

Course Syllabus

Java Developer Training

Topic 1: Java and Command Line Environments

1. The Java Environment
 - A. Why was Java Developed?
 - B. The Java Virtual Machine
 - C. Java Application Execution
 - D. Java Compared With C++
 - E. Java Compared With Other OO Languages
2. Program Structure
 - A. Defining a Root Class
 - B. Declaring an Initialization Method
 - C. Declaring Other Objects
 - D. Incorporating API elements
 - E. File Structure, Packages, and Subdirectories
 - F. CLASSPATH Environment variable
 - G. PATH Environment Variable
 - H. Runtime Libraries
3. Primitive Types
 - A. Discrete Types: byte, char, short, int, long
 - B. Real types: float, double
 - C. The boolean Type
 - D. Operators on Objects vs. Primitive Types
 - E. Type Casting
4. Reference Types
 - A. Arrays
 - B. Interfaces
 - C. Classes (Objects)
 - D. Primitive Types as Objects
5. Variables and Arrays
 - A. Variable Definition
 - B. Primitive and Reference Variables
 - C. Class and Instance Variables
 - D. Array Components
 - E. Exception Handler Parameters
 - F. Local Variables
 - G. Initialization to Null or Zero
 - H. The `final` and `static` Keywords

6. Expressions
 - A. Relational
 - B. Integer Arithmetic
 - C. Floating Point Arithmetic
 - D. Widening Conversions
 - E. Narrowing Conversions

7. Statements
 - A. Simple
 - B. Block
 - C. Variable Declaration
 - D. `if-then-else`
 - E. `switch`
 - F. `while`
 - G. `do while`
 - H. `for`

8. Strings
 - A. Strings as Objects: `java.lang.String`
 - B. Operations on Strings
 - C. Casting Rules Violation for Strings
 - D. Converting Objects to String

9. Object Oriented Concepts
 - A. Encapsulation
 - B. Inheritance
 - C. Data Abstraction
 - D. Information Hiding
 - E. Polymorphism

10. Java Constructs Supporting OO
 - A. `class`
 - B. `extends`
 - C. `interface`
 - D. `private`, `protected`, and `public`
 - E. `implements`

11. Object Life Cycle
 - A. Constructors
 - B. `finalize`
 - C. `dispose`

12. Command Line Parameters
 - A. Arguments to `main`
 - B. Counting Parameters
 - C. Accessing Parameters
 - D. Shell Escape Sequences

13. Exception Handling
 - A. Error Checking vs. Exception Handling

- B. Coding Style Changes
- C. Mandated Handling
- D. `java.lang.Throwable`
- E. `try` Blocks
- F. `catch` Blocks

14. Lab Exercises

- A. Hello, World
- B. Simple Arithmetic
- C. Command Line Calculator
- D. Arrays
- E. Array Tables
- F. Hex Dump Utility

Topic 2: Swing and Events

1. Evolution of Swing

- A. Goals of Java GUI Toolkits
- B. Minimalism: Abstract Windowing Toolkit
- C. Expansion: Swing Look and Feel
- D. AWT and Swing Interaction

2. Swing Design Hierarchy and Philosophy

- A. Top Level Display
- B. Collection Containers
- C. Placement Managers
- D. Atomic Components
- E. Recommended Design Pattern

3. Dialog Boxes

- A. Compare and Contrast with Windows
- B. `javax.swing.JOptionPane`
- C. Confirmation Dialog
- D. Input Dialog
- E. Message Dialog
- F. Option Dialog

4. Top Level Containers

- A. `javax.swing.JWindow`
- B. `javax.swing.JFrame`
- C. Visibility: `show` and `hide`
- D. Size: `isResizable()` and `.setResizable()`
- E. Shutdown: `setDefaultCloseOperation`
- F. Coordinates: `setLocation`, `setSize`, and `pack`
- G. Subordinates: `setContentPane`

5. Intermediate Panels

- A. `javax.swing.JPanel`
- B. Loading: `add`

- C. Placement: `setLayoutManager`
- 6. Adding Components to Panels
 - A. Determine Application: Class or Local?
 - B. Design Visual Characteristics
 - C. Construct Component
 - D. Add Component
 - E. Add Event Listener
- 7. Component Placement
 - A. Panel, Layout Manager, and Component Interactions
 - B. Flow Layout
 - C. Grid Layout
 - D. Border Layout
 - E. GridBag Layout, Coordinates, and Constraints
- 8. Events and Listeners
 - A. Events
 - B. Listeners
 - C. Importing and Defining Interfaces
 - D. Container, Component, Event, Listener Interactions
 - E. `extends` VS. `implements`
 - F. Action Events
 - G. Adjustment Events
 - H. Item Events
 - I. Mouse Events
 - J. Other Events
- 9. Responding to Button Clicks
 - A. Action Events Defined
 - B. `java.awt.ActionEvent`
 - C. `java.awt.ActionListener`
 - D. `ActionListener.actionPerformed(ActionEvent)`
 - E. Widening to Object with `getSource`
 - F. Decoding Which Button Via `if`
- 10. Interacting With Screen Widgets
 - A. Item Event Defined
 - B. Adjustment Event Defined
 - C. `AdjustmentEvent` and `AdjustmentListener`
 - D. `ItemEvent` and `ItemListener`
 - E. `.adjustmentValueChanged(AdjustmentEvent)`
 - F. `.itemStateChanged(ItemEvent)`
- 11. Lab Exercises
 - A. GUI Hello, World
 - B. Icon Buttons
 - C. Tool Bars
 - D. Grid Bag Layout
 - E. Button Clicks

- F. Adjustment Events
- G. Vacation Daydreaming

Topic 3: JDBC and SQL

1. Database Manager Concepts
 - A. Primary vs. Secondary Storage
 - B. File Systems
 - C. Data Bank Concept
 - D. Hierarchical and Set Based Traversal
 - E. Beginnings of Relational Theory
2. The Relational Database Model
 - A. Set Theory Fundamentals
 - B. Original Definition of a Relation
 - C. Refined Definition
 - D. Mappings Between Relational Databases and File Systems
3. Column and Table Design
 - A. Streams vs. Tables
 - B. Normal Forms
 - C. Column Names and Types
 - D. Primary Keys
 - E. Key Design Pitfalls
4. Data Definition Language Statements
 - A. Database Schema Defined
 - B. Database Commands:
 - i. CREATE DATABASE
 - ii. SHOW DATABASES
 - iii. USE
 - iv. SHOW TABLES
 - v. DROP DATABASE
 - C. Data Types:
 - i. INTEGER
 - ii. DOUBLE
 - iii. VARCHAR
 - iv. NOT NULL
 - D. Table Commands:
 - i. CREATE TABLE
 - ii. ALTER TABLE ADD
 - iii. ALTER TABLE MODIFY
 - iv. DESCRIBE
5. Data Manipulation Language Statements
 - A. Literals and Arithmetic Expressions
 - B. Relational Expressions
 - C. Common Functions:
 - i. COUNT()

- ii. AVG()
 - iii. MIN(), MAX()
 - iv. SUM()
 - D. Querying with the SELECT statement
 - i. Expression Evaluation
 - ii. Unconditional
 - iii. Conditions with WHERE
 - iv. Multiple tables
 - v. ORDER BY
 - E. Adding new rows with the INSERT INTO statement
 - i. SET clause
 - ii. VALUES clause
 - F. Modifying existing rows with the UPDATE SET WHERE statement
 - G. Removing rows with the DELETE FROM WHERE statement
 - H. Combined INSERT and UPDATE: REPLACE INTO SET WHERE statement
6. Java Database Interface Architectures
- A. Direct JDBC Driver
 - B. JDBC-ODBC Bridge
 - C. Installing a JDBC Driver
 - D. Installing ODBC if Necessary
7. JDBC Programming Practice
- A. Objects Involved
 - B. Driver Management
 - C. Creating a Connection
 - D. Generating an SQL Statement
 - E. Retrieving a Result Set
8. Lab Exercises
- A. Introduction to SQL
 - B. Command Line Client
 - C. GUI Query
 - D. Hell Hath No Fury...

Topic 3.5: Advanced Topics

1. Console Input and Output
- A. Streams
 - B. Console Error, Input, and Output: `System.(err|in|out)`
 - C. Tokenization: `java.io.StreamTokenizer`
 - D. Character, Number, and String Tokens
 - E. Reading and Writing Files
 - F. File Streams
 - G. Buffered Streams
 - H. Data Streams
 - I. Readers and Writers
 - J. All Together Now

2. Mouse Mangement

- A. Mouse Events Defined
- B. `.mouseClicked(MouseEvent)`
- C. `...Entered`, `...Exited`, `...Pressed`, and `Released`
- D. `MouseEvent.getClickCount` and `.getPoint`
- E. Just Need One?

3. Two Dimensional Graphics

- A. Java Graphics Packages
- B. Extending a Panel
- C. Display, Panel, Graphics Interactions
- D. Setting Background and Foreground Colors
- E. Graphics Primitives: Lines, Boxes, Rectangles

4. Lab Exercises

- A. Son of Calculator
- B. 2D Color Bars

Questions? Send them to [Jason Kazarian](#).