

Java Programming Using IBM Rational Application Developer 7.0 (5 Days)

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Java Programming Using IBM Rational Application Developer 7.0 (CTI 288)

Students will learn how to use IBM's Rational Application Developer (RAD) 7.0 programming environment to create, test and debug programs using the powerful, multi-threaded Java programming language.

Prerequisites: *Prior programming background in a structured programming language. Prior experience with object-oriented programming concepts will be extremely helpful.*

Minimum software requirements: *Windows XP SP 2 or later; or current release of Linux; or Mac OS X 10.5 or later. IBM Rational Application Developer 7.0. Java Software Development Kit (JDK) 5.0 or later.*

Minimum hardware requirements: *PC at 1 GHz with 1 GB of RAM and 30 GB of free hard disk space before installation.*

Microsoft PowerPoint and Internet connection *installed on instructor's workstation for presentation purposes.*

Module 1: Object Technology Basics

- Objects in the Real World
- Attributes of an Object
- Behavior of an Object
- Identity of an Object
- What We Can Do with Real World Objects
- What is an Object in Programming World?
- Examples of Objects
- State of an Object
- Behavior/Functions of an Object
- Data and Function Encapsulation
- Concept of Data Types
- Classes and Interfaces
- Create Objects from Data Types
- Operate an Object to Perform a Task
- Unified Modeling Language (UML)

Module 2: Object Oriented Programming Basics

- Types of Programming Languages
- Object Based Programming
- Object Oriented Programming
- Encapsulation
- Inheritance
- Super Types and Sub Types
- UML Representation of Inheritance
- Aggregation
- Composition
- UML Representation of Aggregation
- UML Representation of Composition

Module 3: Java Programming Basics

- What is Java?
- Java Development Kit (JDK)
- Java 2 API
- Java Compilation Model
- Java Runtime Environment (JRE)
- Types of Java Programs

Module 4: Java Language Fundamentals

- Lexical Structure
- Variables in Java
- Primitive or Build-In Data Types
- Primitive Variables
- Primitive Type Conversion
- Object Data Types
- Object Variables
- Operators
- Expressions
- Strings
- Program Flow Control - if, if/else, for, while, do/while
- Arrays
- Arrays of Objects
- Multithreading
- Garbage Collection

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Module 5: Classes and Objects

- Structure of a Class
- Instance Variables
- Instance Methods
- Class Variables
- Class Methods
- Constructor Methods
- Java Class Syntax
- Naming Conventions
- Creating Objects from Classes
- Method Overloading
- Constructor Overloading

Module 6: Inheritance and Aggregation

- Concept of Inheritance Revisited
- Java Syntax for Class Inheritance
- Inheriting `java.lang.Object`
- Method Overriding
- Typical Methods You Want to Override
(Inherited from `Object`)
- Implementing Aggregation in Java

Module 7: Abstract Classes, Interfaces and Polymorphism

- What is a Concrete Class?
- What is an Abstract Class?
- Example of an Abstract Class
- What is an Interface?
- Defining a Java Interface
- Writing an Implementation Class for the
Interface
- Polymorphism
- Illustration of Polymorphism in Java
- Type Casting
- Upcasting
- Downcasting

Module 8: Access Control and Modifiers

- Concept of Packages in Java
- How to Create a Package
- Importing Packages
- CLASSPATH Setting
- Visibility (Access Control) Modifiers
- Class Modifiers
- Field Modifiers
- Method Modifiers
- Constructor Modifiers
- Access Control Illustration

Module 9: Exception Handling

- Error Handling Overview
- Error Handling in Java
- Errors
- Exceptions
- `try-catch` Mechanism
- `try-catch-finally` Mechanism
- Multiple Catch Blocks
- Using the Keywords `throw` and
`throws`
- Passing the Responsibility to the Caller
- Defining Custom Exceptions

Module 10: Using Java 2 API - Basics and I/O

- `java.lang` Package:
 - Wrapper Classes
 - `Thread` Class
 - `String` Class
 - `StringBuffer` Class
 - `Math` Class
- `java.io` Package:
 - Input and Output Streams
 - Input and Output Readers
 - Reading from Keyboard
 - Reading from File
 - Writing to a File

Module 11: Java Database Connectivity

- JDBC Architecture
- JDBC Drivers
- `java.sql` Package:
 - `DriverManager`
 - `Connection`
 - `Statement`
 - `ResultSet`
- `javax.sql` Package
- JDBC Application Development

Module 12: Multithreading Basics

- Multithreading in Java
- The `java.lang.Runnable` Interface
- The `java.lang.Thread` Class
- Creating and Running a Thread
- Thread Synchronization