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## Java™ for Programmers Course Outline

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### Section 1: Java™ Overview

- A Brief Description of Java™
- Benefits of Java™
- Object-Oriented Programming
- The Java™ Virtual Machine
- Platform Independence
- Security
- Performance
- Java™ 2 Software Development Kit (SDK)
  - Downloading and Installing the Java™ 2 Software Development Kit
  - Setting Up Your Environment
- Hello World
- The main() Method
- Comments

### Section 2: Java™ Basics

- Data Types
  - The Primitive Types
  - The Unicode Character Set
- Identifiers and Variables
- Keywords
- Declaring Variables
- Local Variable Initialization
- Strings
- Statements
- Operators
  - The Arithmetic Operators
  - The Comparison Operators
  - The Logical Operators
  - The Bitwise Operators
- Expression Evaluation
- Operator Precedence
- Associativity and Explicit Grouping
- Blocks
- Scope
  - Nested Blocks and Scopes
  - Variable Naming

### Section 3: Objects and Classes

- The Object Model
- Type
- Object References
- Advantages of Object-Oriented Programming
- Classes and Class Definitions
- Primitives and Memory Allocation
- Primitives and Wrapper Classes
- Assignment
- Object Comparison
- null
- Instance Variables
- Behavior and Methods
- Method Arguments
- Invoking Methods
- Setting Instance Data with Methods
- Method Return Values
- Local Variables
- The this Variable and Instance Data
- Variable Scope and Lifetime
- Encapsulation
- Access Control Modifiers
- Method Overloading

### Section 4: Flow of Control

- Program Execution Sequence in Java
- if-else Statement
- switch Statement
- do-while Statement
- for Statement
- break Statement
- continue Statement

### Section 5: Classes, Strings, and Arrays

- Constructors
- No-Argument Constructor
- Object Initialization
- Calling One Constructor from Another
- Arrays
- Accessing Array Elements
- Array Length
- Arrays of Class Types, Arrays of Arrays
- Class String
- Using Strings
- Static Data Members
- Accessing Static Data Members
- Static Methods
- Invoking Static Methods
- Accessing Data in Static Methods
- Final Variables

### Section 6: Packages and Access Protection

- Packages
- Accessing Package Members
- Fully Qualified Names
- Importing a Single Package Member
- Importing a Complete Package
- Creating Packages
- Package Scope
- The Default Package
- Standard Imports
- Naming Conventions
- Resolving Naming Conflicts
- Access Control for Classes
- Access Control for Class Members
- CLASSPATH

### Section 7: Inheritance

- Characteristics of Inheritance
- The extends Keyword
- Inheriting Superclass Data Members
- Inheriting Superclass Member and Methods
- The super Keyword
- Shadowing Superclass Data Members
- Constructors and Inheritance
- Final Classes
- protected Access
- Overriding Superclass Methods
- Polymorphism
- Method Signatures and Overriding
- Access Control and Overriding
- Private Methods and Overriding
- Class Object
- Automatic Storage Management
- Inheritance and Casting
- Abstract Classes

### Section 8: Interfaces

- Interface Types
- Interface Definitions
- Method Declarations
- Data Members in Interfaces
- The implements Keyword
- Implementing Multiple Interfaces
- Extending Interfaces
- Example of Using Interface Types

### Section 9: Exceptions

- Overview of Exceptions
- Class Throwable
- Class Exception
- Handling Exceptions with try and catch
- Exceptions and Program Flow
- Throwing Exceptions
- User-Defined Exceptions
- Multiple catch Clauses
- finally Clause
- More on Program Flow
- Declaring Exceptions That a Method Throws
- When to Declare Exceptions
- Required Exception Declarations
- Checked Exceptions

### Section 10: Streams

- Overview of Streams
- Character Streams
- Class Reader
- Class Writer
- Common Reader and Writer Subclasses
- Using Readers and Writers
- Filter Streams
- Filtering Example
- Using Filters
- 1.0 Byte Stream Classes
- Common Byte Stream Classes
- Converting Between Byte and Character Streams
- API Overview
- The File Class
- Path Separators

### Section 11: Multi-threading

- Overview of Multi-threading in Java
- Why Threads?
- Single- vs. Multi-threaded Program Flow
- The Thread Class
- Creating Threads
- The Runnable Interface
- A Simple Example
- Methods of the Thread Class
- Controlling Thread Execution
- Thread Scheduling
- Preemptive vs. Cooperative Multi-threading
- The yield() Method
- Costs of Multi-threading
- Synchronization
- The synchronized Keyword