

Computer Science 1351 Java Programming

Student Learning Outcomes

1. **Construct a basic Java program using Sun's Java Development Toolkit (JDK)**
Students will be able to create a Java program using a simple text editor. Students can compile programs through a command prompt window creating Java bytecode using Sun's JDK. Programs can be debugged using errors displayed in the command prompt window.
2. **Use basic programming fundamentals such as variables, constants, selection statements, loops, methods and arrays**
Students will be able to effectively utilize variables, constants, if statements, switch statements, conditional expressions, loops and nested loops, logical operators, relational operators, arithmetic operators, arrays, and methods. Students will be able to validate input and format output.
3. **Use basic object-oriented programming concepts**
Students will be able to utilize predefined classes to create objects as necessary. Students will be able to define classes with properties, constructors, and methods and use those classes to instantiate objects.
4. **Develop an algorithm to solve a given problem and translate it into a working Java program**
Students will be able to develop an algorithm to solve a given problem. Students can translate the algorithm into a working Java program using recommended programming style and techniques.

Course Content

Textbook: *Introduction to Java Programming*, Seventh Edition, by Y. Daniel Liang

The following chapters including the particular sections listed are covered. (See textbook "Contents")

Chapter 1: Introduction to Computers, Programs, and Java

- What is a Computer
- Programs
- Operating Systems
- Number Systems
- Java, World Wide Web, and Beyond
- The Java Language Specification, API, JDK, and IDE
- A Simple Java Program
- Creating, Compiling, and Executing a Java Program
- (GUI) Displaying Text in a Message Dialog Box

Chapter 2: Elementary Programming

- Writing Simple Programs
- Identifiers
- Variables
- Assignment Statements and Assignment Expressions
- Constants
- Numeric Data Types and Operations
- Numeric Type Conversions
- Character Data Type and Operations
- The String Type
- Console Input Using the Scanner Class

- Programming Style and Documentation
- Programming Errors
- Debugging
- (GUI) Getting Input from Input Dialogs

Chapter 3: Selections

- Boolean Data Type and Operations
- if Statements
- switch Statements
- Conditional Expressions
- Formatting Console Output
- Operator Precedence and Associativity
- (GUI) Confirmation Dialogs

Chapter 4: Loops

- The while Loop
- The do-while Loop
- The for Loop
- Which Loop to Use?
- Nested Loops
- Minimizing Numeric Errors
- Keywords break and continue
- (GUI) Controlling a Loop with a Confirmation Dialog

Chapter 5: Methods

- Defining a Method
- Calling a Method
- Void Method Example
- Passing Parameters by Values
- Modularizing Code
- Overloading Methods
- The Scope of Variables
- The Math Class
- Generating Random Characters

Chapter 6: Arrays

- Array Basics
- Copying Arrays
- Passing Arrays to Methods
- Returning an Array from a Method
- Variable-Length Argument Lists
- Searching Arrays
- Sorting Arrays
- The Arrays Class
- Two-Dimensional Arrays
- Multidimensional Arrays

Chapter 7: Objects and Classes

- Defining Classes for Objects
- Constructing Objects Using Constructors
- Accessing Objects via Reference Variables
- Using Classes from the Java Library
- Static Variables, Constants, and Methods
- Visibility Modifiers
- Data Field Encapsulation
- Passing Objects to Methods
- Array of Objects

Chapter 8: Strings and Text I/O

- The String Class
- The Character Class
- The StringBuilder/StringBuffer Class
- Command-Line Arguments
- The File Class
- File Input and Output
- (GUI) File Dialogs

Additional Content

Any section or chapter not listed previously.