13 switch Statements, pp. 100–102 | | 3.14 Conditional Expressions, pp. 103–104 | | 4.6 Formatting Console Output, pp. 145–148 | | Portfolio |
| **7** | Loops, Part I | |  | | --- | | 5.1 Introduction, p. 158 | | 5.2 The while Loop, pp. 158–167 (skip “Input and Output Redirections,” section 5.2.5, p. 167) | | 5.3 The do-while Loop, pp. 168–170 | | 5.4 The for Loop, pp. 170–173 | | 5.5 Which Loop to Use?, pp. 174–175 | | Quiz |
| **8** | Loops, Part II | |  | | --- | | 5.6 Nested Loops, pp. 176–177 | | 5.7 Minimizing Numeric Errors, pp. 178–179 | | 5.9 Keywords break and continue, pp. 184–186 | | Discussion |
| **9** | Methods, Part I | |  | | --- | | 6.1 Introduction, p. 204 | | 6.2 Defining a Method, pp. 204–206 | | 6.3 Calling a Method, pp. 206–208 | | 6.4 void Method Example, pp. 209–210 | | 6.5 Passing Parameters by Values, pp. 212–213 | | Quiz |
| **10** | Methods, Part II | |  | | --- | | 5.8 Overloading Methods, pp. 219–221 | | 5.9 The Scope of Variables, pp. 222–223 | | 4.2 Common Mathematical Functions, pp. 120–124 | | Portfolio |
| **11** | Single-Dimensional Arrays, Part I | |  | | --- | | 7.1 Introduction, p. 246 | | 7.2 Array Basics, pp. 246–251 | | Quiz |
| **12** | Single-Dimensional Arrays, Part II | |  | | --- | | 7.6 Passing Arrays to Methods, pp. 257-260 | | 7.7 Returning an Array from a Method, pp. 260-261 | | 7.9 Variable-Length Argument Lists, pp. 264-265 | | 6.12 The Arrays Class, pp. 270–272 | | Quiz |
| **13** | Multidimensional Arrays | |  | | --- | | 8.1 Introduction, p. 288 | | 8.2 Two-Dimensional Array Basics, pp. 288–291 | | 8.3 Processing Two-Dimensional Arrays, pp. 291–293 | | 8.4 Passing Two-Dimensional Arrays to Methods, pp. 293–294 | | 8.5 Case Study: Grading a Multiple-Choice Test, pp. 294–296 | | 8.8 Multidimensional Arrays, pp. 301–305 | | Portfolio |
| **14** | Objects and Classes, Part I | |  | | --- | | 9.1 Introduction, p. 322 | | 9.2 Defining Classes for Objects, pp. 322–324 | | 9.3 Example: Defining Classes and Creating Objects, pp. 324–329 | | 9.4 Constructing Objects Using Constructors, p. 329 | | 9.5 Accessing Objects via Reference Variables, pp. 330–333 | | Quiz |
| **15** | Objects and Classes, Part II | |  | | --- | | 9.7 Static Variables, Constants, and Methods, pp. 337–340 | | 9.8 Visibility Modifiers, pp. 342–344 | | 9.9 Data Field Encapsulation, pp. 344–347 | | 9.10 Passing Objects to Methods, pp. 347–348 | | 9.11 Array of Objects, pp. 351–353 | | Quiz |
| **16** | Strings | |  | | --- | | 10.10 The String Class, pp. 386–390 | |  | | Portfolio |
| **17** | Course Review | Review previous lesson readings, quizzes, and portfolios. | Review Quiz |
| **18** | Final Assignment | None | Portfolio |