

CORE JAVA PROGRAMMING

Course Contents:

- ***An Introduction to Java Programming***
- What Is Java?
- Java's Past, Present, and Future
- Why Learn Java?
 - Java Is Platform Independent
 - Java Is Object Oriented
 - Java Is Easy to Learn
- Getting Started Programming in Java
 - Getting a Java Development Environment
 - Installing the JDK and Sample Files
 - Configuring the JDK
 - Creating a Java Application
 - Creating a Java Applet

Object-Oriented Programming and Java

- Thinking in Objects: An Analogy
- Objects and Classes
- Behavior and Attributes
 - Attributes
 - Behavior
 - Creating a Class
- Inheritance, Interfaces, and Packages
 - Inheritance
 - Creating a Class Hierarchy
 - How Inheritance Works
 - Single and Multiple Inheritance
 - Interfaces and Packages
 - Creating a Subclass

Java Basics

- Statements and Expressions
- Variables and Data Types
 - Declaring Variables
 - Notes on Variable Names
 - Variable Types
 - Assigning Values to Variables
- Comments
- Literals
 - Number Literals
 - Boolean Literals
 - Character Literals
 - String Literals
- Expressions and Operators
 - Arithmetic
 - More About Assignment
 - Incrementing and Decrementing
 - Comparisons
 - Logical Operators
 - Bitwise Operators
 - Operator Precedence
- String Arithmetic

Working with Objects

- Creating New Objects
 - Using `new`
 - What `new` Does
 - A Note on Memory Management
- Accessing and Setting Class and Instance Variables
 - Getting Values
 - Changing Values
 - Class Variables
- Calling Methods
 - Class Methods
- References to Objects
- Casting and Converting Objects and Primitive Types
 - Casting Primitive Types
 - Casting Objects
 - Converting Primitive Types to Objects and Vice Versa

- Odds and Ends
 - Comparing Objects
- Determining the Class of an Object
- Class and Object Reflection (Java 1.1)
- The Java Class Library

Arrays, Conditionals, and Loops

- Arrays
 - Declaring Array Variables
 - Creating Array Objects
 - Accessing Array Elements
 - Changing Array Elements
 - Multidimensional Arrays
- Block Statements
- `if` Conditionals
 - The Conditional Operator
- `switch` Conditionals
- `for` Loops
- `while` and `do` Loops
 - `while` Loops
 - `do...while` Loops
- Breaking Out of Loops
 - Labeled Loops

Creating Classes and Applications in Java

- Defining Classes
- Creating Instance and Class Variables
 - Defining Instance Variables
 - Constants
 - Class Variables
- Creating Methods
 - Defining Methods
 - The `this` Keyword
 - Variable Scope and Method Definitions
 - Passing Arguments to Methods
 - Class Methods

- Creating Java Applications
 - Helper Classes
- Java Applications and Command-Line Arguments
 - Passing Arguments to Java Programs
 - Handling Arguments in Your Java Program

Java Applet Basics

- How Applets and Applications Are Different
- Creating Applets
 - Major Applet Activities
 - A Simple Applet
- Including an Applet on a Web Page
 - The <APPLET> Tag
 - Testing the Result
 - Making Java Applets Available to the Web
- More About the <APPLET> Tag
 - ALIGN
 - HSPACE and VSPACE
 - CODE and CODEBASE
- Java Archives
- Passing Parameters to Applets

Graphics, Fonts, and Color

- The Graphics Class
 - The Graphics Coordinate System
- Drawing and Filling
 - Lines
 - Rectangles
 - Polygons
 - Ovals
 - Arcs
 - A Simple Graphics Example
 - Copying and Clearing
- Text and Fonts
 - Creating Font Objects

- Drawing Characters and Strings
- Finding Out Information About a Font
- Color
 - Using Color Objects
 - Testing and Setting the Current Colors
 - A Simple Color Example

Managing Simple Events and Interactivity

- Mouse Clicks
 - Mouse Down and Mouse Up Events
 - An Example: Spots
 - Double-Clicks
- Mouse Movements
 - Mouse Drag and Mouse Move Events
 - Mouse Enter and Mouse Exit Events
 - An Example: Drawing Lines
 - Keyboard Events
 - The `keyDown()` and `keyUp()` Methods
 - Default Keys

Creating User Interfaces with the awt

- An awt Overview
- The Basic User Interface Components
 - Labels
 - Buttons
 - Check Boxes
 - Radio Buttons
 - Choice Menus
 - Text Fields
- Panels and Layout
 - Layout Managers: An Overview
 - The `FlowLayout` Class
 - Grid Layouts
 - Border Layouts
 - Card Layouts

- Grid Bag Layouts
- Insets

Packages and Interfaces

- Programming in the Large and Programming in the Small
- What Are Packages?
- Using Packages
 - Full Package and Class Names
 - The `import` Command
 - Name Conflicts
 - A Note About `CLASSPATH` and Where Classes Are Located
- Creating Your Own Packages
 - Pick a Package Name
 - Create the Directory Structure
 - Use `package` to Add Your Class to a Package
 - Packages and Class Protection
- What Are Interfaces?
 - The Problem of Single Inheritance
 - Abstract Design and Concrete Implementation
 - Interfaces and Classes
- Implementing and Using Interfaces
 - The `implements` Keyword
 - Implementing Multiple Interfaces
 - Other Uses of Interfaces
- Creating and Extending Interfaces
 - New Interfaces
 - Methods Inside Interfaces
 - Extending Interfaces
 - An Example: Enumerating Linked Lists

Exceptions

- Exceptions, the Old and Confusing Way
- Java Exceptions
- Managing Exceptions
 - Exception Consistency Checking
 - Protecting Code and Catching Exceptions
 - The `finally` Clause

- Declaring Methods That Might Throw Exceptions
 - The `throws` Clause
 - Which Exceptions Should You Throw?
 - Passing On Exceptions
 - `throws` and Inheritance
- Creating and Throwing Your Own Exceptions
 - Throwing Exceptions
 - Creating Your Own Exceptions
 - Doing It All: Combining `throws`, `try`, and `throw`
- When and When Not to Use Exceptions
 - When to Use Exceptions
 - When Not to Use Exceptions
 - Bad Style Using Exceptions

Streams and I/O

- What Are Streams?
- The `java.io` Package
- Input Streams
 - The Abstract Class `InputStream`
 - `ByteArrayInputStream`
 - `FileInputStream`
 - `FilterInputStream`
 - `PipedInputStream`
 - `SequenceInputStream`
 - `StringBufferInputStream`
- Output Streams
 - The Abstract Class `OutputStream`
 - `ByteArrayOutputStream`
 - `FileOutputStream`
 - `FilterOutputStream`
 - `PipedOutputStream`

Java Virtual Machine

- The Java Virtual Machine
 - An Overview
 - The Fundamental Parts
 - The Constant Pool
 - Limitations

Java Programming Tools

- Overview of the Standard JDK Tools

- The Runtime Interpreter
 - Usage
 - The *OptionsArgument*
- The Compiler
 - Usage
 - The *OptionsArgument*
- The Applet Viewer
 - Usage
 - The *OptionsArgument*
 - Commands
- The Debugger
 - Usage
 - The *OptionsArgument*
 - Commands
- The Class File Disassembler
 - Usage
 - The *OptionsArgument*
 - Usage

Working with Data Structures in Java

- Data Structure Fundamentals
- The Standard Java Data Structures
 - Enumerations
 - Bit Sets
 - Vectors
 - Stacks
 - Dictionaries
 - Hash Tables
- Building Your Own Data Structures
 - Linked List Basics
 - Implementing a Linked List