

Java Fundamentals GWE10800 (5 days)

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5 Days

Course Description:

Intensive and hands-on, the course emphasizes becoming productive quickly as a Java application developer. This course quickly covers the Java 5.0 language syntax and then moves into the object-oriented features of the language. Students will then use several of the provided API packages, such as I/O streams, collections, Swing GUI programming, threads, and accessing a database with JDBC. The course ends with a chapter on performance tuning with hints and best practices for writing efficient applications. Appendices on sockets, regular expressions and J2EE are also available for further study.

Audience: Programmers moving to object-oriented programming using Java.

Prerequisites

Professional programming experience in C, C++ or C# is helpful. Knowledge of Object-Oriented concepts is helpful.

Course Outline:

GETTING STARTED WITH J2SE

- What is Java?
- How to Get Java
- A First Java Program
- Compiling and Interpreting Applications
- The JDK Directory Structure

LANGUAGE FUNDAMENTALS

- A Java Program
- If Statements
- Switch Statements
- Loop Statements
- Syntax Details
- Primitive Datatypes
- Variables
- Expressions in Java
- Strings
- Arrays
- Enhanced for Loop

OBJECTS AND CLASSES

- Defining a Class
- Creating an Object
- Instance Data and Class Data
- Methods
- Constructors
- Access Modifiers
- Encapsulation

USING JAVA OBJECTS

- Printing to the Console
- printf Format Strings
- StringBuilder and StringBuffer
- Methods and Messages
- toString
- Parameter Passing
- Comparing and Identifying Objects
- Destroying Objects
- Using the Primitive-Type Wrapper Classes
- Autoboxing

INHERITANCE IN JAVA

- Inheritance
- Inheritance in Java
- Casting
- Method Overriding
- Polymorphism
- super
- The Object Class

ADVANCED INHERITANCE AND LANGUAGE CONSTRUCTS

- Enumerated Types - Pre-Java 5.0
- Enumerated Types Today
- More Enumerated Types
- Abstract Classes
- Interfaces
- Using Interfaces
- Comparable
- Collections
- Generics

PACKAGES

- Packages
- The import Statement
- Static Imports

- CLASSPATH and Import
- Defining Packages
- Package Scope

EXCEPTION HANDLING

- Exceptions Overview
- Catching Exceptions
- The finally Block
- Exception Methods
- Declaring Exceptions
- Defining and Throwing Exceptions
- Errors and RuntimeExceptions
- Assertions

INPUT/OUTPUT STREAMS

- Overview of Streams
- Bytes vs. Characters
- Converting Byte Streams to Character Streams
- File Object
- Binary Input and Output
- PrintWriter Class
- Reading and Writing Objects
- Basic and Filtered Streams

CORE COLLECTION CLASSES

- The Collections Framework
- The Set Interface
- Set Implementation Classes
- The List Interface
- List Implementation Classes
- The Queue Interface
- Queue Implementation Classes
- The Map Interface
- Map Implementation Classes

COLLECTION SORTING AND TUNING

- Using Java 5.0 Features with Collections
- Sorting with Comparable
- Sorting with Comparator
- Sorting Lists and Arrays
- Collections Utility Methods
- Tuning ArrayList
- Tuning HashMap and HashSet

INNER CLASSES

- Inner Classes
- Member Classes
- Local Classes
- Anonymous Classes
- Instance Initializers
- Static Nested Classes

INTRODUCTION TO SWING

- AWT and Swing
- Displaying a Window
- GUI Programming in Java
- Handling Events
- Arranging Components
- A Scrollable Component
- Configuring Components
- Menus
- Using the JFileChooser

SWING EVENTS AND LAYOUT MANAGERS

- The Java Event Delegation Model
- Action Events
- List Selection Events
- Mouse Events
- Layout Managers
- BorderLayout
- FlowLayout
- GridLayout
- BoxLayout
- Box
- JtabbedPane

INTRODUCTION TO JDBC

- The JDBC Connectivity Model
- Database Programming
- Connecting to the Database
- Creating a SQL Query
- Getting the Results
- Updating Database Data
- Finishing Up

JDBC SQL PROGRAMMING

- Error Checking and the SQLException Class
- The SQLWarning Class

- JDBC Types
- Executing SQL Queries
- ResultSetMetaData
- Executing SQL Updates
- Using a PreparedStatement
- Parameterized Statements
- Stored Procedures
- Transaction Management

INTRODUCTION TO THREADS

- Non-Threaded Applications
- Threaded Applications
- Creating Threads
- Thread States
- Runnable Threads
- Coordinating Threads
- Interrupting Threads
- Runnable Interface
- ThreadGroups

THREAD SYNCHRONIZATION AND CONCURRENCY

- Race Conditions
- Synchronized Methods
- Deadlocks
- Synchronized Blocks
- Thread Communication — wait()
- Thread Communication — notify()
- Java 5.0 Concurrency Improvements
- Thread-Aware Collections
- Executor
- Callable

JAVA PERFORMANCE TUNING

- Is Java Slow?
- Don't Optimize Until You Profile
- HotSpot Virtual Machine
- Garbage Collection Concepts
- Garbage Collection Generations
- Garbage Collection in Java 5.0
- Object Creation
- String, StringBuffer, and StringBuilder
- Synchronized
- Inline methods
- Tuning Collections

APPENDIX A - NETWORKING WITH SOCKETS

- Clients and Servers
- Ports, Addresses, and Protocols
- The Socket Class
- Communication Using I/O
- Servers
- The ServerSocket Class
- Concurrent Servers
- The URL Class
- The URLConnection Class

APPENDIX B – REGULAR EXPRESSIONS

- Pattern Matching and Regular Expressions
- Regular Expressions in Java
- Regular Expression Syntax
- Special Characters
- Quantifiers
- Assertions
- The Pattern Class
- The Matcher Class
- Capturing Groups

APPENDIX C - J2EE OVERVIEW

- Introduction to J2EE
- J2SE Building Blocks
- Servlets, JSPs, and Web Applications
- Web Services
- Enterprise JavaBeans
- Additional J2EE APIs
- J2EE Clients
- The J2EE Platform