Introduction to Java

Introduction to Java teaches the fundamentals required for developing Object Oriented portable Java applications. Starting out with simple console applications this course gives beginning programmers a nice leg up on how to program in a modern and powerful programming language. During the week the course increases in difficulty adding more and more programming exercises to facilitate rapid absorption of the material. By the end of the week students will be coding advanced graphical user interfaces and web applets with confidence and assurance. Specific topics covered are:

- Basic Programming Skills
  - Program Flow
  - Data Structures
  - Repetition Statements
  - Selection Statements
  - File Input and Output
- Advanced Programming Skills
  - Creating Custom Methods
  - System Interaction
  - Error Handling
  - Advanced String Manipulation
  - Creating Custom Classes
  - Graphical User Interface Design
  - GUI Development Tools
  - Event Handling
- Web Application Development
  - Web applets
  - Form Processing
  - Form Validation
  - Web Reporting

Course Details:
5 Days M-F, laptops are provided, certificate awarded upon completion of the course.

Day 1 Agenda

Programming Fundamentals
- Programming versus Scripting
- Programming Language Specialties
- Programming Roadmap

Java Introduction
- Java History
- What is Java (Strengths and Weaknesses)
- Java versus Javascript
- Interpreted Languages
- Portability

Getting Started W/ JAVA
- Java Development Tools
  - JCreator IDE
  - Console JDK
  - Notepad++
- Anatomy of a Java Program
  - Comments, Public Class, {}, Arguments
  - Java and General Programming Rules
  - First Java Program (Hello I'm a Programmer!)
  - Whitespace and Indentation Usage

Numbers, Strings, Variables
- Literal Strings
- Literal Numbers
- Escape Sequences
- Variables
- Variable Declaration Types (Int, Float, Double, String)
- Variable Naming Standards and Reserved Words

Expressions and Operators
- Simple Arithmetic
- Numeric Operators (+, - , *, /, %)
- Order of Operations / Operator Precedence
- Increment and Decrement Operators
- String Operators
  - Concatenation
  - .length()
  - .toLower()
  - .toUpper()

Input Operations
- Input Stream Readers
- Buffered Stream Readers
- Interger.ParseInt and Other Input Conversion Functions
- Type Casting

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Day 2 Agenda

Program Flow
- Blocks
- If Statements
- Relational Operators
- If-Else Statements
- String Comparisons
- Random Number Generation
- Nested If Statements
- Logical Operators (And, Or, Not)
- Loops
  - For
  - While
  - Do while
- Nested While and For Loops
- Breaking and Next commands in Loops
- Exit Statement (Termination)

Switches
- Advantages of Switches versus Nested If

Arrays
- Declaring Arrays
- Pre-filling
- Array Bounds and Runtime Errors
- Array Elements
- Finding Sizes of Arrays
- Copying Arrays
- Manipulating Arrays
- Sorting Character Arrays
- Sorting Numeric Arrays

Multidimensional Arrays
- Using For Loops to Manipulate MD Arrays

Other Array Types
- ArrayLists
  - Growing and Shrinking Arrays

File Operations
- File Input and Output Streams
- Working with Text Files
- File Reader Class
- Reading files with Loop Statements
- File Writer Class
- Appending to Files
- Working with Binary Files
- File Objects
  - File Object Methods
- File Operations
  - Deleting Files
  - Renaming Files
  - Checking for Existence
- Directory Operations

Day 3 Agenda

Methods
- What are Methods
- Creating Our Own Methods
- Scoping

System Interaction
- Starting Programs
- Capturing Application Output or Errors
- System Interaction and Portability Issue

Error Handling
- What are Exceptions
- Try Catch Blocks

String Tokenizer
- CSV Files
- Common Methods
  - .hasMoreTokens()
  - .nextToken()
  - .countTokens()

Using Classes
- Instantiating Multiple Classes
- Modular Design using Classes in Java
- Bicycle Class
- Helper Classes

Applet and Form Design
- AWT and Swing
- Applet Initialization
- Applet Starting
- Applet Stopping
- Applet Destruction
- Applet Painting
- Layout Managers
  - Flow Layout
  - Grid Layout
- Applet Components
  - JLables
  - JTextFields
  - JButtons
  - JCheckboxes
  - JRadioButtons
  - JComboBoxes
  - JTextAreas
  - JPanels

Day 4 Agenda

Applets User Input

- Event Types
  - Button Clicks
  - Mouse Movements
  - Key Press
  - Window Actions (Restore, Max, Min)
- Action Listeners
  - Handling Mouse Clicks
  - Changing Form Properties
  - Action Preformed Methods

GUI Applications

- Portability Revisted
- Full JAVA GUI Applications versus Applets
- Windows
- Frames
- Superclasses
- Window Actions
  - Exit_On_Close
  - Dispose_On_Close
  - Do_Nothing_On_Close
  - Hide_On_Close
- Visible Constructor
- Layout Managers Revisted
  - Grid Layout
  - Flow Layout
  - Border Layout
  - Box Layout
- Component Borders

GUI Tools

- Freeware GUI Layout Managers
  - GUI Builder
  - GUI Designer

GUI Application Events

- Focus Listener
- Action Listener
- Error Handling
- Validation

Course Labs

- Day 1
  - Programming Assignment 1 (Famous Quotes Printer)
  - Programming Assignment 2 (Numbers, Strings and Variable Usage)
  - Programming Assignment 3 (Using Expressions)
  - Programming Assignment 4 (Mad Libs Game)
  - Programming Assignment 5 (Math Facts Calculations)
- Day 2
  - Programming Assignment 1 (Magic Number Guessing Game)
  - Programming Assignment 2 (Using Loops)
  - Programming Assignment 3 (Student Grading Program)
  - Programming Assignment 4 (File Writing Program)
- Day 3
  - Programming Assignment 1 (Creating Homegrown Methods)
  - Programming Assignment 2 (Small Windows Automation Program)
  - Programming Assignment 3 (Phone Number Parser)
  - Programming Assignment 4 (Instantiating Multiple Classes, Boxing Mice)
  - Programming Assignment 5 (Creating Applets, Restaurant Menu)
- Day 4
  - Programming Assignment 1 (Changing Form Properties)
  - Programming Assignment 2 (Making a Java GUI Program)
  - Programming Assignment 3 (Using Application Listeners)
  - Programming Assignment 4 (Adding Event Handling to Lab3)

Day 5 – Student Practical Demonstration:

Students are given the task to create a student management system called SMS in Java. Per the students choice the SMS application can be written as a console application or as a full GUI application. Specific design requirements must be met to satisfy the practical demonstration.